AN INVESTIGATION OF DEVELOPING TEACHERS’ UNDERSTANDING OF USING DIALOGIC APPROACH IN SAUDI PRIMARY MATHEMATICS CLASSROOMS

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SCHOOL OF ENVIRONMENT, EDUCATION AND DEVELOPMENT
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<tr>
<td>CoP</td>
<td>Community of Practice</td>
</tr>
<tr>
<td>CoI</td>
<td>Community of Inquiry</td>
</tr>
<tr>
<td>PLC</td>
<td>Professional Learning Community</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>TIMMS</td>
<td>Trends in International Mathematics and Science Study</td>
</tr>
<tr>
<td>NCTM</td>
<td>National Council of Teachers of Mathematics</td>
</tr>
<tr>
<td>TDP</td>
<td>Teacher Development Programme</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuous Professional Development</td>
</tr>
<tr>
<td>KACND</td>
<td>King Abdul-Aziz Centre for National Dialogue</td>
</tr>
<tr>
<td>GCC</td>
<td>Gulf Cooperation Council</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
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<td>DVC</td>
<td>Dialogic Video Cycle</td>
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ABSTRACT

This study investigates how Saudi mathematics teachers develop their understanding of classroom dialogue through a ‘reform orientated’ professional development programme modelled as a Community of Practice (Wenger 1998). It hypothesizes that Saudi Arabia provides an interesting context for research on teachers’ professional development due to the recent introduction of a ‘reform orientated’ primary mathematics curriculum which emphasizes a more active, dialogic role for students. This contrasts with the teacher-dominated, transmissionist pedagogy, which is widely recognized to be dominant in Saudi classrooms, thus creating a contradictory and conflicted context in which to conduct research on professional development.

Therefore, this thesis reports on an evaluative case study of the aforementioned teacher professional development programme (TDP) which I instigated over 10 weeks in Saudi school based in Tabuk, North West SA. This TDP operated a cyclical design whereby discussion workshops reflected on video episodes of the teachers’ classroom practice, which then produced new teaching strategies to try out in practice and then reflect on in future workshops. The purpose of researching this TDP is to establish how a community of practice on professional learning can be made to work in the SA context and the associated impact on teachers’ identity development.

The findings highlight how teacher development, as an issue of ‘practice-and-identity’ (Wenger 1998), occurred through the teachers’ and my own participation in the TDP, which enabled their development of new meanings and teaching strategies for developing the quality of dialogue in their classrooms. The findings also highlight how the ‘landscape of practice’ in which the TDP was situated generated meanings and contradictions which were negotiated by the teachers and myself as the workshops progressed. Such meanings were also important in mediating the teachers’ developing identity as teachers but also in other domains of their life (e.g. as parents). The study concludes that the contradictions embedded in the SA context offer potential developmentally, in that they appear to motivate professional development (rather than hinder it). This makes a useful additional to the international literature in this field which is dominated by research situated in western contexts.
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Through my four years of Ph.D. study, which included many beautiful as well as sad moments, my wife and my love, Fatemah, was beside me, supporting and sacrificing her time and sometimes her happiness for this journey. I find myself intimidated by her brilliance and remiss in every word of thanks to her. Here, I offer you modest thanks, Fatemah, and perhaps our happiness. At the end of this doctoral journey, we were blessed by our child, Wael, who, despite his health problems, has brought joy to our lives. With Allah’s generosity, we made it through all our struggles. Thank you, my dear son and Fatemah, for supporting me from the beginning to the end of this journey.

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1.1 Introduction

This thesis presents an account of a Teacher Development Programme (TDP), which I instigated, along with three primary mathematics teachers in a primary school in Saudi Arabia (SA). In recent times, a ‘reform orientated’ mathematics curriculum has been implemented in SA with a strong emphasis on promoting high quality classroom dialogue. Therefore, the TDP focused on developing teachers’ practice in relation to their use of dialogue as a tool for learning. For this thesis, I have researched the development of this TDP as an ‘evaluation case study’ (following Bassey 1999) to establish whether and how it supported professional development in the SA context.

In this chapter, I present an overview of the thesis explaining how the research topic was developed, my motivations for conducting research on professional development in Saudi Arabia (SA) and why research on this topic is significant in this context. I also present some detail on the structure of the thesis, which advises on how it should be read. Here, I argue that each chapter needs to be read as part of an overall developing argument which firstly, demonstrates the need for the research, then addresses how the research was done and how the data were analysed, and finally, presents the findings which highlight the complexity of the teacher development process in SA. Therefore, the purpose of this chapter is to orientate the reader in terms of locating the research problem and how it has been addressed which then further supports my argument regarding the contribution to knowledge outlined in Chapter 10.

1.2 Background to this Study

There is no doubt that improving students’ learning is a fundamental aim for schools across the world, and teachers are responsible for achieving this through their teaching practices. The improvement of teaching practices is difficult for teachers when there is a lack of support or guidance (Putnam & Borko, 1997; Borko 2004). Therefore, teachers’ professional development is important, both throughout their initial training, when they begin to have real experience inside classrooms, as well as throughout the duration of their careers.
Many questions have been raised regarding optimal conditions for professional development in terms of developing a teacher’s understanding of their practice, and how this understanding develops over time. For example, participating in professional learning communities is a dominant theme in the research literature since these offer space for teachers’ learning, e.g. communities of practice (Wenger, 1998; Franke & Kazemi, 2001; Cobb, McClain, Lamberg & Dean, 2003) or communities of inquiry (Jaworski, 2006; Potari, Sakonidis, Chatzigoula & Manaridis, 2010). Moreover, the principle of observing other teachers or themselves, and accordingly reflecting on practice, has led to a whole range of professional development initiatives and models, such as video clubs (van Es & Sherin, 2002, 2008; Star & Strickland, 2008) and lesson study (Lewis et al., 2006; Lewis, 2009). In Chapter 3, I argue that the research literature positions these optimal conditions as models for professional development and that from these models, we can identify different components of the processes by which teacher development occurs. For instance, the use of videoed practice (e.g. in Video clubs) can bring teachers’ beliefs and their practice into dialogue which then enables reflection and where appropriate a change in practice. However, much of this research on teacher development has been conducted in the US/UK/Europe and, as I will argue throughout this thesis, the existing literature on teacher development in SA (and other non-western contexts) is weak. This is significant given we know that the cultural context of teaching is important in shaping the processes by which teacher development occurs. Therefore, I argue there is a need to better understand how professional development might occur in non-Western contexts and that by doing so, one can make a substantial contribution to the research literature in this field.

This study has adopted Communities of Practice theory to understand teachers’ professional development as situated in the SA context. It is based on a substantial body of research which suggests this theory is useful both in implementing professional development and explaining how teachers’ active collaboration and reflection on classroom practice can bring about change (Lotter, Yow & Peters, 2014, Hodges & Cady, 2013). Different studies in Mathematics education have shown positive outcomes for cultivating communities of practice to facilitate teachers in improving their abilities (Cobb, McClain, Lamberg, and Dean, 2003, Lotter, Yow & Peters, 2014; Graven, 2004), as well as in forming their professional identities (Pausigere & Graven, 2013). However, in the context of the current study, the 8th Conference of Arab Ministers of Education (2012) only recently recommended enabling teachers to actively participate in processes of professional development. This indicates the limited role teachers have previously
played in their own professional learning in SA with much professional development involving one off workshops where an ‘expert’ (usually someone from the MoE ) delivers knowledge to the attending teachers —a factor which proved to be challenging in conducting the TDP which forms the ‘case’ for this research. Therefore, this study has used CoP theory in two ways: i) as motivation for a programme of professional development which involved more active participation from teachers than is typically the case in SA and ii) to build an analytical framework to examine how this programme might support teachers’ professional learning and to understand the challenges involved. Essentially, this theory views learning (professional) as a process of ‘practice-and-identity’ and therefore, I aim to examine in this thesis if and how a particular group of teachers and myself (who formed the TDP) engaged in a professional development ‘community of practice’ and how this mediated the kinds of identity development hypothesised by CoP theory.

As outlined above, the TDP which forms the ‘case’ for this research is focused on developing the quality of dialogue in teachers’ classrooms as schools in SA are currently instructed to implement a ‘reform orientated’ curriculum (based on ‘reform’ teaching in the US) which emphasises teacher-student dialogue. This draws on research on mathematical discourse and on NCTM standards which suggest that students’ participation in meaningful mathematical discourse provides opportunities for developing understanding (Hiebert & Carpenter, 1992; Wood et al., 1991; Yackel & Cobb, 1996; Sfard & Kieran, 2001; NCTM, 1991, 2000). Therefore, improving the quality of dialogue in their classrooms is a key issue facing Saudi teachers as they implement this curriculum. In this particular TDP, I aimed to support such development drawing on my knowledge of the research literature in this area (e.g. dialogic teaching (Alexander, 2006, 2008)). However, although developing ‘practice’ using classroom dialogue was the focus of the TDP, it is not the focus of this research; rather, the focus is directed towards how teachers’ reflections on the quality of talk and dialogue in their classroom develop through the TDP as a form of professional development.

1.2 Researcher Biography

I would like to start with a story that has motivated me, as a Mathematics educator, and driven my interest in researching the teaching and learning of mathematics, more generally. This story is about my mother who, did not attend school, and therefore is uneducated. When she was around 6–9 years old, my grandfather bought coffee and
cardamom, and my mother was responsible for selling it to their neighbours. She used a small cup as a measurement tool for the coffee, where each cup was equal to 5 Riyals in value. One day, a man came to her to buy some coffee and cardamom; he bought a lot, and paid my mother, leaving with only one 50 Riyal note left. My mother calculated the amount of coffee she had sold, and discovered that there had been a mistake with the calculation. She ran behind the man who was riding a camel, shouting for him to stop. She then told him about the mistake, and he recognised that he still owned my mother 30 Riyals, and said to my mother, ‘But we have a problem as I only have one note of 50 riyals and no more change’. My mother replied, ‘I know that, so I brought 2 cups of coffee and another 2 cups of cardamom, which equal 20 riyals so you can give me the 50 Riyals’. The man laughed and said ‘no one thinks as you do, little girl’.

My argument here is that this story is an important example of the need to be proficient in mental calculation and problem-solving. During the last 20 years of my life, I have seen how my mother, who works as a tailor, sells different things; using a wealth of good mental calculation and arithmetic. Therefore, I became motivated to examine how Mathematics is important in real life, which has eventually led me to become interested in teaching and learning mathematics. This is what initially motivated me to become a Mathematics teacher.

I first became more interested in Mathematics education and teacher development in the final year (2003) of my Bachelor’s degree. Here, I undertook a Mathematics Teaching Methods Module, led by a lecturer who had studied in the USA. This module focused on how teaching strategies can support understanding of mathematical concepts through using manipulatives. In my experience of practice as a trainee teacher, I had extensive work and meetings with this lecturer about the teaching and learning of Mathematics in primary schools. Through this and my subsequent experience as a primary Mathematics teacher, I have come to recognise how Saudi students experience difficulties in learning Mathematics, particularly in classrooms dominated by traditional teacher-led practices. It was this experience that led me to become a lecturer (teacher educator) in the curriculum and instruction department, in the School of Education at Tabouk Teachers’ College.

In 2008, I completed my Master’s degree in Mathematics Education at the University of Leeds. My dissertation focused on the common mistakes and misconceptions of multiplication and division amongst fifth-grade students in Tabuk (Muzil, 2008). This provided experience in conducting qualitative research via interviews with children.
regarding the challenges they experienced with using multiplication and division concepts. This experience plus advice from my supervisor led me to think about using qualitative methods to explore teacher development in SA, since many studies focus on quantitative analyses of survey data (See chapter 2 for more detail).

Moreover, after completing my Masters, I worked as a Lecturer at Tabuk University in the Department of Curriculum and Teaching Methods, between 2009 and 2011 as a teacher educator. During these three years, I noticed that many teachers were struggling to implement the new ‘reform orientated’ curriculum and this led me to develop the topic for my doctoral study. During this period, I made many visits to the classrooms of different pre-service teachers to observe their Mathematics teaching practice and this reaffirmed my decision to utilise school-based research. Therefore, I decided to focus on developing and then researching a programme of professional development, which would focus on the new ‘reform’ curriculum for teachers already in-service. I chose to focus on ‘in-service’ professional learning (rather than initial teacher education) as I felt this would be the most challenging, yet interesting to research due to the conflict between the new ‘reform’ approach and the traditional, teacher-dominated approach which is prevalent in many Saudi classrooms (see Chapter 2).

1.3 Statement of the Research Problem

Whilst working with new Mathematics teachers during their early practicum, I recognised the real difficulties experienced by both pre-service and in-service Mathematics teachers as they attempted to implement the new ‘reform orientated’ mathematics curriculum. This new reform curriculum has been implemented through a series of textbooks - translated editions of the Math Connects series, which parallels the standards in the United States (National Council of Teachers of Mathematics [NCTM], 1991, 2000), (to be discussed in greater detail in Chapter 2). The new Mathematics curriculum encourages students’ learning through an approach where dialogue, critical thinking and problem-solving are central. However, through my classroom experience, I recognised that many students were not active, and had limited participation in classroom interaction. Moreover, most teachers had not been offered sufficient training in the form of professional development which might help them understand the intended pedagogic meanings which underpin the textbook’s tasks. As a consequence, I noticed that many Saudi Mathematics teachers paid attention to progressing their students through the textbook’s exercises without offering them opportunities for dialogue, even with the new textbook.
Therefore, I argue that the implementation of this new ‘reform’ curriculum has created challenges and difficulties for many primary mathematics teachers in SA; some of which are evidenced in the research that has been conducted in this context. For example, some have highlighted problems with Mathematics teachers’ beliefs concerning Mathematics and how Mathematics should be taught (AlSalouli & BenMotreb, 2006; Al-Tayar, 2011). Others have indicated various concerns with teachers’ professional development in SA, such as not meeting the actual needs of teachers (Minawi, 2011; Heba et al., 2014; Mansour et al., 2014), insufficient time (Haroun et al., 2015; Heba et al., 2014), and the lack of support offered by academic facilitators or trainers from universities (Minawi, 2011). Nevertheless, the majority of this pre-existing work is based on questionnaire and interview data which demonstrates how the research in this context lacks depth in how it investigates teacher professional development.

To summarise, this research seeks to establish, through an evaluation case study, how a Teacher Professional Development Programme (TDP) can support teacher development regarding the use of dialogue with students - a key practice of the ‘reform approach’ which underpins the Saudi mathematics curriculum. Furthermore, by using Communities of Practice theory, it aims to examine whether professional learning occurs in the way this theory hypothesises and how this might be explained as a process of teacher identity development (i.e. in relation to the three teachers involved in the TDP). Therefore, this research has important implications in terms of using CoP theory as a model for professional development in non-western contexts.

To the best of my knowledge, in the Saudi context, there are presently no studies using CoP theory in relation to teachers’ professional development, particularly in relation to the ‘reform mathematics’ curriculum. This study therefore, addresses a gap in the field by establishing how a professional development can be ‘made to work’ in this context and what is required to do so. In the next two chapters, I will provide more information regarding the SA context and the implications for teacher development research in order to further explain this gap.

### 1.4 Research Questions

Having outlined the main problem to be addressed by this research, I now present the study’s main research questions, which are as follows:
1. How can a ‘Maths reform-based’ professional development programme bring about professional learning and identity development in the context of Saudi Arabia?

2. What are the affordances and obstacles facing professional learning on classroom discourse in the Saudi Arabian ‘reform-orientated’ primary Mathematics context?

It is my intention to use these questions to direct my discussion of the research throughout this thesis, however, given the use of CoP theory as an analytical tool – I have re-defined these questions in theoretical terms in Chapter 5 in order to discuss the research findings using this theory in Chapters 6-10.

1.5 Thesis Structure

This thesis is structured in order to develop my argument regarding the main contribution to knowledge outlined in the final chapter. In the current chapter, I have introduced the focus of the research and the rationale for investigating this topic in terms of the gap in the literature that it addresses. Chapters 2 and 3 also indicate this gap further. In Chapter 2, I discuss the socio, political, cultural context of this study by providing information pertaining to Saudi society, educational policy, teachers’ professional development as well as giving more detail on the ‘reform approach’ being used for teaching primary mathematics. In this chapter, I will argue that the implementation of this ‘reform’ curriculum potentially creates a contradiction with the teacher-dominated, transmissionist teaching which is typically seen in Saudi classrooms. This makes SA an interesting context in which to research teacher professional development. Chapter 3 provides a literature review which mainly focuses on research on professional development from the ‘reform’ tradition. The purpose of this chapter is to discuss what is already known about teacher development, in order to establish what this study might then offer in terms of an account situated in the SA context. Again I make the case for asking the research questions listed above.

Chapters 4 and 5 in this thesis should be read together as an account of how this research was conducted in terms of data collection and analysis. Chapter 4 presents the research as an ‘evaluation case study’ of an educational practice(s) (i.e. the TDP) following Bassey (1999) which also fits with the epistemological grounding of this study in CoP theory (discussed in Chapter 5). The central phenomena of this case is teachers’ professional development of their practice in using dialogue with students in the classroom and I argue, that CoP theory offers the methodological and theoretical tools to help me explain
the processes by which such development takes place. Chapter 4 also discusses the details of the TDP and its structure, including an explanation of how it was designed drawing on some of the research literature indicated in Chapter 2; in addition to providing detail on how data was collected on the TDP as the ‘case’ for this research. Chapter 5 then presents the theoretical framework for the current research in order to highlight how the concepts derived from CoP theory might be operationalized. Whilst this chapter does aim to establish the rationale for using this theory to understand teacher development, it also provides detail on the analytical concepts used to read the data.

Chapters 6 to 9 present the main findings for this research. In Chapter 6, I present evidence of a community of practice which emerged through the TDP focusing on the three key properties: mutual engagement by participants (including myself), a joint enterprise and a care for a shared repertoire. This chapter highlights how the TDP became supportive of critical reflection and brought about some real changes in the teachers’ practice using dialogue with their students. This chapter therefore, presents a fairly simple authentication of CoP theory. In chapters 7 and 8, I present analysis of two of the three teachers’ identity development which I argue, was mediated through their participation in the CoP established in Chapter 6. I focus on two teachers for reasons of space and because both provide a useful contrast in terms of their trajectory through the TDP. Finally, Chapter 9 builds on the previous three chapters by illustrating how the CoP, which emerged during the TDP, and the teachers’ identity development are mediated by the landscape of practice in which both are situated. Here, I discuss the contradictory nature of this landscape and the significance of my own role as a broker of the research literature on ‘reform teaching’ and classroom dialogue to this TDP. Therefore, this chapter is key to establishing the contribution to knowledge of this thesis, in terms of explaining what needs to be in place in order to conduct professional development in contexts like SA. Chapter 9 also offers a critique of CoP theory by suggesting that other theories, like Bakhtin’s dialogism, are needed if we are to understand how the landscape of practice is made present in a given CoP (such as the workshop discussions which comprised this TDP).

Finally Chapter 10 presents a discussion of the main findings reported in the four analysis chapters in relation to the research questions – i.e. those introduced above and then developed at the end of Chapter 5 (theoretical/analytical framework). It then outlines the contribution to knowledge which I suggest the current research offers, before discussing the wider implications of this research.
To summarise, I suggest this thesis be read as an explanation of how a ‘reform orientated’ teacher development regarding classroom dialogue can be made to work in a complex and contradictory context such as primary mathematics in SA. The purpose is to offer insights in the form of analytical generalisations regarding the processes which underpin such development, that can then be utilised in other contexts.
Chapter 2: Research Context

2.1 Introduction

This chapter explains the education system in Saudi Arabia (from here on, SA) as the research context, and further highlights some recent policy reforms regarding the Mathematics curriculum, schools, and teachers training—all of which have emerged from development projects funded by the Saudi Ministry of Education. The chapter also outlines the situation regarding teachers’ professional development in Saudi, and therefore argues for the urgent need to improve provision in this area. The intention of this chapter is to demonstrate how my own research is situated in an educational context of dramatic change and development, and to highlight this context as offering the potential to explore teachers’ professional development in new ways that are not possible in Western contexts, where much of the professional development literature is situated.

2.2 The Political, Social and Religious Climate of Saudi Arabia

The research outlined in this thesis took place in a school located in the city of Tabuk, which is located northwest of SA and which is recognised as having a diverse population and culture. Such diversity is a reflection of the Saudi state. Sitting on a landmass of more than 2,250,000 km², the Saudi state has a population of 27 million people. The latest data from the Central Department of Statistics and Information indicates that the number of citizens of Saudi origin (i.e. those born in Saudi) has reached approximately 20.7 million people (roughly 67% of the total population), with a further 10.07 million people (representing about 33% of the total population) comprising nationals of other countries who are resident in SA.

Furthermore, SA is a monarchy governed by King Salman bin Abdul Aziz Al Saud, the 6th king of Saudi Arabia. His rule began on January 23, 2015, following the death of King Abdullah bin Abdul Aziz Al Saud, who ruled from 2005 to 2015. The transition to this new monarchy has been widely assumed to have contributed to a loosening up of hierarchical social relations in SA. King Salman governs the country as Prime Minister of the Council of Ministers. Furthermore, there is a Consultative Council, which has 150 members who are selected by the Monarch as a result of their reputation and experience. The role of the Consultative Council is to review the internal and external policies of the country.
SA is situated at the heart of many ancient civilisations, going back hundreds and thousands of years. The most prominent of these civilisations is the Islamic civilisation, which is where the cities of Mecca and Medina are located, representing the headquarters of the Islamic world and history. Policy in SA asserts that all Saudi citizens are Muslims, as the official religion is Islam. The government is based on the principle and laws of Islam in all aspects of their policies (Consultative Council, 2015; Al-Turaiqi, 2008). Arabic is the official language of SA, arguably due to the location of the Kingdom on the Arabian Peninsula—the middle of the Arab world. Therefore, Saudi culture and society is strongly influenced by Islamic and Arabic traditions, which, as I will show below, create an interesting context for this research.

It is widely thought that SA, as a developing country, faces difficulties and challenges as it attempts to implement a modern international development culture within a religious state. Although policy asserts that the Saudi population as a whole follows Islam as one religion and adopts the same language, there are different Islamic scholars’ perspectives and regional cultures that sometimes are brought into tension with one another. Therefore, not only are there potential contradictions between religious states and cultural/political/economic practices designed to facilitate economic development, there also are conflicts between different institutions and regions; together, these make this country an interesting context for research. To address such tensions, the government has established the King Abdul-Aziz Centre for National Dialogue (KACND) with the purpose of ‘creating a new environment which will facilitate dialogue among various sections of the society with the aim of promoting public interest and consolidating national unity based on the Islamic faith’ (KACND, 2015, p. 1). This centre has an annual National Dialogue Forum, which takes place in different cities, with focus on a relevant topic to be discussed, and aims at providing recommendations for all government ministries. KACND has the following aims:

1. To discuss social, cultural, political, economic, educational and other national issues.
2. To encourage members of society and civil society organisations to contribute to and participate in national dialogue.
3. To contribute to the formulation of Islamic discourse based on moderation.
4. To contribute to providing an appropriate environment for the promotion of a culture of dialogue within the society.
5. To create strategic insights for the topics of national dialogue.
Moreover, the changes in SA society described above (beginning with the discovery of oil in 1938) have also created challenges for family relations (Al-Waili, 2011; Al-Khateeb, 1998; Hamdan, 1990). Accordingly, the KACND has carried out a study centred on the reality of inter-family dialogue within Saudi society. The study (KACND, 2011) consisted of 5,000 participants (parents) and children (boys and girls) from different regions of SA. The study showed that 51% of the children prefer to remain silent and not discuss sensitive topics with other family members, whilst 64% of children agree that the mother is the mediator for dialogue, along with the father. These results indicate a weakness in the communication between children and parents, especially with fathers. Therefore, Al-Waili (2010, p. 11) believes that ‘the Saudi family is in dire need of meaningful dialogue methods that enhance the relationship between parents and their children’.

Today’s Saudi families are witnessing rapid development through opening up to social media (Twitter, Facebook, YouTube, WhatsApp, Snapchat, etc.). Like many other countries, there is now a real society (family, school, government bodies) and a virtual society (YouTube channels, Facebook pages, WhatsApp groups), in which society members are living, especially young people. Many of the statistics indicate that the rates of using social media are higher in Saudi society than in many other Arab countries and world states. Through my own observations, I believe that this acceleration during the last 6–8 years has contributed to the evolution of social relations amongst Saudi family members, as well as the significant spread of a culture of dialogue, but this requires further research. However, I argue that schools have not kept pace with this cultural and technological development amongst Saudi families, since they remain sites for traditional teaching methods, which rely on lecturing style, where the teacher plays a dominant role.

Therefore, as a result of the recognition of the need to promote an ‘opening up’ of society, there is an increasing research interest in establishing a culture of dialogue in schools and higher education (Bawazeer, 2010, 2014; Al-Tayar, 2011; Al-Seddiqi 2011). This supports my argument that there are interesting tensions in SA that are likely to impact professional development in interesting ways that need to be explained.
2.3 Education in Saudi Arabia

In SA, public education was established in 1954 by the Ministry of Education (MoE), allowing every Saudi citizen to be afforded the right to education. As in many other institutions, the education system manifests some of the tensions outlined above. Educational policy ‘derives from Islam which is the religion of the nation; its faith, worship, morality, jurisprudence, governance and its total system of life’ (my translation of MoE, 2004, p. 6). This guides much of ‘what can be taught’ to students, but the MoE has also implemented various reforms which are judged to represent a more liberal position based on the key aim: ‘to provide students with the analytical skills they need to make their own decisions, enabling them to become lifelong learners who are capable of contributing to their societies and communities’ (ibid, p. 2).

Therefore, education is viewed both as an important tool for economic development and as social change (G-Mrabet, 2012), but also is responsible for upholding the totality of Islamic beliefs. With this in mind, policy makers have instigated a mix of Western-style teaching and best practices in education in SA and other Arabian Gulf countries so as to help produce a qualitative shift in students’ learning styles (G-Mrabet, 2012). This shift is concerned with steering Saudi students away from rote learning and encouraging them to become self-reliant, independent thinkers (G-Marbet, 2012).

This drive also is motivated by the need to address the poor performance of SA in international league tables: for instance, the Gulf Cooperation Council (GCC) Education Sector report states that ‘international student assessments like the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) have repeatedly ranked public schools operating in the GCC amongst the lowest in the world’ (Ahmad, Vig & Dhirga, 2012, p. 46). The data from TIMSS has generated increasing concern amongst Saudi educators and policymakers regarding the quality of teaching and learning of Mathematics. The table below shows Saudi achievements in TIMSS based on the ISC’s (2004, 2008) reports.

<table>
<thead>
<tr>
<th>Study</th>
<th>Fourth Grade</th>
<th>Eighth Grade</th>
<th>Rank amongst participating countries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>International average</td>
<td>International average</td>
<td>Saudi achievement</td>
</tr>
<tr>
<td>TIMSS 2003</td>
<td>-</td>
<td>467</td>
<td>332</td>
</tr>
</tbody>
</table>
This table demonstrates how Saudi students’ performance is lower than the international average in all TIMSS results. For example, in 2011, the average Mathematics score of Saudi 4th graders (410) was lower than the international TIMSS scale average, which was set at 500. Compared with 2007, the Saudi average Mathematics score at grade 8 in 2011 was 65 score points higher (394 vs. 329).

2.3.1 Saudi Educational Reform

In seeking to address this poor performance, the MoE has focused on teaching methods and strategies, arguing that those typically used within Saudi classrooms too heavily rely on memorisation, and not specifically on developing students’ understandings of the concepts taught. Here, I argue that this practice of memorisation could relate to: 1) a traditional view of teaching and the dominance of teacher-centred approaches without effort to improve it (Educational Research Department, 2014; Alzaghibi & Salamah, 2011); and 2) a historical legacy of religious education where rote learning is important, such as in memorising the Qur’an.

Figure 1.1 below highlights the key projects the SA Ministry of Education have sought to implement as a means of addressing the issues outlined above.
In 2003, the MoE implemented the General Project for Curriculum Development, which was intended to revise the school curriculum wholesale. This general project was based on using educational experts from inside SA; however, in terms of Mathematics and science curricula, it is widely thought that this general project did not significantly improve teaching these subjects, and also did not shift TIMMS results; therefore, in 2008, the Ministry implemented a specific project for both subjects known as the Development of the Mathematics and Science Curricula Project. In this project, the curricula for both subjects were designed by experts from outside SA. Finally, in 2012, the Ministry instigated an entire suite of projects focused on not only subjects’ curricula but also on all other factors related to improving the educational system, such as school improvement and teacher training, etc. The umbrella term for these projects is the King Abdullah bin Abdulaziz Public Education Development Project (alternatively, Tatweer).

### 2.4 The Development of the Mathematics and Science Curricula Project (2008)

The Mathematics and Science Curricula Project (which applies to all school levels) aims at increasing the ability of students in a number of areas, including building new concepts, problem-solving capabilities, engaging in product innovation and development, communication skills, and the capacity to use technology in accordance with international standards. A key focus here is to develop citizens who meet the needs of the developing labour market in Saudi, and accordingly enabling it to compete on a global scale. Here are some of the stated aims of this curriculum project (my translation from Ministry of Education, 2008), which are seen to relate to the focus of this research:
1. To challenge the dominance of indoctrination and the lack of attention in developing cognitive and scientific skills needed by students, the most important of which are analysis, criticism, reasoning, problem-solving, decision-making, and understanding other perspectives.

2. To address poor educational outcomes in science and Mathematics compared with many growing and developed countries.

3. To improve the teaching and learning environment in schools.

4. To enhance the professional qualifications of Mathematics and science teachers.

Here, I argue that the reference to ‘the dominance of indoctrination’ under 1 is a clear attempt at moving the education system, and, more specifically, the teaching of science and Mathematics, beyond a rote-learning pedagogy, which is viewed as dominant. This is an example of the gradual ‘opening up’ of society in SA, as promoted by the new king and policy-makers, as mentioned above. However, it is widely believed that this challenge to indoctrination has brought about tensions between traditional, authority-led cultural and social practices, and the MoE’s own efforts to modernise education in order to further economic development.

### 2.4.1 A New Mathematics Curriculum

As part of the Mathematics and Science Curricula Project, the MoE introduced a series of compulsory textbooks to be taught across all primary levels. These Saudi-developed primary Mathematics textbooks are translated editions of the Math Connects series, which parallels the standards in the United States (National Council of Teachers of Mathematics [NCTM], 1991, 2000). This series is published by Macmillan/McGraw-Hill Education in the United States and is part of the math curriculum based on the NCTM publication ‘A Quest for Coherence’ (NCTM, 2006). This document covers the curriculum focal points, which represent important Mathematics topics for each grade level. According to NCTM (2006), the purpose of this document is to ‘provide one possible response to the question of how to organise curriculum standards within a coherent, focused curriculum by showing how to build on important mathematical content and connections identified for each grade level, pre-K–8’ (p. 3).

According to McGraw-Hill (2012), the Math Connects series was designed ‘to assist today’s teachers with the challenge of helping students become mathematically proficient according to NCTM 2000 standards’ (p. 2). In addition, the goal of creating the Math Connects series was ‘to reflect both the findings from key research on Mathematics
instruction, instructional best practices and curricular focal points’ (p. 2). An example of one such study in the US is Wilson & Kenney’s (2003) research on mathematical proficiency. These authors found that adequate dialogue between teachers and students is important for classroom assessment. Moreover, they emphasised that teachers need to ask higher-level questions, which ‘has not been the norm’ (p. 55, cited in McGraw-Hill, 2012). The Math Connects textbooks include problem-solving lessons that ‘provide the experience students need to develop adaptive reasoning skills and a productive disposition towards Mathematics’ (p. 11). They instruct the teacher to solve a given problem using another approach in every lesson, which, ideally, enables them to open the door for discussion concerning how there are always alternative strategies to solving a problem (p. 27). Therefore, the new Mathematics curriculum adopts a ‘reform’ approach to teaching/learning, where dialogue, critical thinking and problem-solving are central. For instance, these textbooks identify a series of ‘talk tasks’, which are aimed at providing students with the opportunity to explain verbally their understanding and answers. The following table provides examples from these textbooks including the talk task.

**Table 2.1: Examples of the new elements and tasks of new math textbooks**

<table>
<thead>
<tr>
<th>1. The teacher’s guidebook:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Today’s problem:</strong></td>
<td>The idea of this problem is that teachers are encouraged before starting a new lesson to warm up students. The today’s problem is only in the teacher’s guide book and is usually based on previous knowledge learnt and to prepare students for the new lesson. For example, the following picture shows one of today’s problems in original and its translated copy:</td>
</tr>
<tr>
<td><strong>B) Common errors:</strong></td>
<td>One of the new ideas of Mathematics teacher’s guidebook is directing teachers’ awareness towards common errors their students may make. This is to show teachers what to watch out for when students are learning new mathematical concepts and skills. In addition, it includes advice on how teachers should deal with these common errors. The following example shows a common error about writing decimal numbers (fifty and six hundredth) as digits:</td>
</tr>
</tbody>
</table>
2) The student’s textbook:

A) Use of real life examples as tasks:
A significant feature of the new Mathematics textbooks is the introduction of real life examples to contextualise problems. For instance, the first activity of each lesson usually introduces students to a new concept or idea drawing on its use in real life. This is shown by the following example from a lesson on estimating multiplication products:

B) Talk Tasks:
In the new Mathematics textbook, students are encouraged to talk about their answers in terms of how to get it and explain their answer. In addition, they are encouraged to talk about different ways and methods to find solutions. The following examples show some tasks about multiplicative understanding:

Furthermore, Alshayea & Abdulhameed (2011) indicate that the adopted ‘reform-orientated’ Mathematics and science textbooks support inquiry-based learning in that they follow a teaching approach based on the constructivist theory of learning (Alghamdi & AlSalouli, 2013). Such new textbook materials emphasise mathematical thinking and reasoning, conceptual understanding, and problem-solving in realistic contexts developed through activities that place emphasis on student participation in classroom discussion (Alghamdi & AlSalouli, 2013). Therefore, we can argue that the new curriculum instigated via these textbooks requires teachers to implement a more dialogic approach to teaching Mathematics and to moving away from activities that encourage rote learning or memorisation.
The challenge this poses for teachers has been emphasised by Alzaghibi & Salamah (2011), who describe Saudi classrooms as dominated by lecturing, questions that require short responses, and questions that review content as opposed to developing an idea or concept. In SA, students rarely work together in small group situations or talk to one another, even when they are sitting together. This is an important context for the TDP implemented in this project as it aims at exploring how Saudi teachers can improve their practices in terms of initiating and sustaining more dialogue in their classrooms, whether as a whole class or by using group work strategies. In other words, challenging and addressing the traditional pedagogic approach of lecturing is key to the development process that took place in my TDP. Importantly, how this shaped the TDP discussions will be discussed in more detail in later chapters.

It is widely believed that the introduction of this new ‘reform-orientated’ curriculum, through the Maths Connects textbooks, has meant that there now is a need to implement parallel plans of professional development for in-service Mathematics teachers. NCTM (2006) argues that ‘effective instruction built on the curriculum focal points requires in-depth preparation of preservice teachers and ongoing professional development for in-service teachers’ (p. 7). Given the contrast between pedagogic approaches, as outlined above, there is a need to support teachers as they try to implement the textbook’s requirements ‘in practice’. This need is widely recognised: for example, Albalawi (2010) surveyed 31 Saudi experts in Mathematics education, and found that the professional development of Mathematics teachers was their first priority. Consequently, the key aim of this research is placed on investigating the use of a particular teacher professional development approach as a means of supporting teachers as they instigate this new reform-orientated curriculum.

2.5 King Abdullah bin Abdulaziz Public Education Development Project (Tatweer)

Despite the aforementioned curriculum changes, in 2012, it was recognised that there was need for more fundamental development in Saudi education above and beyond curriculum development; therefore, the government invested further in improving education by establishing the Tatweer project. This project is a national strategy for the development of the Saudi education system to meet the current needs and future aspirations of the Kingdom and its move towards ‘opening up’ society (Tatweer, 2015). Tatweer means ‘development’, and this project was introduced in 2012 with the goal of
ensuring that schools become better educational institutions and bear responsibility for their performance whilst putting the student at the centre of the educational process. Ultimately, the intention is that this will result in increased academic and personal achievement levels across the education system, not only in Mathematics and science (ibid). The aims of this project are as follows:

1. To help those working in education to engage in continuous professional development;
2. To develop curricula and learning materials;
3. To improve the school environment to enhance learning;
4. To employ information technology (IT) to improve learning; and
5. To provide extra-curricular activities and student services.

(My translation from Tatweer 2015)

2.5.1 The Programme of the School Development

As part of the Tatweer Project, there is a programme for school development that aims at channelling schools towards becoming learning communities, where the learner is its focus and concern, and ‘all members of the school are learners in continuous learning, change and development community’ (Tatweer, 2012b, p. 9). Currently, certain schools have been identified as leading in this respect—these are called Tatweer schools. There now are 1,020 schools in SA that are adopting this approach out of a total of 35,397 schools (Tatweer, 2015). One of the themes of the programme is to instigate collaborative subject-based communities (departments) under the educational supervision of a Principal Teacher (a new position) within the school for the development of teachers’ performance and teaching. The idea is that the school has an educational leader in each subject, who has considerable professional knowledge and experience, and who then works with the head teacher and deputy head teacher to provide support and help for their colleagues. Tatweer (2012a) defines the principal teacher as someone ‘who has enough educational experience in teaching, and has a distinctive educational vision for the education in general. The Principal teacher is the one who pays attention for new information in his/her work and has a positive attitude toward the professional development for him/herself and those who work with and provide the support in subject’s field for the teacher colleagues’ (p. 11). Moreover, the principal teacher is responsible at the end of the school year for evaluating other colleagues’ teaching based on a classroom assessment scoring system (an observational instrument about multiple aspects of teaching). In this
study, the school in question adopted this model, and one of the teachers involved in the TDP (Ahmad) was known as the supervisor for Mathematics.

2.5.2 The Teacher Training Project

Another key project being implemented within Tatweer is the Teacher Training Project (Tatweer, 2015), which is centred on the professional development of teachers, educational supervisors, and school leaders based in the MoE, and which focuses on developing professional skills in a variety of educational and pedagogical fields. The project aims at providing a variety of training opportunities and funds direct and electronic training costs, training materials and training venues. This project has the following objectives:

• To enhance the quality of formal education outcomes by improving teachers’ basic teaching skills;
• To promote diversity in and improve the quality of the provision of educational services;
• To improve leadership skills amongst teachers and supervisors; and
• To improving teachers’ skills in classroom management.

(Tatweer, 2015)

According to Almazroa & Alshamrani (2015), professional development in SA is a crucial aspect of the nation’s efforts to improve education. In the eighth Conference of Arab Ministers of Education on ‘Effective Training and Vocational Empowerment of Arab Teachers’ (2012), one of the objectives of the conference was to develop teacher preparation and training methods by recognising the reality of teaching in Arab countries. Amongst the most prominent recommendations for Arab countries, including SA, was coordination amongst teacher-training institutions, Ministries of Education, and Higher Education concerning the programmes and curricula used to prepare and train teachers. Here, I argue that the current study can potentially feed in to this Teacher Training project as it may be able to provide a model of teacher professional development that recognises the reality of SA classrooms whilst also focusing on the implementation of the ‘reform-orientated’ pedagogy outlined earlier.

To conclude, all of the projects described above indicate a push from the MoE in SA to bring about substantial reform and investment in the education system so as to move away from ‘indoctrination’ and rote learning. On the one hand, this can be seen as move to increase performance in international league tables, such as TIMMS, but also reflects
the more general ‘loosening up’ of relations, as advocated by the government. As argued, this provides an interesting context for research on professional development—particularly around the ‘reform-orientated’ curriculum for Mathematics and science. It suggests that teachers may be contending with contradictions and tensions between old and new forms of pedagogy and beliefs. Accordingly, in the following section, I focus on teachers’ professional development in the Saudi context in order to explore what is currently in place for SA teachers and how this provision relates to the TDP, which forms the case for this research.

2.6 Saudi Context Professional Development

In SA, most Continuous Professional Development programmes predominantly adopt a top–down approach, and are introduced to teachers regardless of their actual needs and problems (Heba et al., 2014; Mansour et al., 2014): for example, the model lesson is one professional development approach for in-service teachers in schools (Ministry of Education, 1998; Al-Babtian, 1999). Teachers are encouraged by supervisors to design a model lesson that is well-planned and organised, that uses different teaching strategies or implements new strategies, and makes use of technologies. Supervisors usually ask experienced teachers to teach the model lesson, whilst other teachers are invited to observe and write notes about it. It is widely perceived that this approach has limitations as they are only organised by supervisors and are only taught by experienced teachers, and therefore lack collaboration (Al-Ganim, 2004). This gives little opportunity for less experienced teachers to work on developing their own practice, instead promoting the idea that imitating the practice of more experienced colleagues is desirable.

In terms of initial teacher training, Minawi (2011) conducted a review of programmes in SA, and concluded that ‘the Ministry of Education organises a number of programmes and training courses for teachers, but these programmes and courses on the whole are still not based on the actual needs of teachers, as there is no noticeable interest in the preparation of the novice teacher’ (p. 4). Minawi (2011) argues that current training programmes are limited mostly to some ready-made lectures that neither consider the needs of the trainees nor takes into account the opinions of the teachers in the programme. Moreover, a lack of long-term professional development programmes also is a significant problem in Saudi: for example, according to Heba et al. (2014), teachers’ PD programmes in Saudi education are short-term—usually shorter than 2 weeks—and target specific needs, and generally take place before each academic year begins. Therefore, I argue that
the current study provides an example of how a longer term TDP can be implemented in this context.

Moreover, Almazroa & Alorini (2012) argue that much of teachers’ professional development simply does not meet the demands of new Mathematics and science curriculum, as outlined above (cited in Almazroa, 2014). This is seen as a problem of teachers’ and teacher trainers’ lack of experience with ‘reform-orientated pedagogies’: as Alghamdi & AlSalouli (2013) state: ‘Saudi Arabia teachers are expected to critique and adapt curricular, teaching and assessment ideas that they have not experienced in their own education, which was teacher-directed, passive and did not stress reflection and critical thinking’ (p. 505). In their study on teachers and the new curriculum, they found a lack of external support and professional development was widespread in SA (Alghamdi & AlSalouli, 2013). With this in mind, the TDP—which is to be researched in this thesis—has been designed to offer teachers space for reflection on the new ‘reform-orientated’ math curriculum. A crucial component of this TDP is the role adopted in introducing and discussing research literature from Mathematics education on ‘reform’ curricula so that this knowledge can be discussed and negotiated as the teachers reflect.

It is also widely perceived that a key limitation on professional development opportunities in SA is the quantity of teaching duties assigned to teachers over the school day. Teachers cover 4–5 lessons per day, in addition to other tasks (e.g., covering staff shortages), meaning that little assistance is provided in helping teachers understand their students better (e.g., through having time to review and reflect on students’ work) (Minawi, 2011). Mansour et al. (2014) found that curriculum-overload is one of the key problems teachers complain about in terms of the large amount of content they need to cover. More recently, the MoE’s Educational Research Department (Ministry of Education, 2014), in their evaluation of the Mathematics and Science Curricula Project, provided recommendations for reducing this pressure: for example, they recommend that teachers should distinguish between main and enrichment tasks in the textbooks, whereby the main task is directly related to the construction of basic concepts and skills, whilst enrichment tasks build on the main content with the aim of confirming and expanding knowledge. They suggest that teachers focus on main content more so than enrichment tasks. Another recommendation is providing guidelines for teachers on how to manage class time so as to improve efficiency in lessons. Therefore, there is some impetus from policymakers to ‘open up’ teachers time to enable opportunities for professional development.
Another key issue for Saudi Mathematics teachers specifically is the widely held perception that they lack content knowledge. In recent research, Haroun et al. (2015) examined Saudi teachers (N = 197) mathematical knowledge or competence by using Mathematical Knowledge for Teaching (MKT) measures (Ball & Hill, 2008). They found that Saudi teachers showed significantly lower Mathematics content knowledge when compared with the US sample, where the measures have been developed. This is important when considering that the ‘reform-orientated’ curriculum SA teachers are trying to teach is largely based on an approach developed in the US (where content knowledge is apparently higher). The research by Haroun et al. (2015) also suggests that 54% of their SA sample attended only two or fewer workshops for their training (15% non-workshops, 15% only one workshop, 24% only two), which indicates that low content knowledge may be linked to (or is not being addressed by) professional development opportunities (or the lack thereof). Therefore, they suggest that there is ‘urgency for improving teacher education program and providing targeted quality professional development opportunities for teachers in Saudi’ (p. 11).

There also is some evidence to suggest teachers’ beliefs pertaining to Mathematics are also a problem in SA. Alsalouli & BenMotreb (2006) studied Saudi novice teacher students’ perceptions concerning Maths and the learning of this subject, and found that almost half of the students specialising in Maths think that superiority in Mathematics is an innate talent. If a person does not have this innate ability, it is difficult to compensate through diligence. As a result, ‘college students may bring these beliefs with them into class when they become teachers, leading to the discouragement of some students who might not show such innate talent but are willing to make a greater effort to understand Mathematics’ (p. 193).

My argument here is that most recent research on Saudi teachers’ professional development relies on teachers’ views and perspectives on CPD (Mansour et al., 2014; Almazroa & Alorini, 2012; Heba et al., 2014; Almazroa & Alshamrani, 2015), and not what they do during professional development activities; therefore, there is a real need for research that aims to study the process of learning that might or should be manifest in professional development activities in Saudi in order to address some of the challenges facing teachers in this context.
2.7 Dialogue in the Saudi School Context

As discussed in Section 2.2 regarding the social and cultural context of SA, the government has emphasised the importance of shifting towards a more dialogic culture through the establishment of the national centre, the King Abdul-Aziz Centre for National Dialogue. I also have highlighted how this commitment is evident in the reforms made to the education system (i.e. the various projects listed above), and is especially prominent in the new ‘reform-orientated’ Mathematics textbooks. However, various educational studies detail the obstacles to practising dialogue using a reform approach ‘on the ground’ in Saudi classrooms (Al-Obaid, 2009; Al-Shamani, 2012; Al-Tayar, 2011; Al-Mutairi, 2008; Alsharif & Atweh, 2011), such as lack of teacher preparation and training, but also cultural practices of society and families.

In relation to the former, the study of Al-Tayar (2011) aimed at determining how teachers perceive their use of dialogue within the classroom (drawing on a questionnaire completed by 1959 teachers). This research established a widespread perception amongst teachers that the use of dialogue is infrequent, and that supervisors and managers do not fulfil their role in encouraging teachers to use and develop dialogue in the way the ‘reform-orientated’ curriculum suggests. Moreover, Al-Mutairi (2008) conducted a study in a high school in the city of Riyadh, finding that the organisation of the school did not help students to practise dialogue, nor did it involve them in decision-making. One of the obstacles was a lack of teacher training in the use of dialogue (central to the ‘reform’ pedagogy), whether through academic study and preparation or in-service training courses. Alsharif & Atweh (2011) focused on the implementation of The Productive Pedagogies Framework 1 PPF (Education Queensland, 2002) with Saudi pre-service teachers. They found that a key challenge to this implementation was trainees’ efforts to involve students in in-depth discussions and dialogue, which was resisted by students and more experienced teachers. Therefore, they argue that ‘schools in Saudi Arabia provide limited space for democratic practices. Indeed, teachers have no space to engage in a social dialogue which would enable full democratic communication and participation within the school’ (p. 10).

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1 The Productive Pedagogies Framework was developed in Australia (Queensland). It is to identify the essential features of effective teaching with four dimensions 1) Intellectual Quality, 2) Connectedness, 3) Supportive Classroom Environment and 4) Recognition of Difference.
In relation to obstacles stemming from family and cultural practices, Al-Obaid (2009) and Al-Mutairi (2008) have highlighted how traditional parent–child relationships are hierarchical in that children are expected to be quiet and passive receivers of instructions and information, etc. Classroom culture was weak in terms of fostering dialogue because of the existing community. Therefore, Al-Obaid (2009) suggests there is a need to educate families about a culture of dialogue through spreading awareness via bulletins, radio and television programmes, which will help to strengthen the learner’s skills for dialogue. Although as I have said previously, I believe this culture to be changing more recently with an increased use of technology (e.g. social media).

Therefore, all studies in the Saudi education context recommend that there needs to be considerable focus on the culture of dialogue in teachers’ preparation and training programmes in order to address some of the obstacles highlighted above. However, as argued earlier, much of the work on professional development and dialogue in the SA context relies on quantitative surveys of teachers’ perceptions. Al-Tayar (2011) recommends that future studies should focus on investigating professional development and teachers’ dialogue through observation. The findings of this current study does this but goes further by implementing a TDP modelled on the Communities of Practice framework (see Chapter 5), which then is evaluated as a ‘case’ of professional development. The focus of the TDP on professional learning around the use of the reform-orientated textbooks outlined above makes this an interesting example and I anticipate some of the tensions I have highlighted will be seen to manifest and will then be negotiated by the teachers in the TDP activities.

2.8 Conclusion: Reflections on the Complexity of Saudi Education

In this chapter, I have discussed the education system in SA as a particularly important context for researching professional development, since many of the reforms made by the government are potentially in contradiction, not only with other domains of policy (religion) but also with existing cultural practices ‘on the ground’. Therefore, the education system in SA manifests a tension between traditional teacher-dominated teaching practices and the new Mathematics curriculum translated editions of the Math Connects series (as published by Macmillan/McGraw-Hill Education in the United States), which require a more active role and more involved participation for students than has previously been the case. This tension can be loosely described as a mapping on to some of the tensions in wider governance in Saudi - between the need to maintain and
promote a traditional Islamic form of governance, which comes into conflict (at times) with the need to promote economic development through international relations. With this in mind, the evidence suggests that, although the Saudi government has paid much attention to improving the education system through various developmental projects, there is slow progress, and the impact of these projects on schools is low. I argue that one of the reasons for this situation is related to limitations in the provision of teachers’ professional development.

Therefore, the current research aims at addressing this need, at least in part, through implementing a teacher professional programme (TPD) for Mathematics teachers as they implement the ‘reform’ curriculum. In the study by Mansour et al. (2014) concerning Saudi science teachers’ views on CPD practices, the researchers argued that ‘CPD programmes should take place at school where teachers have the opportunity to collaborate with others in an authentic context and where they can participate in the content of the CPD which directly meets their needs within their work context’ (p. 949). Mansour et al. (2014) established that science teachers’ development can be made effective and successful through their active participation in CPD learning activities: ‘science teacher development can be effective and successful when science teachers are able to talk with each other about what they are doing in the classroom and how they can implement the ideas of the CPD programmes into their classroom and school settings’ (p. 967). Nevertheless, to date, there has been no research carried out that has explored professional development in a school-based TPD in SA, which focuses on teachers’ implementation of the ‘reform’ curriculum and, more specifically, its emphasis on interactive classroom dialogue. As I will show in the next chapter, this is an important addition to the literature on professional development since it enables us to consider how ideas about professional development, established mainly in Western contexts, are realised in a potentially contradictory context, such as that of SA, which further allows us to consider the role such contradictions might play in development.

The following chapter therefore presents a review of the literature on teachers’ professional development, both generally and in relation to Mathematics. Since the majority of this literature draws on evidence from Western countries, care will be taken to consider the findings critically in terms of their value to the Saudi context.
Chapter 3: Literature Review

3.1 Introduction

In this chapter, I discuss the research literature on teachers’ professional learning in order to consider how a professional development programme, such as the one in this study, can be ‘made to work’. My key argument here will be that, whilst much is known about what makes professional development effective, very little is known about the obstacles and affordances facing professional learning in the SA context, and even less is known about professional development on classroom discourse in SA; therefore, this literature review aims at establishing a rationale for the study’s overall research questions: How can a ‘Maths reform based’ professional development programme bring about professional learning and identity development in the context of SA? What are the affordances and obstacles to professional learning on classroom discourse in the SA ‘reform-orientated’ primary Mathematics context?

Firstly, this literature review will start by looking at how teacher development is conceptualised in the research literature. This will explore evidence regarding the significance of teacher identity transformation, before moving on to consider teacher knowledge and beliefs surrounding teaching/learning, and how professional development activities can bring teachers into dialogue about classroom practices. It is important to acknowledge here that the concepts of teacher identity and teacher beliefs have different ontological groundings which are potentially contradictory in nature. Nevertheless, I believe the research in both these areas offer much in terms of how we understand teacher development. In addition, I will consider the literature on reflective practice in teaching (drawing on Schon, 1987) in order to highlight how reflection is viewed as another key part of the process by which professional development can come about. This connects to the previous claim about the dialogue between beliefs and practice since it is through such dialogue that reflection occurs. Teacher identities and beliefs are particularly important to this thesis since, as I have outlined in the previous chapter, there are interesting conflicts and contradictions at work in this cultural context, with which teachers are attempting to negotiate (e.g., between a ‘reform-orientated’ curriculum and a traditional transmissionist pedagogy).

This chapter also considers various models of professional development in order to justify the choices made in designing and implementing the TDP: the research requires an
attempt to provide ‘optimal’ conditions for professional development in some sense. I will look specifically at the use of teacher communities for their professional development. Then, the use of video as a tool in the professional development process will undergo examination since it is this that enables classroom practice to become an object of reflection and a source of evidence that subsequently can inform or develop teachers’ espoused beliefs.

The purpose here, therefore, is to establish the ‘need’ for investigating professional development in this ‘reform-orientated’ context, and the potential obstacles that may hinder the processes outlined in this body of literature. As established in Chapter 2, we know that, whilst a small number of Saudi Mathematics teachers have embraced the new ‘reform-orientated’ curriculum, many continue to teach Mathematics using strategies that provide students with only very limited time to discuss their Mathematics and mathematical reasoning. Therefore, many teachers do not ask the types of open question that are likely to generate such ‘talk’ and support the development of students’ reasoning and understanding (Alzaghibi & Salamah, 2011). With this noted, there are many questions raised throughout this literature review relating to the kind of professional development needed and how this might support teachers in trying to implement a ‘reform’ curriculum, and thereby enhance the quality of dialogue in their classrooms. I follow many in the literature who argue that teachers need to afford time and space to developing an understanding of their practice.

3.2 What is Teacher Development? How does it happen?

In this section, the argument is focused on two important aspects of teachers’ professional development: the first aspect is illustrating the significance of teachers’ identity transformation in/as professional development; and the second aspect focuses on teachers’ beliefs and knowledge, and how professional development activities focus on improving classroom practices.

This review of teacher development is based on my search of terms relating to the themes outlined in the introduction to this chapter, such as teacher beliefs, identity development, professional learning, and reflective practice. For example, through my review of the professional development literature, I found increased interest in recent years in Mathematics education in the domain of teacher identity and learning (Hodgen & Askew, 2007; Van Zoest & Bohl, 2005; Lerman, 2012; Walls, 2008; Day et al., 2006). Moreover, I specifically looked for studies on professional development in ‘reform-based
Mathematics’ education and studies relating to classroom dialogue. This process helped to establish the key ideas underpinning teacher development, as detailed below.

### 3.2.1 Teacher Identity and Development

In view of the theoretical perspective adopted in this thesis, which draws on social theories of learning (particularly Wenger’s (1998) Communities of Practice theory – see Chapter 5), teacher identity transformation is a key area of interest in my conceptualisation of what constitutes professional development. This position aligns with the social turn in Mathematics’ educational research (Lerman 2013), where identity has been presented as a powerful concept in teacher development in addition to learner engagement (Graven, 2002, 2003; Morgan et al., 2002; Lasky, 2005; Hodgen & Askew, 2007; Walls, 2008; Boaler, Wiliam & Zevenbergen, 2000). For example, Grootenboer, Smith & Lowrie (2006) argue that ‘a deeper understanding of what impacts on teaching and learning in Mathematics education can be gained by foregrounding the concept of identity and exploring its explanatory potential’ (p, 612). Lerman (2012) argues that ‘as researchers we need rich descriptive tools for analysing identity and the resources potentially available through shifts in discourses’ (p. 2).

Nonetheless, identity is a complex concept with a variety of definitions: for example, a psychological perspective views identity as an individual ‘in the head’ concept concerning how we understand ourselves, which develops internally in order to fit with life’s situations (Piaget, 1977). In contrast, however, a socio-cultural perspective views the formation of identity as taking place through the interaction between the individual, culture and society. It is a view of the self as emerging from participation in a set of practices (Wenger, 1998), or otherwise is a socially shared cultural representation (e.g., I am a mathematician), which an individual might position themselves towards or against (Holland et al., 1998).

In this thesis, I will adopt Wenger’s position on identity as emerging from participation in and across communities of practice. Chapter 5 outlines the reasons for adopting this view, providing an account that primarily rests on the significance of participating in a community of practice (like a TDP) in terms of identity development. It was felt that this theory could provide insight into the changes I observed amongst the teachers (and myself) through the process of the research. Below, I outline some of the research on teacher identity and how this has been understood in the professional development research literature.
According to Beijaard *et al.* (2004), who conducted a review of literature on teachers’ professional identity studies (N = 22) between 1988 and 2000, research on this topic has increased rapidly during this time period. This review identifies the following features as essential for describing teachers’ professional identity (p. 122):

- an ongoing process of interpretation and reinterpretation of experiences,
- recognition that both person and context are implicated (e.g., characteristics of person and context are important in influencing and defining identity),
- the possibility of sub-identities existing as part of the professional identity that are broadly linked to the overall professional identity, and
- agency is an important element of professional identity, meaning that teachers must be active in their process of development for an identity to develop.

Therefore, the implication for professional development here is that prolonged engagement in reflective activity will bring about learning in terms of identity development or change. Ponte & Chapman (2008) conducted a review of studies that focused on developing pre-service Mathematics teachers’ identities. They argue that the development of a Mathematics teacher’s identity is a continuing and dynamic process, and that teachers’ reflections on their classroom practice are important in fostering their identities. Furthermore, learning from experience is an important element of becoming a professional (Brooke, 1994; Beijaard *et al.*, 2004). Teachers’ experiences in classroom practice are an important source for their professional development, but, again, this suggests that teachers need to practice their agency in their professional development in order to develop their professional identities (Coldron & Smith, 1999).

Nevertheless, Hodgen & Askew (2007) recognise that a primary Mathematics teacher’s identity ‘could be enacted in a variety of distinct communities, including the classroom, planning sessions with colleagues, the wider school, community, professional communities and more’ (p. 473). This suggests that negotiating and crossing boundaries between these different forms of practice and social groups is an integral part of enacting professional identity in various contexts, and therefore must be considered a significant part of identity development. This is recognised in learning theories, such as Cultural Historical Activity Theory or CHAT (Engeström, 1987) and communities of practice theory (Wenger, 1998), which highlight that boundary-crossing is important in the learning process. Most professional development models (such as Japanese lesson study, video clubs, etc.) rely on teachers crossing boundaries between professional activities or
workshops, and the classroom context, meaning the ways in which such boundary-crossing are relevant to teachers’ identity development needs conceptualisation.

However, the connection between teaching practice and identity development, as outlined above, indicates that practices that are more restricted or constrained can mediate teacher identities that are less agentive: for instance, Walls (2008) discussed how Australian primary Maths teacher identities are produced within standardised test processes. Here, he argues that, ‘Within these social discursive spaces [practices which involve ‘teaching to the test’], the identities of individual actors such as teachers and pupils for example, are made and remade’ (p. 486) to the extent that teachers’ experiences of teaching to the test was defining and reflecting their identities as teachers who teach Mathematics to the test. He argued that the test challenged and accordingly reinforced teachers’ perceptions of themselves as Mathematics teachers.

This means that reflection, although possibly offering some sense of agency to the teacher, is not always enough to make ‘reform’ happen; one has to take into account the powerful constraints on teachers’ practice/identities, which are defined by the context in which they are operating. In relation to the current research, AlSalouli & BenMotreb (2006) suggest that experience in teaching the old Mathematics curriculum (teacher-led activities) and the emphasis on performance in tests for students (dominated by international league tables, such as TIMMS) have led many Saudi teachers to form monologic professional identities, which are enacted in practice through an emphasis on teaching algorithms in order to teach to the test. This suggests that there is a need to investigate how professional development can be made to work in the SA context, and to identify the obstacles that may be realised in so doing.

### 3.2.2 Teacher Beliefs and Practice

The literature on teachers’ professional identities which I have described above emerged out of and was largely preceded by work on teachers’ beliefs (Thompson 1984, 1992; Ernest, 1989) with some more recent exceptions (e.g. Philipp, 2007). However, prior to discussing the move from beliefs to identity, we should examine the nature of those beliefs. According to Ernest (1989), teachers’ beliefs need to be considered within a wider framework, which examines the psychology of teaching Mathematics. He identifies two key aspects: firstly, the thought structures of the teacher, where beliefs are examined alongside knowledge and attitudes; and secondly, teachers’ thought processes, such as planning lessons and instructional activities, and the capacity to reflect on their practice.
Ernest argues that ‘the teacher’s thought processes and structures are closely interrelated in practice’ (p. 15). This framework suggests a need to have a more fundamental understanding of how Mathematics teachers’ beliefs and attitudes, as ‘thought structures’, interplay with relevant ‘thought processes’, such as approaches to planning. By doing so, we can begin to understand how a teacher’s pedagogic beliefs (which are ideological in nature) may shape their beliefs about what they do ‘in practice’. Therefore, I suggest this move from structures to processes is a key part of the process by which beliefs are manifest in what happens in the classroom.

A focus on teachers’ beliefs also is supported by wider literature in educational research, such as in the works of Pajares (1992) and Nespor (1987), who suggest beliefs as constructs that provide an understanding of a teacher’s practice: for example, a teacher who believes in Mathematics as a connected discipline will be more likely to hold specific beliefs about the kind of teaching that students need in order to make such connections. In their review of studies on teachers’ professional development in Mathematics education, Tirosh & Graeber (2003) conclude that a ‘change in beliefs and change in practices occur in a mutually interactive process’ when achieving change in Mathematics teaching practices.

However, the relationship between teachers’ beliefs about Mathematics, teaching and learning Mathematics, and the influence of those beliefs on teachers’ practice, requires much thought (Thompson, 1992; Nespor, 1987; Pajares, 1992). Evidence suggests this relationship as complex (Pajares, 1992; Thompson, 1992): for instance, Ernest (1989) notes several studies on teachers’ beliefs, which have shown that what is said might not always be what is done in classroom practice, and vice versa: for example, the case study research of Cooney (1985) and Thompson (1984) has shown how contradictions can occur between what Argyris & Schon (1974) refer to as teachers’ espoused and enacted beliefs/models of teaching and learning. For instance, Thompson (1984) states that teachers’ conceptions of Mathematics and its teaching are not related in a simple way to their classroom instructional decisions and behaviour. These contradictions could have an impact on teachers’ teaching effectiveness; potentially, however, they also could be sources of development in the right circumstances.

Ernest (1989) has argued there are three causes for a mismatch or contradiction between espoused beliefs and enacted beliefs: firstly, the depth of the espoused belief in terms of the extent to which it is ‘richly’ connected or integrated with other types of knowledge
and beliefs, which presumably indicates the teachers’ commitment to such beliefs and hence their influence on action/practice; secondly, the teachers’ level of consciousness of their beliefs and the extent to which they reflect on their classroom practice. This implies that teachers need to be more reflective about their teaching approaches in order to have greater integration between beliefs and practice; and thirdly, the powerful influence of features located within the social context such as the system of assessment. For example, if Saudi teachers believe that asking students more open questions is better for the development of understanding, yet they are required to focus on students’ performance in summative assessment tests in the classroom, we then might see a contradiction between personal beliefs about teaching and a teacher’s own enacted practice, which needs to meet the Ministry of Education’s regulations.

In theorising how such contradictions might promote teacher development, Cobb, Wood & Yackel (1990, p. 145) argued that ‘beliefs and practice are dialectically related. Beliefs are expressed in practice, and problems or surprises encountered in practice give rise to opportunities to reorganise beliefs’. This suggests that contradictions between beliefs and enacted practice are an important tool that can give rise to changes in practice. This is supported by Buzeika (1996), who argues that time is needed for espoused beliefs to be transferred back into practice because they are not always immediately in harmony with one another. Once again, reflection is viewed as a key tool in bridging and negotiating the gap between espoused beliefs and enacted teaching approaches (i.e. in re-organising either beliefs or practices as an outcome of this dialectic relationship): for instance, Thompson (1992) argued that ‘it is by reflecting on their views and actions that teachers gain an awareness of their tacit assumptions, beliefs, and views, and how these relate to their practice’ (p. 139).

In addition, there also is some evidence to suggest that teachers understand the relationship between their beliefs and their classroom practice in different ways: for instance, Agudelo-Valderrama, Clarke & Bishop (2007) found that some Mathematics teachers did not see conceptions of Mathematics as the crucial determinant of their teaching practices; instead, they saw factors belonging to the social and institutional context of their teaching as the main reasons behind what took place in their classrooms, such as teaching time and students’ knowledge. Raymond (1997) investigated the relationship between teachers’ beliefs and Mathematics teaching practices, and accordingly constructed a model of mathematical beliefs and practices. The model includes different factors, such as past school experiences, teacher education
programmes, and the teacher’s and students’ lives outside school. The research showed that past school experience is the most significant influence on beliefs about Mathematics, which also are one of the most significant influences on Mathematics teaching practices (i.e. teaching as you were taught). To link this to the Saudi context—given that most teachers in Saudi have experienced an algorithmic approach to learning Mathematics—it is likely that many teachers will implement a similar approach in practice. Support for this can be found in the small number of studies that have examined teachers’ beliefs in the Saudi context (AlSalouli, 2005; AlSalouli & AlMotreb, 2006; Alghamdi & AlSalouli, 2013). For example, AlSalouli & AlMotreb (2006) report that half of the student teachers they surveyed (N = 181) believed that, if a student is not naturally gifted in Mathematics, he will not be excellent, even with more practice. Such a belief will influence teaching practice in the classroom, and may be indicative of an embedded pedagogic culture that views mathematical ability as fixed.

Furthermore, research from the ‘reform’ context in the USA suggests that the implementation of a new curriculum, such as that being implemented in SA, may be highly influenced by teachers’ knowledge and beliefs, and the relationship between such beliefs and practice (Buzeika, 1996; Cooney, Sanchez and Ice 2000). According to Buzeika (1996), ‘If pre-service and in-service approaches are to be effective in promoting practice which supports the new curriculum it is critical to clarify the relationship between beliefs and practice. If one element of this relationship is found to be of greater influence than the other, then professional development work could be focused in that direction’ (p. 99). Thompson (1984, p. 106) similarly states that, ‘If teachers' characteristic patterns of behaviour are indeed a function of their views, beliefs and preferences... then any attempt to improve the quality of Mathematics teaching must begin with an understanding of the conceptions held by teachers and how these relate to their instructional practice.’ However, given that much research on beliefs and teacher development has been conducted in United States, United Kingdom and Europe, there is a real need for research that takes into account the relationship between beliefs and practice in non-Western cultural contexts.

In this respect, there are a small number of studies relevant to this research, none of which have been conducted in SA. In Hong Kong, Chen (2010)’s account of the implementation of a reform orientated curriculum argued that teachers’ mathematics beliefs are difficult to change: 'the role of culture in effecting conceptual change cannot and should not be
overlooked’ (p 292, cited in Chen and Leung 2015). Furthermore, in the Emirate context where a new ‘western’ science curriculum had been implemented, Haidar (2002) investigated teachers’ perspectives about modern science and found that they lacked an understanding of the social component of science. He argued that ‘the present teaching of science, in isolation from its social component may force some students to resist or reject studying certain science concepts especially those that contradict their values, beliefs, and conventional beliefs’ (p. 622). This indicates that adapting ‘Western’ reforms in ‘non-Western’ contexts needs careful transfer (Cobern, 1996; Waldrip & Taylor, 1999; Haidar 1997, 2002). For instance, Haidar argues that the teaching and learning of science in an Arabic culture needs to pay attention to developing teachers’ perspectives in order that they act as ‘cultural brokers… in situations where scientific knowledge differs or contradicts students’ belief system’ (ibid, p. 625). This applies to Saudi teachers also, as the evidence suggests they experience challenges with implementing the new Mathematics reform curriculum in terms of lack of experience with ‘reform-orientated pedagogies’ (Almazroa & Alorini, 2012; Alghamdi & AlSalouli, 2013), and a lack content knowledge of Mathematics (Haroun et al., 2015). Here, the argument is that such challenges can create difficulties for teachers in their classroom practice and accordingly hinder the implementation and intentions of a ‘reform’ approach.

3.2.3 From Teachers’ beliefs to identity

As discussed above, teacher identity transformation is my conceptualisation of what constitutes professional development. However, teachers’ beliefs are an important part of the concept of identity I am using, a position supported by some recent studies aiming to understand teachers and their teaching practices (Goodnough 2010; Trent 2011). For instance, Goodnough (2010) states ‘teacher identity involves teacher[s’] beliefs, values, and emotions about many facets of teaching and being and becoming teachers’ (p. 168). Clearly there is some theoretical work to be done here since the early literature on teacher beliefs positioned them as inside the teacher’s head, informing practice but separate nonetheless. Here, I align with Wenger (1998) who rejects this separation of mind and practice, arguing instead for the social construction of thinking and learning through participation in practice (identity formation). Therefore, I argue that the concept of identity incorporates teacher beliefs in some sense if we understand questions such as: what makes a good teacher? What makes my practice effective? (i.e. belief questions) to be relevant to identity formation.
3.3 The Role of Reflection in Teachers’ Professional Development

I have so far referred to reflection as significant in bringing beliefs and practice into conscious awareness; here, I look at the role of reflection in-depth. A number of researchers have identified reflection as key to the professional development process (e.g., Walkington, 2005; Muir & Beswick, 2007). For instance, Walkington (2005) indicates that ‘reflection on one’s own perceptions, beliefs, experiences and practices is a core activity for all teachers—pre-service and in-service’ (p. 59). In relation to teachers’ professional development, a teacher’s reflection on their personal activities in the classroom can be considered essential for teacher change (Witterholt et al., 2012).

This builds on the theory of the reflective practitioner (Schon, 1987), which suggests professional learning is about developing the capacity for reflection-in-action and reflection-on-action. Reflection-in-action occurs ‘in the moment’—during enacted practice in the classroom—whereas reflection-on-action occurs outside of ‘the moment’, and can be prior to or after a particular episode of enacted practice. Essentially, the two modes of reflection are inter-related, with each informing the other in a cyclical process. The process of reflective practice in teaching is to make teaching approaches and processes objects of critical scrutiny (Schon, 1987; Jaworski, 1994, 2012).

For instance, in terms of reflection in action, teachers may have the opportunity to reflect in action when they teach during students’ independent work, when teachers can take careful notes of the outcomes of their teaching practice, such as students’ strategies to solve the lesson problem (Murata & Takahashi, 2002). Zeichner & Liston (1996) argue that reflection takes place during teaching in different ways, such as rapid reflection and repair. The rapid reflection is any immediate and automatic action that the teacher does in the classroom. The repair level, on the other hand, involves the decisions made by thoughtful teachers to change their behaviour as result of students’ cues in the class.

Furthermore, regarding reflection on action, teachers have the opportunity to reflect back on their teaching experience or practices following the completion of the event: for example, Scherer & Steinbring (2007) did research on joint reflection between themselves and teachers, which focused on their own classroom interaction. They found that the changes of one’s own classroom interactions only takes place in the long-term. Moreover, they argue that joint reflection (by teachers and researchers) on teachers’ practice should be an essential component of their professional knowledge. The idea of reflection on action has not only been implemented in relation to teachers’ professional learning, but
has been used for the learning and professional development of Mathematics teacher educators and researchers in Mathematics education (García, Sánchez & Escudero, 2007). Garcia et al (2007) argue that the process of reflection on the relationship between theory and practice can lead one to investigate how theoretical elements (e.g., situated learning and community of learning/practice) function in practice. They suggest that this can lead to new characteristics of the theoretical elements and further open new theoretical perspectives.

Therefore, there is evidence that highlights the value of reflection in professional development programmes and for teachers as professional practitioners and there are many different ways and forms that are built on this evidence, particularly the notion of reflection on action (this will be explained in the following section). For example, Bengtsson (1995) indicated how reflection enabled teachers to act independently, but to a more or less limited degree. In this vein, Bengtsson (1995) argued:

Least far-reaching is the thesis of making the teacher independent of science. According to this thought, the relationship between science and teacher is thought of as a relation between a passive teacher who applies scientific knowledge whereas reflection gives the teacher self-control over his or her professional tasks. Most far-reaching is the idea of a completely autonomous teacher who, with the help of reflection, is able to see through all political, social, historical and other ideological factors embedded in every educational situation and from this elevated position chooses freely and consciously in order to take full responsibility for his or her actions. (p. 25).

This shows how reflection is/may be powerful, and can enable teachers as professionals to investigate and improve their teaching and classroom practice. Moreover, it also proposes more than a simple cyclical process of reflective practice, whereby reflection enables teachers to review and examine what they did in their classrooms, implement change in practice, and then review and examine the changed or improved practices, and so on. Rather, it suggests that, through reflection, teachers might come to understand how social, historical and ideological factors embedded in the context in which they are teaching may be manifest in contradictions that then can be negotiated through ‘reflection on action’. This connects to studies that draw on Activity Theory, which highlight that, by coming to understand such contradictions, this then can provide a motive for teacher development (Anthony & Clark, 2011; Tsui & Law, 2007). Given the complex and contradictory cultural context in which the current research is located (as outlined in Chapter 2), I find this account of reflective practice interesting, and one aim for this research is to determine how negotiating such contradictions can provide for a better understanding of teacher development in SA.
Therefore, reflective practice has been used as an important component in many different forms or models of teachers’ professional development. In the following section, I illustrate some of these different models in order to further the discussion of what is ‘optimal’ for effective professional development, but also to consider some of the challenges that may be realised in doing similar work in the SA context. In so doing, I aim to highlight how this research addresses a gap in the literature on professional development in non-Western contexts (such as SA).

3.4 Different Models for Teachers’ Professional Development

Having discussed the components of professional development, such as identity transformation, beliefs, and reflective practice, I now go on to review different models of professional development in order to determine how they enact these components. The research literature in this area is vast, with a whole range of professional development initiatives and models emerging (e.g., video clubs (van Es & Sherin, 2002, 2008; Star & Strickland, 2008) and lesson study (Lewis et al., 2006; Lewis, 2009), many of which are largely based on the principle of observing other teachers or themselves and reflecting on practice. A key characteristic of these approaches is to position the teacher as an active participant in their own development process, rather than as a passive receiver of knowledge about teaching. Researchers have argued that this requires exposure to longer periods of development activity, as opposed to one-off sessions, where the focus is directed towards how teachers can become more active learners and accordingly develop their professional skills through reflective participation (Guskey, 1986; Fullan & Stiegelbauer, 1991; Clarke & Hollingsworth, 2002). Here, I will argue that the literature suggests such forms of professional development requires the following three components: i) teachers working together in a community, ii) a space where practices from both the classroom and the institution are brought together, and iii) the significance of videoed 'practice' in enabling development.

3.4.1 Creating Teacher Communities for Professional Development

Much research on teacher development in Mathematics has focused on creating opportunities for development through collective dialogue between teachers: for example, Cobb et al. (2003, p. 15) argue that these opportunities are important to focus on ‘social structures that are within the scope’ of teachers’ practices. Gellert (2008) reports that Mathematics teachers often are viewed as working in isolation from one another, and that there is a lack of empirical evidence on their communication with colleagues about
teaching and learning Mathematics. Gellert (2008) believes that ‘this lack of empirical evidence is mainly due to the dominance of individualistic theories about behavioural and/or cognitive development underlying most research on the practice and development of Mathematics teachers’ (p. 94). This criticism has been recognised in recent Saudi research on teacher development. For example, one study of science teachers’ professional development argued for school-based CPD approaches in Saudi schools (Mansour et al., 2014) since teachers had ‘highlighted that sharing ideas and experiences with other teachers and working collaboratively as a community or a team to discuss their practices at school could support implementation of CPD ideas’ (p. 966). Similarly, Heba et al. (2014) argue that, for Saudi teachers, ‘...CPD activities need to promote a space for discussion among the teachers regarding their own contexts and to reflect on their own practices’ (p. 23). This work is attempting to re-position the role teachers play in CPD in SA by engaging with teachers as partners and not as trainees (Mansour et al., 2014). Furthermore, according to Mansour et al. (2014), teachers prefer to learn and construct their professional knowledge through collaboration and interaction, and they suggest that CPD developers should develop learning activities that encourage and facilitate teachers to reflect on their learning and practices.

Relatedly, a number of researchers have identified the importance of creating a community for teachers as a key feature of successful professional development models (Franke & Kazemi, 2001; Cobb, McClain, Lamberg & Dean, 2003; Koellner-Clark & Borko, 2004). As teachers typically do practice in isolated classrooms (Cwikla, 2004a, 2004b), this creates unique and different experiences for teachers, and, in creating professional communities, one can offer spaces for sharing experiences and learning from each other. A study by Koellner-Clark & Borko. (2004) investigated how a community was established in a professional development institute for 16 middle school Mathematics teachers in US. They argued that teachers explaining and clarifying ideas, building off each other’s ideas, admitting weaknesses, giving praise to others, and laughing, all acted as drivers for the establishment of a professional development community in this context. These researchers also noted an increase in trust between participants that led to deep interaction and dialogue amongst them, as well as a sense of community. Therefore, they argue that these findings add to the literature in terms of how to establish a community as a means of promoting professional development.

However, as Gellert (2008) notes, ‘community building is strongly affected by organisational constraints. But even within educational systems that, in theory, support
the teachers’ autonomy and freedom for self-initiated professional development, socio-cultural constraints may work against collective teacher development’ (p. 106). Here, I argue that it is crucial to take such organisational and socio-cultural constraints into consideration in terms of designing the TDP in the current research (see Section 4.4.4 in the chapter). Moreover, there also is a need to be sensitive to these constraints in my analysis of what happens in the TDP in order to really unpack how the Saudi cultural context plays a role in teachers’ professional development. Previous research on Saudi teachers’ professional development has not examined how context shapes reflective processes and teacher collaboration as it occurs, with the majority of studies focusing on surveys of teacher perceptions of their own development.

Nevertheless, there are several different forms of teacher professional development communities in the research literature, some of which I know discuss. In their review of research, which adopts the notion of ‘communities’ in understanding professional development, Blankenship & Ruona (2007) identify two key concepts: professional learning communities (PLC) and communities of practice (CoP). To this, I add the Community of Inquiry (Jaworski, 2006) approach, which is built on the CoP model. In the following sections, I will briefly discuss the key differences between these concepts.

3.4.1.1 Professional Learning Communities (PLCs):

In their review of literature about PLCs, Stoll, Bolam, McMahon, Wallace & Thomas (2006) argue that this concept has not had universal definition, but there is ‘broad international consensus that it suggests a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way (Mitchell & Sackney, 2000; Toole & Louis, 2002), operating as a collective enterprise (King & Newmann, 2001)’ (p. 223). Here, I argue that a PLC is a broader label for initiatives, which offer space for teachers’ collaboration, whereby they come together to reflect on their practice (reflection on action). Stoll et al. (2006) describe five characteristics of effective PLCs, highlighted in the literature, which are: a) shared values and vision, (as it is important for members to share values and vision for their objectives. This provides a framework for their decision making); b) collective responsibility (as all community members feel accountable and take collective responsibility for pupils learning, as this helps to sustain commitment); c) reflective professional inquiry, (e.g., teachers using reflective dialogue and conversations about serious educational issues or problems, frequently examining their own practice); d) collaboration (involving staff in developmental activities which go beyond superficial
exchanges of support and help towards joint review and feedback); and e) group as well as individual learning is promoted (where all teachers are learners with their colleagues).

Furthermore, Blankenship & Ruona (2007) argue that all models which underpin the PLC concept draw from learning organisation theory (Senge, 1990, cited in Blankenship & Ruona, 2007). This states that a learning organisation is ‘where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together’ (Senge, 2000, p. 3). They found that, although PLC models address community learning in order to focus on students’ needs and achievements, it also pays much attention to building a culture of collaboration in order bring about school improvement at the institutional level, rather than at the classroom level (as with a CoP model (see below)). For this reason, Blankenship & Ruona’s (2007) account of what a CoP model, based on a social learning theory, can do for professional development may be more relevant to this research. They suggest a CoP model as being more focused on the improvement of practice at classroom level (rather than institutional level), although it does address the need for alignment with the institutional organisation. Therefore, the following section will discuss a CoP as model for professional development.

3.4.1.2 Community of Practice as Model:

Wenger’s concept of CoP has been used to characterise the structure of communities that promote professional teaching by several authors (Franke & Kazemi, 2001; Cobb, McClain, Lamberg & Dean, 2003): for example, in their study, Lotter et al. (2014) investigated the building of a community of practice around inquiry instruction in a professional development programme. The participants were 39 middle school teachers and 13 coaches who were trained in coaching techniques. Each coach was located within one school, and teachers were in small groups (3–5 teachers for each group) during the professional development (PD) programme. They found that this PD programme allowed teachers to align their teaching with inquiry-based teaching practices and grow as inquiry teachers. This happened as teachers and coaches participated and engaged in reflection sessions specifically focused on inquiry instruction as the joint enterprise for the CoP, such as reflecting on classroom observational data about teachers practice collected by coaches. This highlights the shift from a PCL, whereby teachers simply come together to
reflect on general issues facing their institutions/practice towards a CoP that is shaped and organised around a specific shared focus (the joint enterprise).

In Mathematics education, this conceptualisation of community has become more common in recent times (Graven, 2004; Gomez, 2002; Goos & Bennison, 2008; Hodges & Cady, 2013). Such research can be grouped in three different ways in terms of how the CoP is played out. Firstly, some researchers have designed a face-to-face community of practice (Graven, 2004; Hubbard, Embry-Jenlink & Beverly, 2015). Secondly, other researchers have developed online communities of practice (Goos & Bennison, 2008). For example, Cady & Rearden (2009) found that using online professional development to construct a community of practice was particularly important for those Mathematics teachers who work in rural schools or areas, and who experience difficulties in attending professional development programmes. Thirdly, the final design of CoP uses a mix of face-to-face and online activities (Hodges & Cady, 2013).

A key study in this area is by Cobb, McClain, Lamberg & Dean (2003), who used a CoP perspective to describe schools and school districts as lived organisations with configurations of communities of practice. In their analysis of the interconnections between various communities of practice within a configuration, Cobb et al. (2003) focused on: (a) boundary encounters in which members of different communities engaged in activities together (e.g., school leaders engaged in classroom visits (as activity of their communities) to monitor and assess instructional practices for teachers (other communities), (b) the role of brokers i.e. those who are consciously active in taking aspects from one practice into the practice of another community (e.g., Mathematics leaders as brokers played an important role in aligning the enterprises of two CoPs (professional teaching community (researchers and teachers) and the Mathematics teaching community), and (c) the role of boundary objects (e.g., teachers’ pacing guide that helps them to teach with the textbooks), as incorporated into the practices of two or more communities.

Like this research, Cobb et al.’s (2003) study took place in a context where a reform textbook series (two new Mathematics textbooks) and a pacing guide—produced by Mathematics specialists to help teachers in coordinating the textbooks—was being implemented. They found that the outcome of the professional development, which had taken place around the implementation of this ‘reform’ approach resulted in ‘... an overall shift in their instructional practices from focusing on mathematical procedures toward
supporting students’ understanding of mathematical ideas’ (p. 19). One of their arguments is that their collaboration with teachers in the name of a joint enterprise (implementing a reform approach) was a sustained attempt to bring about changes in the teachers’ setting of the schools and school districts. They indicate that this collaboration gave teachers access to forms of pedagogical reasoning on/using these tools (e.g., reform series and pacing guide). Again, this work supports the earlier argument posed in this work that a community of professional development must bring together both classroom and institutional practices in some form.

However, schools are complex places with different communities at work; therefore, it is important that attention be paid to the boundaries between these different communities and the contradictions between them: for example, in her five-year research project about teachers’ multiple communities of practices and the efforts of one struggling middle school in the USA to implement NCTM standard reform, Cwikla (2014) outlines the key issues facing teachers when attempting to foster or encourage communities of practice. Firstly, she argues that a shared mission and a focus on reflection in relation to instructional improvement are essential if communities of professional learning are to work well. Cwikla (2014) found in the school she researched a lack of explicitly shared goals between individuals, with complaints about individuals in other different communities of practice, which together caused some failures for the process of change in the school. She concluded that, until the educators of this school ‘have a shared mission and form more productive, reflective communities of practice focused explicitly on instructional improvement, they will continue to battle each other and the administration fruitlessly’ (p. 582). Secondly, Cwikla (2014) argues that ‘change is a process, not an event, and it happens to individuals first, not to organisations’ (p. 581). Again, this research indicates the need to consider not only classroom practice in professional development community, but also the institutional or organisational set-up that can make change possible (or not as the case may be).

3.4.1.3 Community of Inquiry Model:

Jaworski (2006) has built on the CoP model in her concept of ‘communities of inquiry’, which places inquiry as central to the community’s practice. This is because inquiry is not simply seen as the joint enterprise of a community of practice but rather as a way of being in practice—teachers become inquirers as professionals (Jaworski, 2006). Therefore, ‘participants in a community of inquiry aspire to develop an inquiry way of being, an inquiry identity, in engagement in practice’ (Jaworski, 2008, p. 312). Essentially, this
moves us beyond CoP models by focusing on the transformation of teacher identities, which then has longer term sustainability in terms of the impact of the changes that take place.

Here, inquiry is used on three levels: ‘in Mathematics learning, in Mathematics teaching, and in the development of practices of teaching in communities involving teachers and educators’ (Jaworski, 2006, p. 187). These three levels are (Jaworski, 2005, p. 103):

- Inquiry in Mathematics (e.g., teachers exploring Mathematics together in tasks and problems in workshops, and students in schools learning Mathematics through exploration in tasks and problems in classrooms);
- Inquiry in teaching Mathematics (teachers using inquiry in the design and implementation of tasks, problems and mathematical activity in classrooms); and
- Inquiry in developing the teaching of Mathematics (teachers researching the processes of using inquiry in Mathematics and in the teaching and learning of Mathematics).

Drawing on this, a number of studies have investigated the value of a Communities of Inquiry approach as a form of professional development (Potari, Sakonidis, Chatzigoula & Manaridis, 2010; Tirosh, Tsamir, Levenson, Barkai & Tabach, 2014). Potari et al. (2010) conducted research centred on collaboration between secondary school teachers and academic researchers. They indicated that teachers’ participation in these communities enabled them to move from a defensive attitude about their practice and towards questioning their teaching actions and research resources to exemplify important aspects of teaching. Furthermore, in their research, Tirosh, Tsamir, Levenson, Barkai & Tabach (2014) investigated the use of video as a tool in forging communities of inquiry, and how this can be done. They investigated this through ten 3-hour sessions with preschool Mathematics teachers, focusing on their teaching of number and geometry concepts. They found that the use of video enhanced the teachers’ inquiry as ‘new questions and directions for inquiry arose, mostly focusing on the mathematical tasks implemented with children’ (p. 265). This work suggests the community of inquiry approach has much to offer as a model for a professional development community, particularly for Mathematics teachers. However, more research is needed in an effort to understand how it might work in a context, such as SA. As outlined in Chapter 2, in the SA educational context, very little professional development is offered to teachers, and what is available, usually follows a top–down model of being told how to teach. Therefore, I anticipate that becoming an ‘inquirer’ into one’s own practice may be
challenging in this context, especially given the dominance of pedagogy, which views the learner as passive (not only in the classroom but also in professional development).

3.4.2 Using Video for Professional Development

In this section, I will consider in greater detail how video has been used to bring classroom practice into professional development communities as a means of provoking the dialogue between teacher beliefs and their own practice in the classroom.

3.4.2.1 Video Clubs Model:

Video clubs have been developed in the US in the context of ‘reform’ by van Es & Sherin (2010). These provide ‘a professional development environment in which groups of teachers watch and discuss excerpts of videos from each other’s classrooms’ (p. 155). This model provides the opportunity for teachers to regularly see each other’s practice (Little, 2002) so as to help them learn to notice and interpret key features of their own classroom interactions (van Es & Sherin, 2008). Sherin & van Es (2005) found that in-service teachers demonstrated change in what they noticed in their own practice as a result of reflecting on video segments of their lessons. This work suggests that such video viewing can improves teachers’ understanding of their own teaching strategies and overall their capacity to suggest alternatives; therefore, they may in some way, play a crucial role in developing teachers as inquirers (as Jaworski promotes). This is because the video provides teachers with access to classroom interactions, and they can repeatedly see their instruction without pressure of teaching in the moment. Therefore, in terms of this study, it is hypothesised that using video could prove valuable in helping to stimulate Saudi teachers’ reflections on their classroom practice, develop their understanding of dialogic teaching, and explore the gaps between teachers’ ‘espoused beliefs’ and classroom practice when teaching. This is because the use of video recorded lessons can help to keep the researcher and teachers close to the actual events in classroom activities. This brings teachers’ practice directly into the professional development activity, and subsequently positions such practice as an object for reflection.

Moreover, in terms of implementing a ‘reform’ curriculum, van Es & Sherin (2010) argue that ‘perhaps video can become a worthwhile tool for those who educate teachers as they adopt and enact new curricula’ (p. 172). Therefore, I argue that the use of video is an important tool for any professional development programme, but especially where teachers are negotiating conflicting demands or cultures. As outlined in Chapter 2, the teachers in this study are negotiating a new ‘reform-orientated’ curriculum and pedagogy
within a pedagogic culture, which typically is dominated by traditional, teacher-led activities. This creates an interesting context where different pedagogic values are incorporated within dialogue; I argue that reflecting on video episodes of the teachers’ practice can support the negotiation of this difference.

However, although the video clubs model enables teachers to be active reflective practitioners concerning their teaching practice, the TDP evaluated in this research did not adopt this model fully (although it did use video episodes of teachers’ practice) since it relies on teachers themselves coming together as inquirers, with little support from an external facilitator (such as myself—my role in this TDP/research will be discussed throughout this thesis). Here, the argument is that an external participant can offer a different perspective on practice, which comes from outside the school (e.g., from the research community); this might usefully interplay with the use of videoed practice in the TDP.

3.4.2.2 Lesson Study Model:

Another model of professional development that has been dominant in Mathematics education recently, and which also makes substantial use of video classroom practice, is the ‘Lesson Study’ approach. One description of Lesson Study comes from Lewis (2009), who defines it as ‘a professional learning approach in which teachers work together to: formulate goals for student learning and long-term development; collaboratively plan a “research lesson” designed to bring to life these goals; conduct the lesson in a classroom, with one team member teaching and others gathering evidence on student learning and development; and discuss the evidence gathered during the lesson, using it to improve the lesson, the unit, and instruction more generally’ (p. 95). Moreover, Fernandez (2002) indicates that involving an outside advisor or expert enriches the lesson study process. Fernandez argues that ‘these experts are also instrumental in expediting a group’s access to information, particularly theoretical information or recent research findings, which might otherwise be too time-consuming or difficult for teachers to access on their own’. (p. 396)

This approach has been used widely in Japan for many decades, and has spread rapidly to many countries (Lewis et al., 2006; Lewis, 2009; Doig & Groves, 2011): for example, this model has been used in the USA since Stigler & Hiebert (1999) argued that it could improve classroom instruction. This could be because teachers’ participation in lesson
study increases their knowledge of content and students (Lewis et al., 2009; Tepylo & Moss, 2011), and this approach illustrates how the strengths of teacher leadership and research-based content can be joined in order to support teachers in the implementation of the curriculum (Lewis & Takahashi, 2013). However, Akiba & Wilkinson (2015) argue that there are three major challenges for practising lesson study in United States (which also are relevant to the Saudi context), such as: (a) teachers’ work schedules that do not allow sufficient time to engage in a continuous learning process of lesson study; (b) a lack of familiarity with a research process of studying the curriculum, collecting and interpreting the data, and drawing conclusions and implications for teaching and student learning; and (c) a lack of resources and opportunities to develop content and pedagogical content knowledge necessary for facilitating the lesson study process by themselves (p. 3). With Japanese lesson study, there is a sense that continuous professional development is embedded in Japanese educational culture, in that time and structure are given to teachers to support their professional development (Lewis & Takahashi, 2013; Yoshida, 2012). Takahashi & Yoshida (2004) argue that the lesson study approach has played a vital role in improving curricula in Japan on a national scale. However, to relate this back to the current research, this model is not currently used for Saudi teachers’ professional development, and to do so would require embedding this kind of professional development in schools more widely. This is because the Lesson Study approach needs all teachers’ commitment to attend lesson events and observing each other. As discussed previously, in the Saudi educational context, it is difficult to find time for all teachers to commit to all of the lesson study process and stages (for instance, the TDP in this study only involved three teachers from different grades). Therefore, although prolonged engagement in professional development activity is desirable, this will be challenging to implement in Saudi schools, where teachers are unfamiliar with such models. Nevertheless, the TDP I have established does require a substantial commitment of time, from both myself and the teachers involved, which makes it important to track our experience and development in the TDP over time, and to critically explore the challenges we experience in engaging with this form of professional development practice. The model I have implemented contrasts sharply with the kinds of in-service teacher-training in Saudi, which typically adopt a one-workshop model, with the teacher as passive acquirer of knowledge without any opportunity for them to connect such knowledge to their classroom practice.

3.4.2.3 Dialogic Video Cycle’ (DVC) Model:
As the current research focuses on the quality of classroom dialogue, it seems worth looking at specific models for teachers’ professional development about dialogue (Hennessy, 2011; Mercer, Hennessy & Warwick, 2010; Hennessey, Mercer & Warwick, 2011; Groschner, Seidel, Kiemer & Pehmer, 2014; Pehmer, Gröschner & Seidel, 2015). The ‘Dialogic Video Cycle’ (DVC) model is a key example here as it focuses on fostering more productive forms of classroom dialogue (Groschner et al., 2014; Pehmer et al., 2015). In DVC, a series of three workshops conducted by a facilitator introduces teachers to theoretical inputs on productive classroom dialogue (e.g., make learning goals transparent and ask cognitive activating questions). For this, it builds on work by Walshaw & Anthony (2008), who reviewed literature on how Mathematics teachers practise classroom discourse, and thus identified four key activities: 1) clarifying discourse participation rights and responsibilities; 2) scaffolding students’ ideas to move thinking forward; 3) fine-tuning mathematical thinking through language; and 4) shaping mathematical argumentation. In DVC, teachers are required work on both 1) and 2) to plan lessons by implementing teaching approaches that apply what they have learnt about classroom dialogue in workshops. The structure of DVC is outlined below.

Table 3.1: The ‘Dialogic Video Cycle’ (DVC) programme details (Pehmer et al., 2015)

| Workshop one | - Input on productive classroom dialogue.  
- Learning about the importance of activating students to engage in learning.  
- Adapt concrete techniques for student activation and scaffolding for a lesson plan. |
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<td>Planned lesson</td>
<td>- Teachers are videotaped by the research team while teaching the planned and revised lesson in the first workshop.</td>
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| Workshop two | - It concentrates on Student activation and clarifying discourse participation rights.  
- It reflects on teaching routines that motivate students to engage in the learning process. |
| Workshop three | - It focuses on Scaffolding student ideas and feedback and ways to scaffold students' learning. |
| The facilitator select video excerpts based on the criteria for productive classroom dialogue for the teacher reflections in workshops 2 and 3 |
| The facilitator poses Guiding questions to support the teachers’ reflections. |
| The second iteration of the DVC followed the same course of action. |
Groschner, Seidel, Kiemer & Pehmer (2014) argue that, in order for any PD programme on classroom dialogue to be successful, one must draw on what is seen to be productive in the Mathematics education research literature (e.g., pedagogical focus, duration and using video). In their research, they compared the DVC approach with a traditional professional development programme. They found that teachers were more satisfied with their participation in the DVC, compared with those who participated in traditional professional development programmes without video-based discussions or feedback. Therefore, they indicate that video-based reflections of teachers’ own teaching, but also the input of theory or ideas from the research literature, must be brought together; it is this that positively motivated teachers and encouraged attendance at the DVC sessions. However, I anticipate that three sessions is insufficient when implementing a programme of professional development in a context such as Saudi Arabia (DVC has been developed in Germany). Furthermore, Groschner \textit{et al.} (2014) argue that there is ‘still a lack of empirical knowledge about the specific effect of video and future studies should provide specific PD programs that vary in the use of video’ (p. 750). Therefore, the current research aims at using the video for collective and individual reflection in order to investigate their classroom practices prior and during the TDP.

\subsection*{3.5 Summary of the Chapter}

In this chapter, I have presented the key concepts the research literature indicates might be critical in promoting professional development, namely teacher identity transformation, teachers’ beliefs and reflective practice. This review has indicated that teacher identity transformation is essential for development in that, through reflective activities, teachers come to hold a new or different perspective on their practice, which
encompasses a new sense of who they are as teachers. I also have highlighted, throughout
the course of this chapter, the importance of finding ways to interrogate and challenge
teachers’ beliefs through reflection on their classroom practice. This can provoke
contradictions or tensions that eventually may lead to the development of beliefs and
practice. Inherent in both of these arguments is the centrality of teachers’ reflective
practice to support their professional development, and I have outlined what that
reflection might look like in different contexts (e.g., ‘in action’ in the classroom or ‘on
action’ in a professional development community).

Additionally, my review of professional development models has indicated several points
that should inform the development of both my TDP programme and my research on it:
firstly, communities need to have a common joint enterprise, and there must be a space
where institutional and classroom practices come together; secondly, videoed practice is
an important tool in bringing together beliefs and practice, which can result in
contradictions that, hence, can facilitate reflection and development; and thirdly,
following the DVC model, we can say that the input of some theory may be important in
development activity as it enables teachers to bring theory and practice into dialogue in
understanding what is possible in the classroom. This means the presence of a
Mathematics education researcher therefore, is also likely to be important since, in many
of the models, such individuals play a crucial role in facilitating the development activity,
as well as in bringing theory/ideas from the research community into contact with
practice.

Nevertheless, throughout this chapter, I have highlighted that the SA context may create
specific challenges (and affordances) for the implementation of these ‘optimal’ features
of professional development; therefore, I argue that the research literature can benefit
from an evaluation study of professional development in this context, which brings these
key features together with the practical challenges of the completing of professional
development in SA. In so doing, I will investigate the specific role of these various
elements in this case, considering, for instance, the significance of the ‘reform’ impetus
for the institutional context and the ‘shared enterprise’, and hence the bonding of a
professional development community, the significance of the video for the professional
development practice(s) that emerge, and the role of ‘outsiders’, who consciously broker
research into the professional development community. Therefore, by investigating these
issues, I will be able to address the research questions underpinning this thesis, which
query how professional learning and identity development can be made to work in the SA context, and what the challenges/affordances are in so doing.

In the next chapter, which provides an account of how the TDP was developed and then researched, I will illustrate how these concepts are embedded or enacted within the TDP and in the research design and methodology.
Chapter 4: Research Methodology

4.1 Introduction

This chapter presents the methodological approach to the current study. It begins by presenting the research standpoint, which I identify as an evaluation case study of a professional development programme which draws on CoP theory in order to understand teacher development. This follows the approach of Bassey (1999), who presents educational practice as the ‘case’, and its evaluation then allows for analytical generalisation in relation to the theory (CoP) and the phenomena (teacher development). I will illustrate in this chapter how I gathered the data in order to evaluate the TDP as a ‘case’ of educational practice as a means to answering the study’s research questions: How can a ‘Maths reform based’ professional development programme bring about professional learning and identity development in the context of SA? What are the affordances and obstacles to professional learning on classroom discourse in the SA ‘reform-orientated’ primary Mathematics context? The purpose of this chapter, therefore, is centred on establishing the TDP as the ‘case’ to be analysed using CoP theory, which is operationalised in Chapter 5.

This chapter is structured as follows: firstly, I will provide more detail on the methodological standpoint adopted; secondly, I will discuss the two pilot studies that inform the research design and the development of the TDP itself (the case): a) Saudi teachers’ perceptions of the new reform curriculum/textbook; and b) the value of using video as a means as a professional development tool. Next the chapter provides an outline of the Teacher Development Programme (TDP) in terms of its phases, components and participants. Then, I discuss how the TDP was researched in terms of what data was collected and analysed in relation to the research questions. Finally, the chapter concludes by providing an explanation of how the current research ensures trustworthiness, research integrity, and the addressing of the ethical issues which arose.

4.2 Research Standpoint

The methodological standpoint for this study follows an evaluation case study (Bassey, 1999,). According to Bassey (1999), evaluative case studies in educational research are ‘inquiries into educational programmes, systems, projects or events to determine their worthwhileness, as judged by analysis by researchers, and to convey this to interested audiences’ (p. 58). In this framework, researching the ‘case’ requires considerable detail
in order to evaluate its worthiness as a form of educational practice. As Bassey states: ‘the evaluators seek to understand what is happening within the case. They are trying to describe, interpret or explain what is happening, but in doing so they are setting out to make value judgements, about the worthwhileness of the case. The expected endpoint is that someone will use their findings to decide whether or not to try to induce change’ (p. 41). Based on this standpoint, in this research careful attention will be directed towards the process of data collection and analysis so as to establish the worthwhileness of the TDP as a form of professional development for mathematics teachers in SA. To do so, I have collated various data sources which view the ‘case’ from different perspectives (see Section 4.7), but I have also utilised community of practice theory (Wenger, 1998) as a tool for critical evaluation of this TDP (this will be explained in Chapter 5).

4.2.1 The Positionality of the Researcher

As will be highlighted, my positionality and role in this research was critical in terms of my standing in relation to the others involved (the teachers, as well as the others in the school, Mathematics education community, and Saudi Ministry of Education, etc.). Two key positions I adopted appeared to be particularly important to the development of the TDP: firstly, my role and position as a fellow participant who engaged with the teachers in the activities of the TDP, such as in reflecting on the video episodes of classroom practice, which gave me access to some of the shared meanings that were negotiated in the group; the second position was as facilitator of the group: as a researcher from a University in the UK, I was responsible for organising, instigating and facilitating the activities of the TDP, which gave me some legitimacy within the group. I viewed my role as a broker, introducing some key ideas (see below) and modelling reflective practice for the teachers, essentially supporting the translation of ideas which have been developed outside of the TDP (in other contexts) into ideas which might work or not work in this Saudi context. I also adopted a third position, which, whilst not directly relevant to the development of this TDP, did influence the other two roles I enacted. This was as a researcher wanting to make a contribution to knowledge through researching this TDP. Here, I was aware of my privileged position as I had an overview (through some research activities such as interviews) of how the other participants were experiencing the TDP and the impact on their classroom practices. This overview informed my other roles of facilitator and participant in different ways: for instance, I was able to identify interesting changes implemented in an individual teacher’s classrooms (through research activity) and bring them into the group for discussion and reflection (development activity).
Nevertheless, occupying three roles in this research needed to be managed and, for this reason, much of the in-depth analysis took place after the TDP had been completed.

4.3 Pilot Interviews and Video Use Method

In order to develop the focus and format of the TDP and to pilot data collection methods for researching teacher development, I conducted a pilot study involving: a) interviews with two Saudi primary Mathematics teachers; and b) the use of video episodes as a means to facilitate reflection on teaching with an undergraduate lecturer here in Manchester.

4.3.1 Saudi Teachers’ Perceptions of the Adapted Mathematics Textbooks and Classroom Instruction

The two primary Mathematics teachers were interviewed in order to acquire further information about teachers’ perceptions of the new reform-orientated Mathematics textbook/curriculum (see Appendix A). The interviews were used to identify the roles of teachers and students within the activities advocated by the new textbook, the main challenges teachers face, and the extent to which teachers perceived they needed training to be able to teach it. Both teachers agreed that the new Mathematics textbooks were better than those used previously in terms of content and recommended teaching approaches. They suggested that the implementation of these textbooks created a need for improving the role adopted by teachers and students in pedagogic activities. For example, regarding the role of teachers and students, Teacher 1 believed that:

‘Almost all of the old curriculum was just filler where the teacher says some questions and examples and the student only writes that, but the new one is not, it requires the student to participate more.’

Here, we can see T1 comparing the expectations of the student under the old and new curricula, and recognising that the new ‘reform-orientated’ approach ‘requires students to participate more’ and be more interactive. T1 also states that the role of students needs to change in order to use the textbook effectively:

‘it requires the student to discover and deduct the [mathematical] concepts.’

Here, T1 appears to perceive that students are required to develop more conceptual forms of understanding through their increased participation in response to the teachers’ questions (see the first quote). This connection was made explicit by T2:
‘the student is a participator and more interactive, if he does not interact with the teacher, he will not understand.’

As I have shown in Chapter 2, the ‘reform-orientated’ Mathematics textbook tasks and activities (as outlined in Chapter 2) required students to talk about their mathematical thinking and how they solve problems. For these two teachers, this signalled a shift in the position and requirements of the student, which, subsequently, required a shift in existing classroom practice. Thus, there appeared to be a fundamental need for teachers’ professional development in order to bring about such shifts in practice.

‘The teacher needs training, there is no training... training must be by people who have at least doctorate degree because those who train us, they are educational supervisors who were teachers of mathematics and have only experience ... at least when you apply a U.S. curriculum, you either send the trainers to get training in America or bring American trainers here to train in Saudi Arabia to show us how to teach, and the problem is that the current training sessions are short’ (T1)

The sense in which the teachers felt they needed more support in implementing the ‘reform-orientated’ textbooks in their own practice is quite palpable here. T1 recognises that there is a lack of professional knowledge in SA in terms of how this reform approach can be implemented since it is left to SA-based ‘supervisors’, rather than ‘training/trainers from America’, who, presumably, have experience with such teaching. Therefore, we can see from these pilot interviews that there is some agreement with the literature in Chapter 2 regarding the need for professional development activity in order to support teachers in changing their roles in the classroom to align with the expectations of the textbook/curriculum. Here, the argument is that these pilot interviews illustrated that teacher development, which focused on increasing pupil participation/interaction, was appropriate and highly relevant in supporting teachers as they negotiate the new curriculum; therefore, the design of TDP focused on the quality of dialogue because: a) this appeared to be a key area which proved challenging for Saudi teachers; and b) it was an integral part of the new textbooks and I could bring in my knowledge of the ‘reform-orientated’ research literature upon which it was based.

4.3.2 Use of Video Recall as a Tool for Professional Development

As discussed in the literature review, the use of video of teachers’ practice is a useful tool for their development and reflection; therefore, I also conducted some pilot work to assess the use of video stimulated recall as part of a teacher development process with one tutor from an undergraduate course. The purpose was to use the video episodes to encourage reflection, specifically focusing on the nature of dialogue between the tutor and
undergraduate students. A video recording was made from a one-hour lecture. Upon viewing the video, I selected key episodes relating to the tutor’s interaction with students, which included dialogue and question-response sequences. The purpose of this was to develop my skills in selecting appropriate episodes and questioning teachers regarding these episodes as a means of promoting reflection. As this pilot could not include more than one tutor and was conducted within a very different context to that of the main study (due to logistical reasons), it was decided that a semi-structured interview with the tutor would be more appropriate, as opposed to a shared group discussion involving three teachers, as was the case in the TDP. This interview with the tutor involved asking key questions about tutors’ beliefs regarding dialogic teaching and the nature of questions (see Appendix B for full details). The schedule of the interview is shown in the following table.

**Table 4.1: An example of tutor pilot interview**

<table>
<thead>
<tr>
<th>Part one</th>
<th>Video No. 1</th>
<th>Video No. 2</th>
<th>Video No. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video selected</td>
<td>The purpose</td>
<td>The interview questions:</td>
<td></td>
</tr>
<tr>
<td>Video No. 1</td>
<td>In this video, I identify your question as open (i.e. a question that requires free recall), how do you think this went in terms of the type of question asked and the responses you got?</td>
<td>Q.1: What type of question do you usually ask your students? (e.g., open vs closed)</td>
<td></td>
</tr>
<tr>
<td>Video No. 2</td>
<td>In this video, I identify your question as closed (i.e. only a fixed answer is possible), how useful was this?</td>
<td>(Presenting video) Q.2: When you ask your students a question, what do you expect of them?</td>
<td></td>
</tr>
<tr>
<td>Video No. 3</td>
<td>In this video, the opportunity for the tutor to start a dialogue occurs but this needs to be extended using follow-on questions.</td>
<td>Q.3: Do you like to engage in dialogue with your students? Q.4: What do you think about the purpose of this dialogue? (Presenting video) Q.5: How do you see the role of your students during the dialogue?</td>
<td></td>
</tr>
</tbody>
</table>

Piloting this approach indicated that there are challenges and affordances created by the video-stimulated recall method when investigating teacher reflective practice. For example, the importance of familiarising the participants with the video camera and the experience of being videoed was apparent. I noticed that the tutor was slightly nervous,
and frequently attended to the camera. This also was the case with the primary teachers I worked with for the main study; therefore, I extended the length of Phase 1 (this will be explained in Section 4.4) to increase familiarity with the video camera prior to the initiation of the TDP.

Additionally, although the context of the pilot study (undergraduate lecture room) and the main study (primary classroom) were different, the influence of being videoed and the intrusion of the researcher as an unfamiliar person in the classroom were seen as relevant issues to both. Therefore, in the main study, more attention was directed towards making my presence less intrusive by being a co-teacher or teaching assistant in the classrooms of the main study. This pilot study also helped me to see the challenge in presenting the selected video episodes to the teachers in such a way that makes them notice possible contradictions between their espoused beliefs and enacted practice, but without the need to judge and/or critique them directly. For example, the tutor believed that students are expected to explain and justify their answer, but the video recording showed that, on some occasions, follow-on questions, such as why do you think? and how? were not used to achieve this, such as in the following demonstrative example:

**T:** What do you think they do with pictures?

**S1:** I think tabloid like pictures are important whereas in broadsheet is bit... text is important... pictures are little.

**S2:** I say in tabloid that the death more... like incriminated pictures whereas in broadsheet they trying get one picture that tells lot parts of story.

**T:** Okay.

Here, in this example, in the moment of presenting the video, I noticed how difficult it was to ask the teacher questions what may be perceived as critical of their own practice. Therefore, I learned in future how to create a safe space for reflection and discussion about contradictions by gradually presenting them and preparing the teachers to notice such contradictions.

In summary, both pilot studies contributed to the main study in different ways. The interviews with Saudi Mathematics teachers were important for my own understanding about their experiences and challenges with the new Mathematics textbooks. This contributes to the main study through seeing the conflicts (e.g., with new tasks such as...
classroom talk) that they are experiencing in teaching with this textbook. Moreover, regarding the second pilot study, it was important to practise how I used video episodes of teaching in order to facilitate reflective discussion about teaching practice.

4.4 The Teachers’ Development Programme (TDP)

In this section, I explain how the TDP happened as a developmental activity. The TDP took place in two phases, which were influenced by my own understanding of different literature concerning teacher development and classroom practice. This section will illustrate the two phases of the TDP, and the aim and activities of each phase. Then, I will justify designing the TDP like this as a means of facilitating teachers’ professional development.

4.4.1 Phase 1

The aim of this phase was to gather preliminary data about the teachers, focusing especially on the communicative strategies they use in the classroom and the quality of discussions that take place there. The purpose of this phase was to establish a starting point in terms of the kind of communicative strategies used in the classroom at the beginning of the research, their use of the textbook, and how they perceived their teaching practice. This involved general lesson observations in the three teachers’ classrooms and individual semi-structured interviews (see Appendix C, which provides a sample of questions asked in this interview). I also videoed lessons with the intention of selecting some video episodes for use in the workshops in Phase 2 (see below). Here, the video recordings served two functions: (i) to establish an account of current communicative practices in the identified classrooms; and (ii) to provide episodes for stimulated recall during the teacher development workshops.

As I described earlier, the use of video was significant as it brought classroom practice into the TDP discussions. Here, I suggest such video observations also brought the researcher close to the teachers’ practice by enabling me to establish a holistic picture of what teaching was like prior to the TDP. However, one possible disadvantage is that classroom observation can produce ‘unwanted change’ (as opposed to deliberate change) in the teachers’ or students’ behaviour and actions (e.g., misbehaviour, exhibitionism) due to the presence of a researcher—notably a stranger—in their familiar territory (Fraenkel & Wallen, 2003). For this reason, prior to Phase 1, there were lesson observations (2–3 lessons per teacher), spanning a period of two weeks, to familiarise the teachers and
students with the researcher prior to actual data collection in order to build collaborative relationships that could enable a more deliberate change in practice by the teachers (and, eventually, amongst the students too).

4.4.2 Phase 2

The second phase involved the implementation of the TDP, which comprised the following components: (i) 8 Professional Development Workshops, which involved viewing video episodes (initially selected by myself) connected to a series of themes (see below); (ii) Lesson Observations, conducted by myself of the three teachers in the classroom (forming the material for the video episodes whilst also allowing me to see how their practice was shifting in response to workshop discussions); (iii) homework activities (e.g., writing recommendations for change); and (iv) a final seminar organised by myself and the TDP teachers to disseminate our reflections to the wider teacher community in the school.

4.4.2.1 Professional Development Workshops:

Eight professional development workshops were set up to stimulate teachers’ reflections on the quality of talk that took place in their classrooms. These workshops took place on a weekly basis; all were attended by all three case teachers and myself. In order to start this process, a series of key themes identified by the researcher and, later, the teachers themselves, provided the starting point for discussion in each workshop. These themes were drawn from relevant ‘reform’ type literature, such as:

- The notion of dialogic teaching defined by Alexander (2006) as
  - collective: teachers and children address learning tasks together, whether as a group or as a class;
  - reciprocal: teachers and children listen to each other, share ideas and consider alternative viewpoints;
  - cumulative: teachers and children build on their own and each other’s ideas and chain them into coherent lines of thinking and enquiry;
  - supportive: children articulate their ideas freely, without fear of embarrassment over ‘wrong’ answers, and they help each other reach common understandings;
  - Purposeful: teachers plan and steer classroom talk with specific educational goals in mind.
The eight characteristics of effective teacher-initiated teacher–pupil dialogue
Kyriacou and Issitt (2007).

Table 4.2: The characteristics of effective teacher-initiated teacher–pupil dialogue (Kyriacou and Issitt, 2007)

<table>
<thead>
<tr>
<th></th>
<th>The characteristics</th>
<th>the nature of teacher-pupil dialogue</th>
</tr>
</thead>
</table>
| 1 | Going beyond IRF                                                                     | - Asking open-ended questions and follow-up questions  
- Including asking pupils to justify or explain their answer or to comment other pupils’ answers |
| 2 | Focusing attention on mathematics rather than performativity                         | - Teachers can use dialogue to get pupils involved in mathematical thinking rather than getting correct answers. |
| 3 | Working collaboratively with pupils                                                  | - Teachers can use dialogue to establish a learning environment in which pupils and teachers are working collaboratively in exploring mathematical problems |
| 4 | Transformative listening                                                             | - Teachers listen to pupils’ contributions in a manner that conveys that there is a genuine ‘meeting of minds’.  
- Teachers are genuinely willing to change their own thinking in the light of what the pupil has said. |
| 5 | Scaffolding                                                                         | - Teachers use dialogue to scaffold pupils’ thinking and understanding. |
| 6 | Enhancing pupils’ self knowledge concerning how to make use of teacher-pupil dialogue as a learning experience | - Teachers can enhance pupils’ self-knowledge about the nature of the learning process by help pupils:
  - To develop skills that will enable them to make better use of classroom dialogue.  
  - To appreciate how using talk and listening to teachers and other pupils’ talking is a learning experience. |
| 7 | Encouraging high quality pupil dialogue                                             | - Teachers respond in an encouraging manner to pupils’ contributions. |
| 8 | Inclusive teaching                                                                  | - Teachers can convey to all pupils regardless of ability that their contribution is equally valued and that all pupils in the class are engaged and have their answers taken seriously. |
The themes of these workshops related to ‘teachers’ talk’ in an effort to understand how the teachers think and respond to students, and also to encourage reflection on the quality of dialogue in line with the recommendations of the new ‘reform’ curriculum. This involved consideration of how a more interactive approach might be implemented using the classroom activities and tasks from the new textbooks, such as real-life problems, talk tasks, and higher-thinking skills problems. Ideas, such as starting lessons using problems in order to establish dialogue with students, were also considered. Table 4.3 provides a detailed plan of themes for the teacher development workshops.

**Table 4.3: The workshops’ themes of the teacher development programme (TDP)**

<table>
<thead>
<tr>
<th>Workshops</th>
<th>Themes</th>
<th>The purpose of planned themes</th>
</tr>
</thead>
</table>
| **First workshop** | Preparing the classroom. Creating a supportive classroom. Collective teaching | - To encourage teachers to change the arrangement of classroom toward pair seating.  
- To encourage teachers to establish classroom interactions.  
- To encourage teachers to share the lesson or learning tasks and objectives with students. |
| **Second workshop** | Talk in the classroom  
Talk Task  
Talk–listen–talk  
Talk–respect–talk (Ground rules)  
Obstacles and Opportunities to the skill of talking | - To increase teachers’ awareness of crucial role of classroom talk for students learning and allowing them to talk.  
- To discuss the purpose of Talk Task as one of important tasks in the new Mathematics curriculum.  
- To encourage teachers to establish ground rules in classroom through more listening and respecting each other’s talk and to support teachers’ in developing more dialogue with their students.  
- To allow teachers to offer the obstacles and opportunities of classroom talk and discuss them.  
- All these themes were to cover the principle of supportive teaching as characteristic for dialogic teaching. |
| **Third workshop** | Classroom questions  
Asking questions  
Giving more time for students’ responses | - To open discussion about the different types of classroom questions.  
- To encourage teachers to ask more open questions to increase students’ participation and engagement in classroom interaction.  
- To encourage teachers to offer students more time for their responses. |
| **Fourth + fifth workshops** | How–why questions  
Asking students to explain their thinking  
We-rather-I statements | - To encourage teachers to use open questions for students explanations and justification for their responds.  
- To encourage teachers to establish collective talk |
<table>
<thead>
<tr>
<th>Workshop</th>
<th>Theme</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Reciprocal teaching | Asking students to ask other students | through change their talk to use language which include everyone in the classroom.  
- To introduce the principle of reciprocal as characteristic for dialogic teaching.  
- To encourage students participation in classroom dialogue through asking each other.  
- To encourage teachers to reflect on the change of lesson’s time based on the changes and new teaching strategies |
| The sixth workshop | Effective discussion | - To encourage teachers to have more effective classroom discussion.  
- To introduce the principle of Cumulative as characteristic for dialogic teaching.  
- To encourage teachers to support classroom dialogue through students’ pairs or groups. |
| Cumulative teaching | Supporting dialogue by organising students’ in pairs or groups. |  |
| The seventh and eight workshops | Cumulative teaching | - To introduce the principle of purposeful teaching as characteristic for dialogic teaching.  
- To introduce different characteristic of effective teacher-initiated dialogue.  
- To discuss how to improve classroom practice through all principles of dialogic teaching.  
- To increase teachers’ awareness of crucial role of classroom dialogue to support finding different strategies or ways for a mathematical problem. |
| Purposeful teaching | The nature of dialogue  
Practicing principles of dialogic teaching. Activity (finding $1012 - 815 = ?$) |  |

Prior to each workshop, I identified key video episodes from the lessons I had recorded relating to the chosen theme: for example, initial lesson recordings in Phase 1 showed teachers explaining-then-drilling students, with the authoritative voices of the teachers dominating what was going on in the classroom. Therefore, I selected different video episodes that I used to provoke a discussion on the relevant workshops themes: for example, I selected two video episodes which showed how students worked individually in order to support the theme regarding classroom organisation (which moved the discussion towards paired learning) in the first workshop (for full details of Workshop 1, see Appendix D).

4.4.2.2 Lesson Observations:

Following each teacher development workshop, a lesson conducted by each case teacher was observed and video-recorded. Teachers were encouraged to implement some of the ideas raised during the teacher development workshops (these became part of the group’s shared repertoire—see Chapter 6). These video recordings then provided further episodes which could be utilised as a tool for reflection in future workshops: for example, the first workshop looked at encouraging students’ participation and paired-learning. Therefore,
the changes in practice which connected to this aim were video-recorded for discussion in the next workshop, in order to determine how teachers experienced this change and how we could develop it further to support classroom dialogue.

4.4.2.3 Short Weekly Sum-up Meetings:

Short meetings were conducted directly after the lesson observations, which followed each workshop. These were conducted as individual meetings between myself and each teacher. Here, the purpose was to hear the teacher’s immediate reactions and perceptions about what he had implemented in his lessons. These meetings formed the future discussions in the TDP as they informed my decision making about the selection of video episodes and new themes.

4.4.2.4 Mid-study Break:

There was a week-long break after four weeks of the TDP, during which time no workshops or lessons were implemented or observed. During this time, I reviewed and analysed the lessons’ videos from the initial four weeks (3 lessons per a teacher) to evaluate the evidence collated, and how this might feed in to future workshops. This enabled me to select different video episodes to present them within planned themes of future workshops. Here, my criteria for selecting such videos were based on a number of elements, including: i) evidence of change in the quality of dialogue in the teachers’ classrooms since Phase 1; and ii) evidence of practice relating to the themes outlined in Table 4.2. I also looked at the quality of critical reflection occurring within the workshops in order to make decisions on how we might organise the remaining workshops in the TDP. It was at this point in the TDP that we agreed to conduct an end-of-programme seminar, where our reflections would be discussed and disseminated amongst other teachers who were invited by the participating teachers. Additionally, during this break, one video episode was sent to teachers to view independently with the intention that they write notes about this episode. Here, the main instructions given to teachers were to provide their reflections on teacher’s practice and to justify their reflections or notes. Then, as I received teachers’ written notes and reflections (see Appendix E for full transcript of video episode, teachers’ written notes), I reviewed them to identify those that were relevant to the discussions in the first half of the TDP. This informed the plan of the second half of the TDP.
4.4.2.5 The Seminar:

As mentioned above, at the end of the TDP, a seminar was conducted as an emergent activity due to my recognition of teachers’ interest to share their experience of what happened in the TDP workshops with their personal Mathematics teacher network in other schools. There were six math teachers from different primary schools invited by the participating TDP teachers. Therefore, in the final seminar, each of the three TDP teachers acted as a leader of a group of new teachers and discussed their experiences. The seminar was structured by themes and questions (see Appendix F), which related to the teachers’ experiences of the TDP (this will be explained in the following section). Whilst the aim of this activity was centred on offering a space to disseminate teachers’ reflections, which had taken place in the workshops, to a wider audience. It also provided a rich source of data concerning how the teachers explained and understood their participation and development in relation to the TDP.

4.4.3 A description of the 8 TDP Workshops

As illustrated above, there were eight workshops conducted during the TDP. The following table provides descriptions of each workshop and the lesson observations that took place in between workshops, and therefore fed into the discussions

Table 4.4: The workshops’ descriptions of the teacher development programme (TDP)

<table>
<thead>
<tr>
<th>workshops</th>
<th>The narrative of each workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>First workshop</td>
<td>In this workshop, I started the first professional development workshop with video of an example of a Japanese Lesson study to demonstrate collaboration between teachers and how this can be supported with videos of classroom practice. Then, I presented some data from the first phase about the nature of the classroom learning environment and the students’ participation. This included presenting eight video episodes to support the discussion around the planned themes. The focus was on classroom interactions in terms of how students are able to participate and interact with their teachers and how the classroom climate supports their involvement. For example, we discussed using worksheets and sharing the lesson’s aim by writing we want to learn on the whiteboard and we debated how this might affect students’ participation through encouraging student-student and teacher-student interactions. In addition, the workshop explored the principle of collective teaching when teachers and students address learning tasks together, whether as a group or a class, rather than in isolation. This was intended to create opportunities for teachers to develop classroom rules which operationalise a more interactive format in the coming weeks. At the end of this workshop and further workshops, all teachers and I concluded with writing recommendations for implement the new meanings and strategies in their classroom practice.</td>
</tr>
<tr>
<td>Lesson observation (Week 1)</td>
<td>Date</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Teachers</td>
<td>Ahmad</td>
</tr>
<tr>
<td></td>
<td>Zayed</td>
</tr>
<tr>
<td>Lesson</td>
<td>Probability and Fractions</td>
</tr>
<tr>
<td></td>
<td>Add and Subtract Unlike Fractions</td>
</tr>
</tbody>
</table>

**Second workshop**

This workshop started with discussion on the first week of implementing new teaching strategies (e.g., pair learning, and sharing learning goals with students) discussed in workshop 1. I supported this discussion by presenting different videos of this implementation. Then, in addition we discussed the themes of talk–respect–talk (TRT) and talk–listen–talk (TLT) rules for students to encourage them to talk without being afraid of making mistakes; students should respect each other’s talk. The TLT rule means that students are encouraged to talk while other students carefully listen and then talk based on previous comments. These rules were to support teachers’ in developing more dialogue in their classroom. Then, this linked to the principle of supportive teaching when students articulate their ideas freely, without fear of embarrassment over wrong answers, and help each other reach common understandings.

<table>
<thead>
<tr>
<th>Lesson observation (Week 2)</th>
<th>Date</th>
<th>16–20/02/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Ahmad</td>
<td>Sultan</td>
</tr>
<tr>
<td></td>
<td>Zayed</td>
<td></td>
</tr>
<tr>
<td>Lesson</td>
<td>Multiples</td>
<td>Units of Length</td>
</tr>
<tr>
<td></td>
<td>Ratios and Rates</td>
<td></td>
</tr>
</tbody>
</table>

**Third workshop**

In the third workshop, firstly, we revised all recommendations of the previous two workshops. Then, I presented a hand-out containing different levels of questioning based on Bloom’s Taxonomy for discussion with teachers. After this discussion, we viewed four video episodes about teachers’ classroom questions. These episodes were for teachers’ reflections on their questions. Next, we moved on to discuss different types of classroom questions, such as closed-ended (e.g., yes/no questions), those that produced short-responses and open questions. This was supported by more four video episodes to reflect on them. At the final part of this workshop, the discussion focused on the suitable time for asking questions and how to give students more ‘wait time’ to offer responses.

<table>
<thead>
<tr>
<th>Lesson observation (Week 3)</th>
<th>Date</th>
<th>23–27/02/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Ahmad</td>
<td>Sultan</td>
</tr>
<tr>
<td></td>
<td>Zayed</td>
<td></td>
</tr>
<tr>
<td>Lesson</td>
<td>Compare Fractions</td>
<td>Perimeter</td>
</tr>
<tr>
<td></td>
<td>Decimals and Fractions</td>
<td></td>
</tr>
</tbody>
</table>

**Fourth workshop**

The fourth workshop continued to develop and focus on the previous weeks’ themes, such as students’ talk rules, teachers’ questions and ‘wait time’. Firstly, we held discussion which developed in to looking at asking ‘how–why’ questions so students can explain their answers and thinking. These themes were supported by various video episodes to reflect on them. Additionally, we discussed using ‘we’ rather than ‘I’ statements, in which all classroom participants think together so that teachers are not the only ones who have correct answers. This linked to the principle of reciprocal teaching, when teachers and students listen to each other, share ideas and consider alternative viewpoints. In this workshop, teachers were offered different example of their students written reflections about what and how they had learnt, and two written examples of pairs’ conversations. This was to show teachers the increase of students’ participation through paired learning.

<table>
<thead>
<tr>
<th>Lesson observation</th>
<th>Date</th>
<th>02–06/03/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Ahmad</td>
<td>Sultan</td>
</tr>
<tr>
<td></td>
<td>Zayed</td>
<td></td>
</tr>
</tbody>
</table>
### (Week 4)

| Lesson | No lesson observation as most students were absent. |

### Mid TDP break (1 week)

As explained in section (4.4.2.4), teachers independently viewed one video episode (for one teacher) in order to reflect on it and justify their reflections.

### Fifth workshop

In this workshop, the time was divided into two parts. In the First part we continued to discuss the previous workshop’s themes. This was by presenting the themes for teachers and allowing them to share what they had learned of them. For example, we considered how important it is to encourage students to explain and justify their answers and why this important. Moreover, more discussion was about the principle of reciprocity as a characteristic of better quality dialogue and how to implement that in classroom. In the second part, I presented the teachers’ individual written reflections about Zayed’s video episode (from phase one) which they had written during the mid-break of the TDP. Here, we started this activity by viewing the video episode and then we had a discussion about the teachers’ individual reflections. At the end of this activity, we viewed another video episode for Zayed from Phase 2 which showed the implementation of different teaching strategies (sharing learning goals, supporting students’ talk without being afraid, and pair learning). Teachers reflected on this video with some comparison between the two video episodes.

### Lesson observation (Week 5)

<table>
<thead>
<tr>
<th>Date</th>
<th>16–20/03/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Ahmad</td>
</tr>
<tr>
<td>Lesson</td>
<td>Add like Fractions</td>
</tr>
</tbody>
</table>

### The sixth workshop

In the sixth workshop, we discussed two video episodes in terms of how to have effective discussion in the classroom. Then, we discussed the principle of cumulative teaching which I introduced to the group. Here, the focus was on how teachers and students build on their own and each other’s ideas, linking them together into coherent lines of thinking and enquiry. Additionally, using a video episode of students doing paired work, we also had more discussion about encouraging students to work in larger groups during classroom activities and how to support their dialogue within them.

### Lesson observation (Week 6)

<table>
<thead>
<tr>
<th>Date</th>
<th>23–27/03/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Ahmad</td>
</tr>
<tr>
<td>Lesson</td>
<td>Prime and Composite Numbers</td>
</tr>
</tbody>
</table>

### The seventh workshop

We started the seventh workshop with continuing discussion about previous workshop’s themes such as how teachers and students build on each other’s ideas. Here, the teachers were offered space to share their experiences regarding their own classroom discussion and their students’ participation. Then, the teachers introduced the purposeful feature of dialogic teaching as purposeful. Furthermore, in this workshop and the next, there was an emergent theme about teachers’ own experiences. Therefore, we had space and time for teachers’ to discuss their individual experience of the TDP in previous weeks. At the final part of this workshop, teachers were introduced the characteristics of effective teacher-initiated teacher–pupil dialogue (Kyriacou and Issitt 2007) and discussion about them.

### Lesson observation (Week 7)

<table>
<thead>
<tr>
<th>Date</th>
<th>30/3 until 3/04/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Ahmad</td>
</tr>
<tr>
<td>Lesson</td>
<td>Units of Time</td>
</tr>
</tbody>
</table>
In this final workshop, we started with more discussion about the teachers’ experiences of the purposeful feature of dialogic teaching. Moreover, the teachers were encouraged to reflect on different examples of success stories about students’ participation. These examples were selected based on my classroom observations. Then, the workshop moved to review the principles of dialogic teaching in their classrooms and how they could be developed for use in Saudi classrooms more generally. Furthermore, there was activity about a lesson which focused on ‘What is 1012 – 815? How to solve this?’ I had selected this video to show how dialogue is important to encouraging different strategies for solving mathematical tasks or problems. Then, I gave the teachers a hand-out containing a table presenting the first, second and seventh workshop’s teachers’ written recommendations. Here, the teachers reflected on the development of their recommendations and suggestions between early and final workshops. At the end of this final workshop, the teachers had space to write some final recommendations not only about the eight workshop’s themes but generally for the whole TDP and its all workshops.

### Lesson observation (Week 8)

<table>
<thead>
<tr>
<th>Date</th>
<th>06–10/04/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Ahmad</td>
</tr>
<tr>
<td>Lesson</td>
<td>Revision of Units of Time</td>
</tr>
<tr>
<td></td>
<td>Revision of Division by 2</td>
</tr>
<tr>
<td></td>
<td>Zayed</td>
</tr>
<tr>
<td></td>
<td>percentage</td>
</tr>
</tbody>
</table>

All the three case teachers and the six new math teachers attended the seminar. I prepared small booklet which had information about the TDP and different examples and photos from the TDP. For example, it included an example of transcript of students in conversation and discussion as pairs. The seminar started with a short introduction about the TDP and the concept of dialogic teaching. Then, we discussed teachers’ experiences of the TDP (e.g., questions about teachers’ thoughts of dialogic teaching, Talk Task, and opportunities and challenges faced using dialogic approach in classroom). Moreover, we also discussed questions about the role of school, society and government in terms of supporting teachers to improve classroom dialogue. Finally, the seminar ended with an open discussion about classroom questions in terms of asking questions have more than one answer. (see appendix F).

4.4.4 Rationale for the TDP design

In Chapter 3, through reviewing the research literature on teachers’ professional development, I have discussed both the components of the process of teacher development and some of the different models used in different countries. In so doing, I have argued that teacher development essentially is concerned with identity transformation through reflection, and that reflection is more likely to occur in spaces where beliefs are brought into dialogue with practice. I have suggested the use of videoed episodes of practice is useful for making this happen, but there also are other mechanisms, which are identified by the various models discussed—the building of a community where teachers can come together to talk about their practice, and where institutional and classroom practices can be discussed—and, lastly, the input of theoretical insights from the research literature on the topic in question (in this case
classroom dialogue) and some input from Mathematics educator researchers who can broker such theoretical insights. In this next section, I explain how these findings informed the design of the TDP.

4.4.4.1 Teacher Identity Development:

Firstly, in this study, I have constructed the TDP to investigate how Saudi teachers can develop their own understanding of dialogic teaching as they teach the new ‘reform’ curriculum; therefore, teacher identity development was incorporated into the design of the TDP in terms of its long-term nature, which aimed at supporting this development. As discussed in Chapter 3, identity development needs teachers to be active in the process of development (Beijaard et al., 2004). Furthermore, teacher identity development is a continuous and dynamic process (Ponte & Chapman, 2008); therefore, it is important to offer a long-time programme, which allows teachers to be active in this process through their engagement with professional activities. The account of the workshops in Table 4.3 illustrates the active collaboration that this TDP aimed to instigate with the teachers involved, and I hope it is evident that the teachers began to take more ownership of the discussions as the workshops progressed.

4.4.4.2 Bringing Beliefs and Practice into Dialogue:

The intention behind the use of video episodes of the teachers’ practice was to elicit beliefs, both from myself and the teachers, bringing them under conscious reflection and into dialogue with the teachers’ practice. The purpose was to provide opportunities for teachers to reflect on such beliefs and, over time, consider how they might be developed and then enacted in practice. For example, if a teacher holds a strong belief about students’ mathematical abilities, which are dependent on stable characteristics, such as natural talent, the teacher may enact forms of teaching which tailor differentiated access to specific parts of the curriculum. However, if this belief begins to shift through negotiation and discussion, we then may see a different form of pedagogic practice. Therefore, researching teacher beliefs and bringing them to consciousness within the group was a key aim behind the selection and introduction of the video episodes outlined above.

4.4.4.3 Building a Community:

In the literature review, I have shown how different models of professional development are designed to support teachers’ collaboration, and some of them pay much attention to the concept of teacher communities. Therefore, the TDP design was a school-based
professional development, which enabled 3 teachers and myself to come together on a regular basis with the aim of creating a community in terms of building relationships over time. The workshops outlined above took place on a weekly basis, and I argue that this consistent collaboration between teachers and myself enabled us to form a community of sorts, which would facilitate reflection on their classroom practice and how the quality of dialogue could be improved, which was taking place during the TDP time period.

4.4.4.4 A Cyclical Approach:

As outlined in the literature review (Chapter 3), one of the important components of some professional development models is the cyclic nature, whereby practice moves from being an object of reflection to being practiced and then back to being an object of reflection. This is a key component of the reflective practice model, as identified by Schon and colleagues, but is also built into some PD models, such as lesson study and VDC. Therefore, I designed the TDP partly with this kind of cycle in mind. The description of the TDP outlined above details how the cycle starts with the first workshop, where the teachers reflect on themes instigated relating to new ideas and meanings about classroom dialogue, which I had brought from the research literature. Next, the teachers were encouraged to implement these ideas and meanings in their classrooms. As stated, in each workshop, the teachers brought their experience of their developed classroom practice, and then continued to discuss and reflect on further new ideas and meanings, which informed practice. A key motivation behind adopting a cyclical design such as this was the argument that the direct classroom observations of their own, along with each other’s practice, is critical in producing some form of teacher development, and maybe even change in practice (Guskey, 2000). By bringing video episodes from teachers’ classrooms into the TDP workshops, I provided a link between actual practice and reflective activity. Nevertheless, as noted in Chapter 3, whilst adopting a cyclic design such as this is useful in facilitating ‘reflection on action’, it is difficult to discern how this brings about development per se. Therefore, as I will demonstrate through the analysis chapters of this thesis, there is a need to consider how reflection on action can expose contradictions, which then must be negotiated and sometimes even addressed through a change in practice.

4.4.4.5 Input of Theoretical Insights/Research Literature:

The key focus of the TDP was to foster reflection on the quality of classroom dialogue in teachers’ classrooms. As outlined above, in each workshop, themes from the research
literature were introduced to teachers in order to provoke discussion, which focused on how they were manifest in their own classrooms and/or if they could be implemented, if deemed appropriate. For example, many Saudi classrooms contain whole-class teaching which follows highly controlled initiation–response–evaluation (IRE) sequences, in which the initiating question gets a response by students and is then evaluated by the teacher (Alzaghibi & Salamah, 2011; The Centre for Educational Development, 2004). This kind of pattern can leave few opportunities for students to engage with the teacher or in student-to-student dialogue (Wells, 1993; Wells & Arauz, 2006). Therefore, the teachers’ practices (such as questioning) were discussed in a number of workshops (third and fourth ones) in order to provide the teachers with the opportunity to reflect on typical patterns of discourse and accordingly to develop strategies that could facilitate better ‘quality’ student participation. By introducing such themes from the research field, I then was able to focus the teachers to their dialogue with the intention that they might come to critically reflect on this more spontaneously as the TDP progressed.

4.5 The Participant Teachers

This study was conducted in Tabouk city, as I live and work in the area. For the selection of the school, the General Education Department in Tabouk was sent an email, indicating the title of study, its purpose, the number of teacher participants required, and the time and plan of the programme. Three teachers was deemed an appropriate number as this created sufficient opportunity for discussion of diverse teaching practices and experience; however, it also was small enough for the teachers and myself to build relationships throughout the TDP. The participants were three male primary Mathematics teachers: Ahmad, Sultan and Zayed. All of the participants work in a public primary boys’ school, teaching grades 5, 3 and 6, respectively. As discussed in Chapter 2, all schools are single-sex, as based on the Islamic perspective; therefore, selecting female participants or a girls’ school was not possible for myself as a male researcher.

All three teachers graduated from Tabouk Teachers’ College with a Bachelor’s degree in elementary education and a specialisation in Mathematics. The selected primary school is one of the Tatweer (development) primary schools in Tabouk, as outlined in Chapter 2. A Tatweer school is one that has been afforded more authority in terms of promoting teacher professional development. A teacher in each subject area is elected by Education Department to act as educational supervisor for other teachers, and is responsible for their
professional development and its contribution to the development of the school. The status of the school as a Tatweer school was an important factor in enabling me to conduct an intensive and time-consuming TDP at this particular school: the teachers and senior management were keen to establish this, and the selected teachers appeared eager to participate. One of the teachers involved in this TDP was Ahmad, who also had a role to play as the supervisor, which impacted the development of the TDP (to be discussed later on in this thesis).

To summarise, these three teachers became involved in this TDP because: (a) they were interested in becoming involved in the research and learning about their own practice; (b) they were willing to allow me to interview them and observe their classes, making video recordings; and (c) I already had a pre-existing positive relationship with one teacher, Zayed, since we had been friends in secondary school and attending teachers’ college for Mathematics specialisation. These factors were important for the type of in-depth probing and scrutiny into the teachers’ own practice I intended to try and facilitate amongst the group during the TDP workshops. The following table shows some of the teachers’ history prior to the TDP:

### Table 4.5: The description of teachers’ experience and teaching history

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Teaching experience (years)</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sultan</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; year</td>
<td>All grades</td>
</tr>
<tr>
<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; year</td>
<td>One and six</td>
</tr>
<tr>
<td></td>
<td>3–9</td>
<td>Mix grades with priority of early grades</td>
</tr>
<tr>
<td></td>
<td>10–13</td>
<td>Mix grades with priority of early grades</td>
</tr>
<tr>
<td></td>
<td>TDP year</td>
<td>Three</td>
</tr>
<tr>
<td>Zayed</td>
<td>1–2 (two years)</td>
<td>Mix grades</td>
</tr>
<tr>
<td></td>
<td>3–5 (three years)</td>
<td>1–3 grades (two years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4–5 grades (one year)</td>
</tr>
<tr>
<td></td>
<td>6–9 (four years)</td>
<td>Six Grade</td>
</tr>
<tr>
<td>Ahmad</td>
<td>1–6</td>
<td>Mix grades</td>
</tr>
<tr>
<td></td>
<td>7–8</td>
<td>Counselling</td>
</tr>
<tr>
<td></td>
<td>9–10</td>
<td>Administration</td>
</tr>
<tr>
<td></td>
<td>11–20</td>
<td>Mix grades</td>
</tr>
</tbody>
</table>
The following profiles provide further background information about the three teachers themselves.

4.5.1 Ahmad’s Profile

Ahmad has 20 years’ of schooling experience in various roles. Most of his experience (16 years) was as a Mathematics teacher in the primary school sector; however, he also had 4 years’ experience in secondary school as a student counsellor (2 years) and Vice Principal (2 years). In the year when this TDP took place, Ahmad was the teacher who acted as the supervisor for Mathematics teachers in this school. In addition, he taught Mathematics to First-fifth grades. Therefore, the fifth-grade classroom was selected to conduct the current research.

4.5.2 Sultan’s Profile

Sultan had 14 years’ experience as a primary Mathematics teacher. He had one year’s experience of teaching outside of Tabuk in a school, where almost all students were non-Saudi nationals, as the school was located in a town in the industrial and petroleum region with many non-Saudi workers. This provided Sultan with a different experience, and more experience than other two teachers, in terms of teaching non-Saudi students. During the period of his participation in the TDP, Sultan taught Mathematics in second- and third-grades and the research focused on his third-grade classroom.

4.5.3 Zayed’s Profile

Zayed was the least experienced amongst the three teachers with only 9 years’ experience as a primary teacher. He had started teaching for two years in a school in Riyadh, which is the capital of Saudi Arabia, which enabled Zayed to access greater opportunities for teacher training when compared to the other teachers. The last seven years of Zayed’s experience was in Tabouk, teaching high grades. During the time of the TDP, Zayed taught fourth to sixth grades; his sixth-grade classroom was selected for the focus of this development-research.

4.6 Challenges of the School Research Context

One of the challenges experienced in the school was the lack of a designated space for teachers of each subject to come together; there was only one common room in the school for teachers. At times, it was difficult to find a suitable room for the completion of individual interviews with the teachers at the beginning of the project; this affected the
scheduled times for interviewing two of the teachers in Phase 1. This lack of a designated space for Mathematics teachers was one of the reasons which prevented teachers in this school from communicating with each other and discussing each other’s teaching experience. This situation led Sultan in the first workshop to suggest that they should have a special department where teachers can discuss the learning environment, meaning they could hold meetings about Mathematics teaching.

Another challenge was to find a time which was commensurate with the three teachers for the professional development workshops to take place. The school policy regarding the distribution of teaching tasks amongst teachers did not provide a dedicated time for Mathematics teachers to hold short meetings so this had to be negotiated with the teachers and myself (senior management left this to us to work out). The only time suitable for all the three teachers was a 1.5-hour session at the end of the daily work on Saturday or Sunday. The teachers agreed to meet on Sundays because, on Saturday, the absence ratio of some teachers is high, causing additional burdens to be placed on other teachers and thus affecting the functioning of the school day. The timing of the workshops at the end of the working day affected teachers’ participation because of fatigue and tiredness. Therefore, the researcher was keen to ensure the first minutes of the workshop involved general talk before beginning the tasks of each workshop in order to provide the appropriate atmosphere for teachers to relax. The difficulty of finding an appropriate and dedicated time to conduct the professional development workshops had an impact on the proposed duration of each workshop; originally, I had planned that each workshop would last two hours, but this was not possible. After a while, the school administration allocated the learning sources room for holding the training workshops. This room was a dedicated classroom used by all teachers if they wanted to teach in groups or use computer facilities, and also operates as a small library.

In summary, although there were challenges in completing the TDP in the school, it was implemented relatively successfully with the workshops being well attended by the participant teachers. In the following section, I explain how the TDP was researched in terms of how I collected data for answering the research questions.
4.7 Researching the TDP

This section illustrates how the TDP became the object or the ‘case’ for research. It begins by providing some explanation about the research design (a case study approach) and the nature of this case study. Subsequently, it presents the process of research data collection and analysis. Finally, the issues of research trustworthiness and ethics were discussed.

4.7.1 The Research Design

Given that this study focuses on a particular TDP (developed by myself in collaboration with the three teachers), I decided to apply an evaluative case study approach (Bassey, 1999; Yin, 2003) to collect qualitative data on what was happening in the TDP discussions and how this might produce reflection and development of some kind. The case study method was chosen not only because of my need to research this specific context (i.e. the case of the TDP) but also due to its appropriateness when investigating ‘a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’ (Yin, 2003, p. 13). Using a case study approach allowed me to look in-depth at development within the TDP, including any/all changes in the teachers’ understanding of their own practice and how dialogue might feature more in this; it also allowed me to monitor changes in how the group of us (myself included) worked together to facilitate (or hinder) such development. This rationale is substantiated by the research literature on teachers’ professional development, and educational practice more generally (Bassey, 1999): for instance, Thompson (1992) argued that ‘case studies of teachers can be used intentionally to prompt teachers to reflect upon and examine their own beliefs and practices’ (p. 143). Therefore, it was felt that constructing a case study of the TDP would be useful in terms of speaking to other teachers and researchers about what took place, thus enhancing the impact of my research.

Moreover, as stated in Chapter 2, research into Saudi teacher education has shown a preference for quantitative research using surveys and questionnaires (e.g., AlSalouli & AlMotreb, 2006; Al-Tayar, 2011; Haroun et al., 2015). Here, I argue that a qualitative case study can provide an in-depth understanding of teachers’ professional communities and their developing professional identities. In addition, given the focus of the TDP (i.e. its overall purpose), which was to encourage teachers to become more reflective about the quality of dialogue in their classrooms, I needed a research approach that could map this
becoming, whilst also considering the challenges faced by the TDP and the teachers in so doing. Therefore, the use of qualitative case study enabled me to build in-depth understanding of the teachers’—and my own—experience in the TDP (Creswell, 2012).

4.7.2 The Nature of this Particular Case Study

My research on the TDP is specifically underpinned by the embedded case approach. Merriam (1998) defines a case as a ‘phenomenon that is inherently bounded, with a finite amount of time for data collection or a limited number of people who could be interviewed or observed’ (p. 27). In this case, the phenomenon under investigation was the development of the teachers’ reform practice (apparent in their understanding of the quality of dialogue in their classrooms) in the TDP (as a community of practice). This phenomenon, therefore, was bounded by the length of time over which the TDP ran (10 weeks), as well as the number of participants (teachers) involved who could provide relevant data.

Using case study research ‘enables the researcher to answer ‘how’ and ‘why’ type questions, while taking into consideration how a phenomenon is influenced by the context within which it is situated’ (Baxter & Jack, 2008, p. 556); this was particularly significant in this case as I wanted to investigate how the TDP operated within the SA context (the landscape of practice—see Chapter 6) in order to consider the type of teacher development that is possible. As such, an embedded case study design involves a larger case study containing more than one subunit of analysis or subcases (Scholz & Tietje, 2003; Yin, 2003). Baxter & Jack (2008) argue that ‘the ability to look at subunits that are situated within a larger case is powerful when you consider that data can be analysed within the subunits separately (within case analysis), between the different subunits (between case analysis), or across all of the subunits (cross-case analysis). The ability to engage in such rich analysis only serves to better illuminate the case’ (p. 550). In the case of this research, the large case was the development of the TDP, and the subunits focus on the development of the three teachers’ professional identities within this TDP. I also include my own development as a subunit within this case, as this appeared to be critical in relation to the development of the TDP as a whole (see the section on brokering in Chapter 9). Figure 4.1 below shows the nested nature of this case study design:
Figure 4.1: The embedded case study design of the research

Figure 4.1 shows that the subcases involve three teachers as they provide information about themselves, in meantime, about the general case study (TDP). Therefore, I argue that the embedded case approach is suitable when seeking to explore the research questions, which query how the quality of professional learning, which took place through the TDP, is mediated by the particular SA cultural context in which it is situated (whole case), but also how this professional learning can be seen as teacher identity development ‘in practice’ (subcases).

In relation to case study research, Yin (2003) argues that using different sources of data collection is very important, such as through interviews, observation and documents. The methods of collecting data here also needed to correspond with the theoretical framework of community of practice theory (Lave & Wenger, 1991; Wenger, 1998), which I will outline in the next chapter. Therefore, this study has adopted a variety of methods for data collection in researching the events that took place during the TDP. I used repeated interviews with the teachers in order to tap into their individual perceptions of their experience of participation, and I also recorded all workshop discussions to capture the collective dialogue, which took place between myself and the teachers. The workshop discussions, therefore, had a dual function in that they were both developmental for the teachers and my own professional development, but they also provided a key source of data to research this development (much of the analysis in later chapters focuses on such discussions). The final seminar involving other teachers was also recorded for this purpose. This corresponds with the research-development methodological standpoint this project has adopted.
Finally, the teachers’ videoed lessons also acted as a source of data, as well as a tool for development. My analysis does not focus primarily on what took place in the teachers’ classrooms because this research looks mainly at their development through the workshop discussions; however, at times, I have used accounts of the episodes recorded in the teachers’ classrooms in my analysis to further support my analysis of the TDP.

Moreover, as time and history are important in the work of Wenger (1998), the data collection was planned in a simultaneous way, ensuring the progress of TDP. Prior to data collection, there was preparation meeting for: 1) preparing discussion with teachers about the research and giving more details about the project, 2) participating in classrooms, and 3) gaining informed consent. The following table illustrates the data collected as the TDP progressed.

<table>
<thead>
<tr>
<th>Study Design</th>
<th>The task</th>
<th>Time</th>
<th>Data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Nine Lesson observations (3 per a teacher)</td>
<td>Jan–Feb 2013</td>
<td>- 9 Lesson observations to get more information about the normative practices of classroom instruction operating in the teachers’ classrooms.</td>
</tr>
<tr>
<td></td>
<td>Teacher interviews</td>
<td>Jan–Feb 2013</td>
<td>- Initial interview with all three teachers prior to participation on TDP to get more about their beliefs of Mathematics and teaching it.</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Professional Development Workshops 21 Lesson Observations (7 per a teacher) Weekly sum-up meetings</td>
<td>March–May 2013</td>
<td>- Recorded workshops every week with teachers - Lesson Observations - Recorded sum up meetings every week with individual teachers. - Teachers written reflections and recommendations forms</td>
</tr>
<tr>
<td></td>
<td>Seminar</td>
<td>March–May 2013</td>
<td>- Recorded seminar with new Mathematics teachers who invited by the three participants teachers.</td>
</tr>
<tr>
<td></td>
<td>Final Teachers’ interviews</td>
<td>For one week (May 2013)</td>
<td>- Recorded interview with each individual teachers.</td>
</tr>
</tbody>
</table>

Table 4.6 above shows how I collected the data during the two phases of the TDP. Below, I provide further detail on this, outlining the rationale for the chosen methods.
4.7.3 Data Collection

4.7.3.1 Data Collection in Phase 1:

 Lesson observation and Initial semi-structured interviews:

The first phase involved 9 video observations of lessons in the identified classrooms (3 per teacher) in an effort to establish what were normative practices for each teacher. Each teacher also participated in individual semi-structured interviews in order to tap into their perceptions of their own use of classroom talk, their use of the new reform textbook, their perceptions of the Talk Task in the textbook, and their thoughts on the types of training opportunities undertaken in implementing this textbook/curriculum (Appendix C). These interviews took place at the end of Phase 1 after the videoed lesson observations had taken place. It has been argued that interviews are important as data collection for gaining more understanding of participants and their experience (Kvale, 1996; Cohen, Manion & Morrison, 2007). This data then was used to build a holistic picture of the teachers’ approach to classroom dialogue, which supplemented what I observed in their classrooms. I also was able to use these initial interviews to establish their understanding of their professional identity in the classroom and their ‘needs’ in terms of professional development. This then could be used to look for any shifts in their perceptions as they progressed through the TDP.

4.7.3.2 Data Collection in Phase 2:

The second phase involved data collection relating to the implementation of the Teacher Development Programme. This dataset included recordings of the discussions that took place in the eight workshops and the teacher seminar at the end of the TDP, artefacts produced within the workshops, the homework reflections the teachers engaged in (e.g., in the mid-TDP break), and short weekly sum-up meetings with the teachers that took place outside of the workshops.

 Professional Development Workshops

The 8 workshops that formed the TDP were planned with different themes relating to improving classroom dialogue. All the workshops were audio-recorded so as to document the discussions between the teachers and with myself as participants in the TDP. Other artefacts collected within the workshops included the teachers’ written notes, which contained both recommendations for their future practice and reflections on the content of the discussion (see examples in Appendix G and Appendix H). In each workshop, the
teachers completed written recommendations and suggestions forms (RSF) on the themes and topics discussed in the workshop (the guidance form for this is in Appendix I). These RSF were kept by the teachers for their own future reference; at the end of the TDP, I made copies of all of them (one form for each teacher, therefore equating to 24 forms in total).

- **Lesson Observations**

Moreover, as per the cyclical design of the TDP, video recordings of lessons were made on 7 occasions for each teacher (21 lessons in total), and these also were used as data (to explore what was happening ‘in practice’) to support the analysis of the TDP and the teachers’ identity development. During these observations, I also made audio recordings of the students talking in pairs in each case teacher’s classroom for a period of two lessons.

- **Short Weekly Sum-up Meetings**

The purpose of the weekly sum-up meetings was to collect data on how the teachers perceived their professional development as they took part in TDP. These interviews were conducted directly after the lesson observations, which followed each workshop. In these short meetings, teachers were asked questions, which required them to reflect on any changes in their practice or the implementation of new teaching strategies that had emerged out of the TDP discussions. Whilst such reflections were developmental (i.e. part of the TDP) in that they encouraged teachers to reflect on their experiences of what was happening in the workshops, the weekly meetings also provided data concerning evidence of change (and, more specifically, evidence of identity change—see chapters 7 and 8).

- **Final Seminar**

I also audio-recorded the teacher seminar that took place at the end of the TDP and involved other teachers (as explained earlier). As described previously, the seminar was conducted at the request of Sultan and Zayed, who wished to share what had taken place during the TDP workshops with their personal Maths teachers’ network outside the school.
Final Semi-structured Interview

At the end of TDP, I interviewing all three teachers (see Appendix J for the questions) in order to gain their personal knowledge and experience of the TDP. For the final interview, the questions were divided into different categories.

The first category repeated questions from the first interview, and further queried the teachers’ perceptions about Mathematics and teaching Mathematics, and how they understood the role of teacher and student in classroom discourse. This was to determine the change in teachers’ perceptions through comparing the data collected in the two interviews. Secondly, some questions were asked so as to verify or check my own interpretation of the different meanings, negotiated through the professional development workshops: for example, teachers were asked about classroom questions in terms of supporting classroom dialogue. Moreover, the last category included some individual questions for each teacher, which asked them to reflect back on the beliefs and perceptions they had discussed with myself in the first interview. For example, prior to his participation in the TDP, Zayed believed that Mathematics, as a subject, should improve students’ understanding, and requires updated teaching strategies. Then, in the final interview, Zayed was asked how his participation in the TDP had helped and/or contributed to these beliefs.

Below I describe how the data collected was transcribed and analysed, before moving on to provide the rationale for using the CoP theory as a framework to understanding development in this research.

4.7.4 Transcription and Translation

The following table shows the recording times of all data collected.

<table>
<thead>
<tr>
<th>Case teachers</th>
<th>Ahmad</th>
<th>Zayed</th>
<th>Sultan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial interviews</td>
<td>1 hour and 10 m</td>
<td>1 hour and 25 m</td>
<td>1 hour and 10 m</td>
</tr>
<tr>
<td>Short weekly interviews</td>
<td>34 minutes</td>
<td>45 minutes</td>
<td>54 minutes</td>
</tr>
<tr>
<td>Seminar</td>
<td>1 hour and 47 m</td>
<td>1 hour and 45 m</td>
<td>1 hour and 46 m</td>
</tr>
<tr>
<td>Final interview</td>
<td>2 hours and 35 m</td>
<td>2 hours and 15 m</td>
<td>2 hours 45 m</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4 hours and 19</td>
<td>4 hours and 25</td>
<td>4 hours and 49</td>
</tr>
</tbody>
</table>
As the project took place was in a primary school in SA, all the data collected were in Arabic. Therefore, initially, all audio data were transcribed in Arabic before being translated into English. Due to the size of the dataset, this required assistance from professional transcribers in the following way. All initial analysis of this dataset was done using the Arabic transcriptions, and then, once I had selected relevant data excerpts to be used in the writing of the analysis, I again used the assistance of professional translators to translate them into English. However, this was not without problems, and the quality of the translation needed to be checked and revised by myself in order to ensure that the meaning was both close to the original Arabic and clear enough for the reader (see below). To assist with this, I created a glossary (see Appendix K) of the most common words and terms for the translators to use as a means of improving accuracy in the translations; however, this still required some considerable input from myself.

In checking the quality of the translation, I should mention that I paid much attention to this critical process of data analysis. Firstly, I checked the transcribed data through listening, many times, to the recordings. I also reviewed the translated data by comparing them to the original transcribed texts and to the translator’s drafts. Here, I found different examples of incorrect translations, which related mostly to the complexity of the utterance being transcribed, or the cultural specificity of the words/terms used in the utterance. As I was the closest person to the data as a participant in all of the recorded events, I brought to bear my experience of the group and the classrooms in ways that helped me formulate an interpretation. This meant that, whilst my checking and reviewing was labour-intensive, it did provide a far more accurate and higher quality dataset than otherwise would have been the case. Additionally, for ethical reasons, I distributed the translation work between three different professional transcribers in order to avoid sharing all data with any one person. I discuss these ethical issues in greater detail at the end of this chapter.
4.7.5 Data Analysis

4.7.5.1 The Stages of Data Analysis

As mentioned above, the analysis of the data took place mainly after the TDP had ended, which gave me more space to reflect on what had taken place, and to develop an analytical framework with which to understand this. In the next chapter, I provide an account of the analytical framework, which is based on CoP theory, and how this was operationalised and then used to read the data. In this section, I discuss the process by which the data was prepared and read in order to provide information about how I approached the analysis. This process took place in three stages: 1) analysis of the whole case using CoP concepts; 2) analysis of the teachers as subcases using CoP identity concepts; and 3) analysis of the position of both the TDP and the teachers in the landscape. All sources of data then were used in each stage (e.g., teachers’ interviews, classroom observations, workshops, and seminar) as they offered different insights into the case or sub-cases (TDP or teachers), and therefore, triangulated my account of the processes taking place.

○ The First Stage of Data Analysis (the TDP as the whole case):

Initially, I began investigating the TDP to see whether I could see any evidence of development in terms of the quality of reflection taking place in the discussions and/or how this informed the collective understanding we built regarding the quality of dialogue in the classrooms. This involved reading the transcripts from the first and second workshops, and comparing them with the last workshop using concepts from the analytical framework. At this point, I was confident that some form of development had taken place in that there was an apparent change in how the teachers talked about dialogue in their classrooms; this caused me to begin thinking about how to interpret the process of change.

At this point, I began to select distinct conversations or interactions or artefacts from the remaining workshops (3–7), which I felt offered insights into the development process. Again, this involved looking for evidence of data, which exemplified the concepts identified in the analysis framework. Much of the data presented in the analysis chapters is in the form of dialogue between the teachers and myself, which indicates the collaborative nature of the workshops. These conversational exchanges usually included an opening initiation (e.g., a question is posed, or a statement is made), and all the relevant responses made by the teachers and myself. Where the conversation was moved
on to a different topic (i.e. a new initiation), the exchange was closed, and a new exchange then was identified.

❍ The Second Stage of Data Analysis for Identity Development (Subcases):

In order to explore the development of each teacher as a subcase, I wrote narrative accounts of each teacher and their experience in the TDP. The purpose here was to track teachers’ participation in the TDP workshops, using the data collected in Phase 1 as a starting point, and thus looking for any evidence of changes and/or reflections on their own experience of change. For this analysis, I used the concepts from the theoretical framework, which relate to the teachers’ professional identity and the development of such over time. As with the general case, the narrative subcases relating to the teacher initially looked at the interview data from both before and at the end of the TDP so as to establish any evidence of change. Then, having established an account of change, I examined their participation in the workshop discussions in order to understand how this change had come about.

In reporting this analysis, I focused on two teachers (Ahmad and Sultan) only due to word count limitations. I selected Ahmad and Sultan for this analysis because their narratives revealed interesting differences in terms of how they experienced the TDP, as well as in their identity transformation. Nevertheless, the data pertaining to Zayed does heavily feature in understanding the more general case of the TDP, and how it is situated in the wider landscape of practice. Notably, all three teachers were important collaborators in this research, and I hope their important contribution is visible throughout the analysis.

❍ The Third Stage of Data Analysis for Landscape of Practice:

In this stage, the analysis focuses on how the landscape of communities of practice in which the case teachers operate affect the development of the TDP and of themselves as they participated in the workshop discussions. As the landscape of practice refers to all the other practices surrounding the TDP, which the teachers and myself moved between (see Chapter 9), I looked across the dataset for references made to these other practices. In Chapter 9, I will explain how I investigated these references, and how they signify the teachers’ own experiences of boundary-crossing and/or the relation between other practices and the TDP itself. This meant investigating potential tensions and conflicts between these practices, which may be apparent in the data.
4.8 Trustworthiness in Case Study Research

Research validity is one of the most important criteria for assessing the quality of any research project, and there are several ways to ensure the validity of qualitative research. In this study, I adopted the concept of trustworthiness to establish the validity of my analysis. There is much research centred on how to ensure trustworthiness in qualitative research (Guba, 1981; Lincoln & Guba, 1985), which offers different frameworks and strategies for establishing credibility, transferability, dependability, and confirmability. Of particular relevance here is my use of an embedded case study approach which included analysis of sub-units (teachers), in addition to analysing the case as a whole (the TDP). Here, I argue this contributes to the validity of my analysis as it entails considering the same data/evidence for different purposes.

Moreover, the literature suggests that prolonged engagement in the research context is important for boosting research credibility (Lincoln and Guba 1985; Erlandson et al 1993). This also helped me to understand the teachers’ classrooms and to build a relationship of trust with them. Therefore, prior to beginning the data collection process, I spent one week introducing myself to the teachers and familiarising myself with the school. I also planned two weeks during which I would use a video camera to record teachers and students in their classrooms. These weeks were designed to ensure my familiarity with the teachers and the school in order that I use my insider knowledge to establish an interpretation of the data that recognized the situated meanings relevant to this particular context.

Member checking is also an important process for establishing research credibility (Lincoln & Guba, 1985) since participants are offered the opportunity to confirm the researchers’ understanding and interpretation of data collected about them. In this case, firstly, member checking was built into the design of the research since my interpretation of much of the data collected was fed back into later workshop discussions as topics for dialogue. For instance, I used my initial analysis of the teachers’ interviews from Phase 1 to develop themes for discussion in the early workshops – as well as stimulating the discussion; this also allowed me to see if the teachers’ shared my interpretation of what they had told me in these interviews. I also asked the teachers to produce written reflections at the end of some workshops which allowed me to see if their interpretation of the discussions were in line with my own (see section 4.4.2). In addition, during the data collection and analysis process I engaged in frequent informal conversations with the
three teachers in order to member check my interpretation of the data collated. However, it also should be noted that since the TDP workshops involved reflective dialogue between myself (as facilitator and participant) and the three teachers I was also involved in the meaning making which took place within the group. Therefore, I suggest my insider roles as both facilitator and participant gave me access to the TDP’s shared meanings which also helped with data analysis. Secondly, after finishing data analysis, I also engaged in informal conversations with the teachers about my interpretation of their developed identities. For example, I shared with Ahmad and Zayed my analysis of their cases which I wrote about in two conference papers (Muzil, 2014, 2015). This was an opportunity for me to speak with them away from the TDP and for the teachers to check what I understand about their participation in the research.

Regarding dependability, Shenton (2004) argued that addressing dependability in a qualitative study means that ‘the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results’ (p. 71). Therefore, as discussed in Sections 4.4 and 4.7, all details about the research design and methods for data collection are presented. Moreover, through the data analysis, I shared with my supervisor thick and detailed descriptions of one teacher’s (Ahmad’s) participation and classroom practice as a case study prior to presenting the narrative analysis (Chapter 6), which featured selected examples of the case. I have also provided a full description of three workshops (1, 2 and 8 see Appendix D) in order to offer some transparency regarding the data collected and to show examples from the dataset, other than the selected ones for detailing in the analysis chapters.

Furthermore, in this study, I used long interviews, classroom observation, and short interviews as well as being a participant in the professional development workshops, which I argue enabled me to build an understanding of how teachers perceived their experience/participation in the TDP. Subsequently, by positioning the teachers as embedded within the whole case of TDP, I have been able to use my analysis of the whole case to support and interrogate the analysis of the subcase teachers’ experience. For example, through the analysis of the development that took place throughout the workshop discussion, I was able to recognise how the teachers’ appeared to move towards engaging in more critical reflection, and how this impacted on their investment in different forms of professional identity.
Moreover, the structure of this project involved the collection of different types of data, collated at different points in time (e.g., teacher interviews prior, during, and after the TDP, and classroom observations before and during the TDP), which enabled the triangulation of the interpretations being made. In a case study, using multiple data sources is a strategy that can enhance the data’s overall credibility (Patton, 1990; Yin, 2003) and is essential for the study’s confirmability, in terms of reducing any researcher bias. For example, the seminar was an important place to collect data at the end of the TDP as it required teachers to encapsulate the value of the TDP in their own words, whilst addressing and being addressed by a wider professional audience than in the TDP workshops. This meant the development I observed through the data analysis was also recognised in some form by the case teachers in this seminar. However, managing and analysing the amount of data collated through the various different sources in this project was challenging; I was aware of this in my research, and I paid much attention to the process of data management and analysis.

Finally, during the data collection and the TDP, I had several skype meetings with my supervisors to discuss progress. These online meetings were supportive, and improved my activities in data collection and the development of TDP through their experiences and suggested points. According to Shenton (2004) ‘frequent debriefing sessions between the researcher and his or her superiors… provide a sounding board for the investigator to test his or her developing ideas and interpretations, and probing from others may help the researcher to recognise his or her own biases and preferences’ (p. 67). Also, Shenton (2004) argues that ‘opportunities for scrutiny of the project by colleagues, peers and academics should be welcomed, as should feedback offered to the researcher at any presentations’ where ‘questions and observations may well enable the researcher to refine his or her methods, develop a greater explanation of the research design and strengthen his or her arguments in the light of the comments made’ (p. 67). Therefore, during the process of data analysis, I shared my analytical framework with two postgraduate researchers who were interested in CoP theory as part of the Social Theories of Learning course at the University of Manchester. The purpose of this was to discuss my understanding of CoP theory and to accordingly gain feedback on my analytical framework. Moreover, I presented my initial analysis and findings to various audiences, including the British Society for Research in Learning Mathematics.
4.9 Ethical Issues

The data for this research were gathered in accordance with the ethical guidelines of the University of Manchester. All ethical forms were read and reviewed by the researcher and the supervisor, and then were approved by the Research Integrity Committee in MiE. There were different ethical forms used for all participants in the current research (see Appendix L). Regarding the main study, in the first week in the school, the teachers were given information sheets and consent forms (see Appendix M) to take away and read before agreeing to participate in the TDP and the research. Furthermore, the new teachers who participated in the seminar were given information sheets and consent forms (see Appendix M) before agreeing to participate in the seminar event. Moreover, I was aware of how the different TDP activities demanded more time of teachers both daily and weekly, and so I discussed this with the teachers at length in order to ensure they were fully informed about this commitment, and confirmed to them that the research would not affect their professional work.

Moreover, in this first week, teachers helped me to speak with their students about the research and the use of the video throughout the course of their lessons. The students were also given information sheets and a consent form (see Appendix M) to read with their parents. This detailed how the video camera would be positioned in the classroom, and provided parents with the assurance that this would not be intrusive to the students’ classroom routines. All students’ parents agreed to allow their child to participate, although three parents requested further explanation by contacting me direct prior to the research.

In addition, as this research used services of transcription and translation by professional agents, much attention was paid to ensuring confidentiality and anonymity of participants. Firstly, I used three different professional transcribers, who did not know each other. This ensured that no one transcriber would have access to enough of the data to identify the school or the teachers. Secondly, I also was sure I did not provide any audio files containing personal details beyond the first name of the teachers. Once the data were transcribed, all translators were given anonymised files to translate.

However, whilst I have followed the steps above in order to ensure ethical compliance and research integrity, there are also broader ethical issues which should be reflected upon in conducting research such as this. In order to do so, I adopted a reflexive stance throughout the research by being both sensitive and alert to potential any issues or
dilemmas which may arise. For instance, given the TDP aimed to develop teachers and change classroom practices, there are potentially some substantial issues which are inevitably raised by implementing activities which promote change in this way. Firstly, the research had an impact on the teachers in terms of their changing identities which also had a ripple effect on their lives in homes and in school (see chapters 7 and 8). In order to ensure the teachers felt comfortable with such changes a process of ongoing consent checking was used through. Another impact of the changes being implemented through the TDP (and therefore the research) relates to the students who were being encouraged to engage in more dialogue with their teachers. As I have outlined in Chapter 2, such input (in dialogue) was not normally expected of students in SA classrooms and so potentially this could have raised concerns from parents and/or students. Whilst the teachers did not report such concerns directly, they did mention discussing their new practices with parents and this became a topic for reflection in one of the TDP workshops (Workshop 8). As such, the potential impact of the research on the students and their families was explicitly discussed as part of our developing reflective practice.

A key issue here is reflecting on the extent to which I was exploiting both the teachers and students by collating data on their experiences in the TDP and classrooms. How far was I exerting my power as researcher to use their lives for my own advantage? Whilst this may be true in part, I also argue that the teachers (and students) were not powerless and were able to gain substantially from being involved in the research since professional development was the main aim. For the students, my lesson observations suggested that the students appreciated the changes implemented by the teachers – a perception which was also shared by the teachers. Nevertheless, issues of power and the researcher’s identity are, perhaps, magnified when the researched are children and therefore, it is essential to critically consider the potential consequences of research-development activity like the TDP thoroughly.

4.10 Conclusion

In this chapter, the methodological aspects of the current research have been discussed. I have outlined the methodological standpoint as an evaluation case study design of educational practice (Bassey, 1999); this informed both the development of the TDP and the research approach. Therefore, I argue that the TDP served a dual function, both i) as a
set of development activities for the teachers and myself, and ii) as a research object or ‘case’ that can reveal wider understandings of how teacher development can operate in a context such as this. In achieving the latter, I have argued that an embedded approach to the case study was necessary as this enabled the individual experiences of the teachers (subcases) to be investigated through the TDP, and how these were situated in a wider account of the development of the TDP itself (the whole case).

Aside from this methodological argument, I also have illustrated in this chapter further information on how the project developed, how data were collected and prepared for analysis, and the ethical issues negotiated in conducting this TDP research project. I have highlighted how the two pilot studies were important for developing and researching the TDP. The first pilot interviews with Saudi Mathematics teachers enabled me to understand the challenges they faced in implementing the Talk Tasks in the new textbooks; this therefore allowed me to see some of the conflicts and tensions Saudi teachers are experiencing. This further supported the rationale for Research Question 2, which queries how such conflicts might be realised through implementing a TDP in the SA context. The second pilot study enabled me to practice using video episodes of teaching to facilitate reflective discussion about practice, which then informed my ‘practice’ as facilitator in the TDP workshops. Details concerning the TDP in terms of when and how it was implemented, and who participated, also have been presented here.

Finally, the chapter also has presented an account of the data collected on the TDP as a ‘case’ of teachers’ ‘reform-orientated’ professional development in the SA context. Here, I have highlighted how data collection went hand-in-hand with the professional development activities so that many of these activities served a dual role, which also connects to the multiple roles I adopted as facilitator, participant, and researcher. I also have argued here that it is the multiplicity of these roles that adds to the trustworthiness and validity of my analysis.
In the next chapter, I will discuss CoP theory, which forms the main theoretical framework used to establish whether teacher development occurred in this TDP, and how this might be explained. I will argue here that this theory allows me to recognise the multiplicity of my role and that of the teachers as they move between the TDP and other practices.
Chapter 5: The Theoretical Framework

5.1 Introduction

In Chapter 4, I established the content of the TDP, and how this has been researched as a ‘case’ of reform-orientated professional development in SA. In this chapter, I outline my use and operationalisation of CoP theory, which I am using in this study to establish whether teacher development has occurred through participation in the TDP, and how this might be explained. As outlined in Chapter 3, CoP theory has been increasingly used in Mathematics education research, and particularly in professional development interventions that aim at promoting teachers’ learning about Mathematics teaching by researchers and educators (Graven, 2002, 2004; Lotter et al., 2014). This work is particularly relevant to my research questions since it recognises professional learning as occurring through participation in development activities (such as the TDP workshops), whilst also arguing that such learning necessarily involves identity transformation of some kind—a core component of professional development (as argued in Chapter 3). Therefore, by using CoP theory, I aim at understanding professional development as an issue of developing teachers’ ‘practice-and-identity’. I am also particularly interested in the use of CoP theory as it provides the tools to understand how a given CoP is located in the landscape of practice (i.e. how it relates to a whole host of other practices which teachers move between). As I will highlight in this chapter (and the analysis), this is important for understanding how professional development programmes (such as this TDP) are mediated by their wider context (e.g., the Saudi education system, Saudi culture, etc.).

Therefore, in this chapter, I discuss CoP theory (Wenger, 1998) in-depth in order to indicate how it may be used to gain understanding of learning and development in the TDP I set up. By so doing, I draw on Wenger’s (1998) core text, whilst also considering other works, such as that by Lave & Wenger (1991) and, more recently, Wenger-Trayner & Wenger-Trayner (2014). The purpose of this chapter is to use this discussion to develop an analytical framework of concepts that can be used to read the data in the coming chapters. Therefore, the final part of this chapter presents this analytical framework and re-visits the study’s research questions in order to establish how CoP theory has developed the focus of this research.
5.2 A Social Theory of Learning

Wenger argues that his work is a social theory of learning, and does not replace other theories of learning, which may focus on different aspects of learning with different assumptions concerning the nature of knowledge, knowing, and knowers: for instance, some approaches discuss learning as the acquisition of knowledge, i.e. as an object to be acquired by the knower; Wenger, in contrast, sees learning as participation in social practice, where knowledge is collectively generated through such participation. Therefore, Wenger’s (1998, p. 4) work is based on four premises, which come together to form his assumptions about learning:

1. People are social beings and this is a central aspect of learning.
2. Knowledge is about competence with respect to ‘valued enterprises’.
3. Knowing is about active engagement in the world.
4. Meaning is ultimately what learning produces.

These four assumptions have much to offer to my use of CoP theory. As I will show in my analysis, understanding the teachers (and myself) as social beings who are developing relationships with one another, and their classroom practice through participation in the TDP workshops, is a central component to their learning. Again, this fits with the research literature on teachers’ professional development, which adopts various community models. Similarly, it is important to recognise that teachers are not just any type of learner; they bring practical competence to professional development activities which, ultimately, can serve to facilitate the quality of reflection taking place. Wenger further explains that his social theory of learning consists of four components, as summarised in the figure below.
These four components—community, practice, meaning and identity—support my conceptual framework as a means of analysing each individual teacher’s learning as the continuous product of their social participation in the group. Additionally, each component could be the main focus to exploring professional learning in research such as this, as they are ‘deeply interconnected and mutually defining’ (p. 5). Therefore, Wenger states that a researcher is able to ‘switch any of the four peripheral components with learning; place it in the centre as the primary focus, and the figure would still make sense’ (p. 5).

To summarise, I am using CoP theory as a framework for my research for two reasons: firstly, as detailed in Chapter 1, the SA Ministry of Education has developed a new reform-orientated Maths curriculum focused more so on students’ role in classroom dialogue as being more active than has typically been the case in SA. The implementation of this new curriculum requires a change in teachers’ role and practice, and, therefore, there is an opportunity for teachers to come together to learn professionally as they attempt to learn this new role and practice. Secondly, my research is concerned with how to develop teachers’ understanding of the quality of talk in their classrooms. This theory can help to capture the ‘development’ of the teachers’ group, and also can help to understand how the teachers came together, negotiated the research topic (dialogic teaching) and simultaneously transformed who they are as teachers (identity)—at least in part. CoP theory, therefore, is a useful way of understanding development using the embedded case study design, as outlined in the previous chapter. This offers the tools to
understand ‘development’ of the TDP (as a whole case) but also the development of the teachers in terms of their identity transformation (as subcases).

5.3 The Theory’s Components for Learning

5.3.1 Defining a CoP

Wenger (1998) defines a ‘community of practice’ as a group of people who share a concern or a passion for something they do, and who accordingly learn how to do it better over time. Linking this definition to the current research, we can argue that the design of the study, using a programme of professional development workshops, ideally provided the opportunity for the case teachers and myself to have regular meetings and workshops with the objective to collectively learn about a ‘reform-orientated’ dialogic approach— notably, a shared professional concern given the introduction of the new curriculum in Saudi. Furthermore, Wenger argues that the integration of the two concepts ‘practice’ and ‘community’ can be justified for two reasons: firstly, this distinguishes the concept of practice from other terms such as culture, activity, or structure, with Wenger focusing on a particular type of practice considered to be ‘a way of talking about shared historical and social resources, frameworks and perspectives that sustain mutual engagement in action’ (p. 5); secondly, he defines the term ‘community of practice’ as a special type of community which is different from anything that might be called a community such as a residential neighbourhood, where the special character of a community of practice is to be viewed as a unit with three dimensions (mutual engagement, a joint enterprise and a shared repertoire) that make the practice the source of coherence of this community. All three are relevant to my analysis of the ‘case’ here, i.e. professional development in this TDP.

5.3.1.1 Mutual Engagement:

The mutual engagement of participants is the first property of practice in a community as the practice ‘exists because people are engaged in actions whose meaning they negotiate with one another’ (Wenger, 1998, p. 73). Mutual engagement creates relationships between people. These relationships are a result of participants’ membership in the community. However, membership is also a product of mutual engagement, which requires interactions between participants over time; therefore, membership and mutual engagement are dynamically inter-related with one another. Enabling engagement to make it mutual is ‘an essential component of any practice’ through talking and interaction whilst doing practice. Regarding this study, the researcher’s role as facilitator of the
workshops can be seen as central in shaping how engagement was enabled during the professional development workshop. However, this does not mean that I, the researcher, am the only member to enable engagement (as some kind of leader or authority within the group); rather, enabling engagement is open for any participant in a community of practice, and, in later chapters, I will demonstrate how the teachers took on this role at different moments.

Secondly, mutual engagement includes both diversity and homogeneity so as to make the community a community of practice. In terms of diversity, this is because the members are different from one another owing to their different personal characteristics and histories; therefore, they are unique in their personal contribution to the community. On the other hand, as members of a community, participants see and talk to each other and work together by exchanging opinions and information on a common interest, which creates space for homogeneity. Both diversity and homogeneity together make mutual engagement possible in practice, since people begin from different points of view and, through mutual engagement, reach some common consensus of purpose. Therefore, Wenger indicates that ‘each participant in a community of practice finds a unique place and gain a unique identity, which is both further integrated and further defined in the course of engagement in practice’ (p. 76). For the teachers and myself in this study, mutual engagement in the CoP involves bringing practical competence from their own diverse experiences of practice and using this to investigate or work towards a common goal (joint enterprise—see below); therefore, there is some movement between diversity and homogeneity, back and forth, through the practice.

5.3.1.2 Joint Enterprise:

The second property of a practice that defines a community’s coherence is the negotiation of joint enterprise. Here, Wenger (1998) makes three points. The first is that ‘it [joint enterprise] is the result of a collective process of negotiation that reflects the full complexity of mutual engagement’ (p. 77). This means, for example, disagreement between the participants is possible in the pursuit of a joint enterprise because mutual engagement does not require homogeneity. Wenger believes that disagreement between members in some communities can be viewed as a productive part of their enterprise; therefore, what defines joint enterprise is communally negotiated between members on an ongoing basis, and is not always based on an agreed consensus or shared goal. The second point is that the enterprise is defined by the participants because it is about their situation. For example, in their research about the development of teachers’ communities
of practice, Hodges & Cady (2013) found that teachers in this context valued and negotiated their content and pedagogical content knowledge as the joint enterprise. In the current research, the teachers—as well as my own—participation in the TDP workshops can be said to be united by our common interest in their teaching practice (their situation). This will be discussed in the analysis of the TDP, investigation centres on how the teachers and myself defined this situation, and how both I (as a member of the group) and the teachers used the video episodes to invest in developing the quality of dialogue in their classrooms.

The final point is that the enterprise is not a stated goal, but rather creates mutual accountability between community members in order to position it as a central part of their practice. Here, Wenger (1998) describes relations of mutual accountability to include ‘what matters and what does not, what is important and why it is important, what to do and not to do, what to pay attention to and what to ignore, what to talk about and what to leave unsaid, what to justify and what to take for granted, what to display and what to withhold, when actions and artefacts are good enough and when they need improvement or refinement’ (p. 81). In terms of this research, my analysis of mutual accountability in the TDP will consider how the teachers (and myself) valued what we were doing and their/our sense of responsibility or commitment to the joint enterprise.

5.3.1.3 Shared Repertoire:

The development of a shared repertoire is the third property of practice as a source of community coherence. Any resources that the community of practice develops are considered to be a shared repertoire. Wenger (1998) suggests that the shared repertoire of resources are developed by ‘producing or adopting tools, artefacts, representations; recording and recalling events … telling and retelling stories; creating and breaking routines’ (Wenger, 1998, p. 95). These resources are important for the community for supporting engagement and negotiating meaning: for example, in terms of this research, the video episodes recorded in the teachers’ classroom can be seen as one of the resources used to support teachers in their professional development; therefore, it is logical to think the video episodes might come to be an important shared repertoire in the community of practice.

In this analysis, I will detail the meanings and tools drawn on in the TDP discussions to facilitate the joint enterprise of reflecting on the quality of dialogue in the teachers’ classrooms. At this point, I emphasise that teachers’ professional development creates a
special kind of CoP, since two forms of practice are relevant to the joint enterprise. The first refers to that in which the teachers engage within the community of practice through the professional development workshops in order to develop their perceptions about the quality of dialogue in their classrooms. The second, conversely, refers to the classroom practice of the teachers involved, which comes to be the focus of the joint enterprise; in other words, one form of practice becomes the object of another as it crosses a boundary from the classroom to the CoP. Nevertheless, as Wenger has argued, it is difficult to see classroom practice (e.g., teacher–student dialogue) as a CoP since the principles of mutual engagement and joint enterprise frequently do not apply because of the power relations enacted by teachers in relation to students. For example, Goos, Galbraith & Renshaw (2004) found that the school structure was a barrier for cultivating a CoP in the classroom as ‘teachers need to adopt new roles and move out of their traditional position as the dispensers of knowledge’ (p. 112). Nevertheless, it remains a form of practice in a looser sense, which can become the object of a professional development CoP.

5.3.2 Meaning

The concept of meaning is as an experience of everyday life but is located in a process namely, the ‘negotiation of meaning’ (Wenger, 1998). Meaning, in this context, involves the interaction of two processes ‘participation’ and ‘reification’. Wenger argues that the duality between participation and reification is ‘fundamental to the human experience of meaning and thus to the nature of practice’ (p. 52). In the following, it is important to explain these two processes, as well as what Wenger means by them, prior to accounting for their duality.

5.3.2.1 Participation:

The community of practice approach views learning as social participation. Wenger uses the concept of participation in the common usage—as a process of taking part in activities and enterprises, which necessarily involves relationships with others. He uses participation to ‘describe the social experience of living in the world in terms of membership in social communities and active involvement in social enterprises’ (p. 55). Here, participation involves the negotiation of meaning, which is an active process including participants’ talking, thinking, feeling and doing. Furthermore, participation can involve all kind of relations, and it may be ‘conflictual as well as harmonious, intimate as well as political, competitive as well as cooperative’ (1998, p. 56).
Moreover, participation in a community of practice shapes members’ experiences and, simultaneously, shapes the community itself; this means that, as a community’s members have experience and negotiate meanings through their participation in it, they are able to shape the practices of their community as well. Finally, participation is not only a matter of members’ engagement in such practice, but also is about their experiences beyond the CoP, as well as beyond the specific context of members’ engagement. This means that members’ participation in a community of practice extends beyond their direct engagement with specific activities and specific people. Here, participation in a CoP involves negotiating meaning by bringing in resources or meanings from experiences beyond the CoP itself.

Obviously, in professional development CoPs, teachers bring in resources, knowledge and ideas from their practice in the classroom, which they then use this to make meaning in the CoP. Moreover, in this ‘case’ of professional development, the teachers (and myself) may also use our insights into SA culture, home life, etc., since the meanings negotiated by teachers never belong only in the CoP itself; rather, they are distributed, and participation involves bringing those meanings in to the CoP, i.e. using them to negotiate further meanings through mutual engagement. This relates to Wenger’s idea of brokering across landscapes of different CoPs, as will be discussed shortly.

5.3.2.2 Reification:

Wenger defines reification as when ‘A certain understanding is given form. This form then becomes a focus for the negotiation of meaning, as people use the law to argue a point, use the procedure to know what to do, or use the tool to perform an action’ (p. 59). Wenger claimed that ‘any community of practice produces abstractions, tools, symbols, stories, terms, and concepts that reify something of that practice in a congealed form.’ (1998, p. 59). Therefore, reification is the process through which experience takes form as an object, which then are drawn on (quite implicitly) in future negotiations of meaning: for example, a law or a scale is the reification of the meaning of justice. The scale is an object people use to give concrete form to the concept of justice. In this research, as I analyse development in the TDP, I will consider to see whether any new or emergent meanings become reified so that they are drawn on as representations; this would signal specific meanings without explanation. This may well be the case given the introduction of themes by myself into the workshop discussions, which will need to be explicitly negotiated at first, but which may become embedded in our discussions (i.e. reified).
5.3.2.3 The Duality of Participation and Reification:

As discussed above, participation and reification are important for practice, and cannot be considered in isolation. Participation and reification form a unity in their duality. Wenger states that participation and reification both require and enable one another: for example, on the one hand, participation in a community produces, interprets, and uses reified cultural forms (such as rules, laws, and objects). Here, there is no reification without participation. On the other hand, members’ participation involves interaction between them, and therefore shortcuts or reifications can facilitate participation by coordinating meanings. This means that there is no participation without reification.

However, another aspect of this duality is that participation and reification imply one another, and therefore do not substitute each other. From Wenger’s perspective, as participants increase their participation in a community, this leads to an increase in the requirements for their level of reification and vice versa. Wenger explains, for example, that reification rests on participation and assumes a history of participation as context in order to achieve its interpretation. Every reified form has a history of participation, which produces it as reified. In this research, I will look to determine whether such reifications increase as the shared history develops over time during the TDP.

5.3.3 Identity

As outlined in Chapter 3, identity transformation is often referred to in the literature on professional development as a key concept for understanding learning and development. This is also central to CoP theory and is part of the reason I have opted to use this to understand professional learning in the TDP. Lave & Wenger (1991) argue that, ‘learning and a sense of identity are inseparable: They are aspects of the same phenomenon’. (p. 115). Building on this, Wenger (1998) argues also that participation is essential for the development of members’ identity, and therefore of their learning. In this respect, participation refers ‘not just to local events of engagement in certain activities with certain people, but to a more encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities’ (Wenger 1998, p. 4; emphasis in original). Therefore, ‘identity involves
learning as becoming’, and ‘it is in that formation of identity that learning can become a source of meaningfulness and of personal and social energy’ (p. 215).

The construction of identity takes place through members’ different forms of participation in different communities of practice. Wenger also argues that identity is situated and dynamic within social participation in different communities. Therefore, identity is integral to the other three interconnected components of Wenger's social theory of learning (see Figure 5.1) in that practice, community, and meaning all implicate the identity one becomes through participation in a community where meanings are negotiated. Nevertheless, whilst Wenger recognises identity as participatory, i.e. that it is negotiated through participation in a CoP (e.g., becoming certain of teacher/practitioner), he also considers it as extending beyond a CoP. It focuses on the individual from a social perspective in so far as one is able to unify different ‘becomings’ from participation in the wide range of practices to which they belong. Therefore, identity is never entirely located in the CoP but rather works beyond it in that it also involves negotiating multiple memberships across CoPs.

In the case of this research, identity enables me to examine the development of individual teachers as they participate in the TDP. It further enables me to explore how this CoP shapes the teachers’ sense of who they are as teachers. Crucially, more importantly, however, Wenger’s definition of identity also allows me to consider how participation in practices beyond the CoP shape and mediate this professional aspect of teachers’ identity. In the following, I will present two aspects adopted by Wenger to explain identity: identity in practice, modes of belonging.

5.3.3.1 Identity in Practice:

Wenger argues that identity and practice are connected, where the development of a practice ‘requires the formation of a community whose members can engage with one another and thus acknowledge each other as participants’ (p. 149). In the data collated from my TDP, for instance, I am looking to see how teachers come to regard each other and myself as we participate in the workshop discussions (and other activities) over time. This connection between practice and identity is summarised by Wenger through parallels, as the following table shows.
Table 5.1: the connection between practice and identity based on (Wenger 1998)

<table>
<thead>
<tr>
<th>Practice as</th>
<th>Identity as</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negotiation of meaning (in terms of participation and reification)</td>
<td>Negotiated experience of self (in terms of participation and reification)</td>
</tr>
<tr>
<td>Community</td>
<td>Membership</td>
</tr>
<tr>
<td>Shared history of learning</td>
<td>Learning trajectory</td>
</tr>
<tr>
<td>Boundary and landscape</td>
<td>Nexus of multi membership</td>
</tr>
<tr>
<td>Constellations</td>
<td>Belonging defined globally but experienced locally</td>
</tr>
</tbody>
</table>

For example, Wenger views identity as negotiated experience, where members define who they are by the ways they experience themselves through participation and through the reification of themselves by others. He argues that ‘building an identity consists of negotiating the meanings of our experience of membership in social communities. The concept of identity serves as a pivot between the social and the individual, so that each can be talked about in terms of the other’ (p. 145). Moreover, in terms of identity as a learning trajectory, members of a community of practice define who they are by where they have been before being participants and where they are going in terms of learning new things. The concept of trajectory is adopted by Wenger to argue that identity is fundamentally temporal, whilst the work of identity is ongoing and ‘the vehicle that carries our experiences from context to context’ (p. 268). This concept ‘has coherence through time that connects the past, the present, and the future’ (p. 154). In terms of this research, we might explore, then, how the teachers learn to define themselves professionally—as reflective practitioners attempting to implement a ‘reform-orientated’ Mathematics curriculum through a focus on the quality of dialogue in their classrooms. This is the focus of the CoP, which forms the ‘case’ for this research and, through my analysis, I will consider how other aspects of teachers’ identity from before and outside of the CoP influence what it means to be part of the group. I hypothesise that the data from the final seminar conducted by the teachers with other teachers from outside of the TDP may well be a crucial site for studying the development of their identity; this event involved objectifying (or even reifying) what it meant to be a member of the TDP group for another audience, and therefore could be valuable.
5.5.3.2 Modes of Belonging (Identification):

Wenger’s perspective on identity-formation involves three distinct modes of belonging (Wenger, 1998), or modes of identification\(^2\) (Wenger-Trayner & Wenger-Trayner, 2014): (1) engagement; (2) imagination; and (3) alignment (as defined in the following table).

<table>
<thead>
<tr>
<th>Engagement</th>
<th>Refers to the ‘active process of involvement in mutual processes of negotiation of meaning’ (p. 173)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagination</td>
<td>Refers to ‘the process of expanding our self by transcending our time and space and creating new images of the world and ourselves’ (p. 176).</td>
</tr>
<tr>
<td>Alignment</td>
<td>Refers to ‘coordinating our energy and activities in order to fit within broader structures and contribute to broader enterprises’ (p. 174).</td>
</tr>
</tbody>
</table>

These three components will be core to my analysis of the teachers’ professional identity, which is presented in chapters 7 and 8, as well as in Chapter 9 when I consider how this identity is mediated by participation in other communities, practices and CoP outside of the TDP itself. Here, I argue that engagement will be viewed consistently in teachers’ conversations, debates and written reflections produced during the course of the TDP. This is because engagement, as an identity-forming process, is part of the participation and mutual engagement forming the CoP. Moreover, imagination is particularly important as a mode of belonging because the joint enterprise of the CoP is focused on reflection; therefore, in reflecting on their practice, we might see how the teachers’ imagine themselves as practitioners teaching, i.e. they imagine doing what they have discussed in the classroom. Finally, alignment also is considered relevant since it reflects how teachers align their identities with the community’s practices and its joint enterprise of improving classroom dialogue in the SA ‘reform-orientated’ context.

The argument, therefore, suggests that Wenger’s concept of identity enables me to see the teachers’ professional development as mutual development of their ‘practice’ and ‘identity’. Moreover, their social participation in different communities outside of the CoP is important for defining identity; therefore, the boundaries between these

\(^2\) As part of development process of some concepts on CoP theory, Wenger changed belonging to identification as a better explanation of how a member identifies him/her self with a CoP.
communities are an essential part of the context in which the teachers maybe developing. The following section builds on this to explain boundary crossing as a vital feature of CoP theory.

5.3.4 Boundary-crossing

One of the features of Wenger’s theory is the concept of boundary. The history of a community of practice is a history of articulation with the rest of the world, and it is not isolated from other communities and practices. The histories create discontinuities between participants and non-participants. Participants move between different communities, and can participate in multiple communities of practice at once: for example, the Mathematics teachers’ community in a school is not isolated from other subject teacher groups, nor is it isolated from family, communities, and other groups and practices one is seen to move between. In the case of this research, the three Maths teachers and myself belong to various communities both within and outside of the school. Wenger argues that joining a community of practice involves also its relations with the rest of the world. In the case of this research, teachers’ participation on the TDPs will not be isolated from the other different communities that they belong to; therefore, through applying CoP theory in order to understand their participation, I can begin to understand how this boundary-crossing mediates the meanings negotiated in the workshop discussions.

In terms of the boundaries between communities, Wenger explains that these come in to play in a CoP in two ways:

1. Boundary objects (artefacts, documents, terms, concepts, and other forms of reification around which communities of practice can organise their interconnections.

2. Brokering – connections provided by people who consciously introduce elements of one practice into another.

In the following, I illustrate the concept of brokering in more detail.

5.3.4.1 Brokering:

Wenger defines brokering as a way of connecting between different communities of practice by people who ‘transfer some elements of one practice into another’ (p. 109). He further states that ‘brokering is complex and involves processes of translation, coordination, and alignment between perspectives’ (p. 109). In addition, Wenger argues that brokering requires legitimacy in order to influence the development of practice and to
address conflicting interests. Here, this means that those who play the role of brokers require enough legitimacy to be able to consciously address the conflicting interests between the practices of brokers’ different communities.

Furthermore, brokering ‘requires an ability to manage carefully the coexistence of membership and non-membership, yielding enough distance to bring a different perspective, but also enough legitimacy to be listened to’ (p. 110). This is an integral element of what participation involves—bringing meanings from outside of the CoP to bear on the current meanings being negotiated within the CoP, and vice versa. In the case of this research, my role is explicitly attempting to do this: to bring meanings in to the TDP workshops so as to allow them to be negotiated further, with teachers, to define some form of consensus or joint product.

Similarly, the work by Cobb et al. (2003), as referenced in Chapter 3, is relevant as an example of a CoP perspective being used to describe schools and school districts as configurations of communities of practice. They analysed brokers as located and practicing at the interconnection between different communities of practice, whereby they consciously attempt to bring meanings/objects from one practice into another. They go on to argue that the role of a broker is important ‘in developing alignment between the enterprises of different communities of practice’ (p. 19). For instance, Cobb et al. (2003) found that brokers shifted the professional development sessions away from ‘a conventional workshop format and toward joint inquiry into problems of Mathematics teaching and learning that characterize meetings of the professional teaching community’ (p. 19). Moreover, they indicate that the brokering activities by brokers (Mathematics leaders) closely aligned the enterprises of the two different communities to which they belonged.

In the current research, my role as researcher and facilitator of the professional development community can be seen as a broker, i.e. a conscious effort to introduce research from the Mathematics education/educational research community in the TDP. Here, I suggest that my ‘identity’ provided enough legitimacy to introduce different meanings regarding research on ‘reform-orientated’ pedagogy (particularly its emphasis on dialogue) and reflective practice from the Mathematics education research community into the TDP discussions. This role is distinct from other potentially authoritative positions in a CoP, such as ‘old timers’ (Lave & Wenger, 1991), who provide
apprenticeship to newcomers, which, given the emergent nature of this particular CoP, do not apply.

5.4 The Landscape of Practice

As discussed earlier, communities of practice are not isolated but rather are part of a broader social system involving other communities of practice (Wenger, 2010); therefore, Wenger argues that, ‘as communities of practice differentiate themselves and also interlock with each other, they constitute a complex social landscape of shared practices, boundaries, peripheries, overlaps, connections, and encounters’ (Wenger, 1998, p. 118). The landscape of practice is explained by Wenger (1998) through two points. The first one is that ‘the texture of continuities and discontinuities of this landscape is defined by practice, not by institutional affiliation’ (118), which is owing to the fact that, when communities of practice engage in practice, they define themselves through their ways which tend to escape formal descriptions and control. Therefore, the landscape of practice, as Wenger argues, is not independent of the structures of institutional affiliations and boundaries, but neither is it reducible to them. In this research, I will be aware of how the teachers’ practice (teaching) is not only related to the school but also how it is influenced by their broader landscape; this will allow me to investigate how professional development is realised in the SA context.

The second point is that the landscape is defined by the weaving of both boundaries and peripheries. Here, Wenger explains that the boundaries and peripheries both refer to the community of practice’s points of contact with the rest of the world with emphasize different aspects. Boundaries refer to discontinuities and lines of distinction between inside and outside whereas peripheries refer to continuities and to possibilities for participation offered to outsiders or newcomers. In this research, one such boundary might be between the TDP as a professional development CoP and the classroom in which the teachers and students are learning Mathematics. N.B. With the latter, we might argue that it is the teacher who acts as the broker (rather than myself)—brokering Mathematics for the students.

In terms of peripheries, these are viewed as ways of connecting ‘with the rest of the world by providing peripheral experiences to people who are not on a trajectory to become full members’ (Wenger, 1998, p. 117). The main idea of peripheries is to offer outsiders different forms of access to a practice without subjecting the outsiders to the demands of full membership: for example, we might view the final teacher seminar as a
peripheral part of this CoP since it offered new teachers the opportunity to access the meanings and strategies negotiated in the TDP workshops.

5.5 Criticisms of CoP Theory

The concept of a community of practice in Lave & Wenger (1991) and Wenger’s (1998) perspective is a way to challenge traditional forms of teaching and learning: ‘rather than a teacher/learner dyad, this points to a richly diverse field of essential actors and, with it, other forms of relationships of participation’ (p. 56). Cox (2005) argues that the concept of CoP is very diverse; ‘sometimes it is a conceptual lens through which to examine the situated social construction of meaning. At other times, it is used to refer to a virtual community or informal group sponsored by an organisation to facilitate knowledge sharing or learning’ (p. 527). However, one of the criticisms of this position is that it tends to focus more so on learning in informal or everyday contexts, where learning is a part of but not the central focus (joint enterprise) of the CoP. According to Lerman & Graven (2003) in their review of Wenger’s book (1998), they suggest that ‘much work needs to be done in order to translate Wenger’s (1998) perspective on learning (based in the context of learning on the job) to learning in more formal education contexts where teachers (or facilitators, co-ordinators etc.) have a central role in ensuring that successful learning occurs and are furthermore held accountable for such learning’ (p. 190). However, whilst this criticism may be valid in terms of applying a CoP framework to classroom learning, I argue that it is feasible to see teachers’ professional learning as a form of ‘learning on the job’ and for this reason CoP is relevant to this research. By exploring the TDP as a potential CoP, I intend in my analysis to explore how this provided the teachers (and myself) with the space to have ‘collective construction of a local practice’ (Wenger, 1998, p. 46).

Wenger and his colleagues (2002) argue that ‘Communities of practice create value by connecting the personal development and professional identities of practitioners to the strategy of the organisation’ (p. 17). According to Lea (2005), one point of criticism is the role of CoP as a precise model of social practice as opposed to being used as an analytical heuristic. Lea (2005) critiques the uses of CoP, where researchers use the theory to ‘underpin directives as to how to create effective learning environments’ and instead argues that the theory might more usefully ‘lay to bare some of the differential ways in which meanings are both contested and constituted for participants in the process of teaching and learning’ (194). My study uses CoP theory as a heuristic for the analysis of
data in order to explore professional learning and development in/through the TDP. It does not assume that there is an effective way of constructing professional learning in or across schools since this would require some generalisation regarding what can be achieved. As I hope to show through my analysis, professional learning is highly context-specific and, subsequently, what it means to learn or develop in this environment also is context-specific. By analysing the TDP in this way, I hope to generate some conceptual insights into the process of professional development, which can be generalised at the analytical level, but which has a particular manifestation in this TDP, in this school, in Tabuk, Saudi Arabia.

Moreover, in his criticism of CoP theory, Cox (2005) suggests that ‘a fruitful area of research would be the relation between the internal features of emergent communities of practice and the structural forces within which they operate’ (p. 533). In this research, I argue that the social structure operating in SA may partially be considered by examining the landscape of practice in which the TDP operates, and how this influences the meanings negotiated in TDP workshops. As outlined in Chapter 2, the educational landscape in SA is very interesting since it manifests tensions between a historical legacy of a teacher-led pedagogy which focuses on rote learning and memorization and the pedagogy advocated by the new reform curriculum and textbooks. Through my analysis, I will attempt to consider how such tensions (rooted in the landscape of the TDP) are apparent in the workshop discussions.

5.6 Re-shaping the Research Questions

Throughout this chapter, I have illustrated how this research is enhanced by how CoP sees learning. In this theory, learning is not only about engagement in the practice of a community, but rather is centred on sustaining such engagement over a period of time. Wenger (1998) argues that, what defines a community of practice is ‘sustaining enough mutual engagement in pursuing an enterprise together to share some significant learning’ (p. 86). Therefore, the practice’s three dimensions (mutual engagement, joint enterprise & shared repertoire) establish a community of practice as ‘shared histories of learning’ (p. 86). In this research, the CoP theoretical framework is hypothesised so as to enable us to understand what happens in the TDP in conceptual terms. For this reason, there is a need to re-visit the research questions previously stated in order to incorporate the key concepts of CoP theory, and therefore, establish whether development has taken place,
and how this can be explained. Previously, the research questions have been outlined as follows:

1. How can a ‘Maths reform based’ professional development programme bring about professional learning and identity development in the context of SA?
2. What are the affordances and obstacles to professional learning on classroom discourse in the SA ‘reform-orientated’ primary Mathematics context?

In light of my discussion of CoP theory, the more conceptually orientated research questions for the study are as follows (these will be answered in the forthcoming analysis chapters):

1. How does the ‘reform-orientated’ Teacher Development Programme, which forms the ‘case’ for this research, emerge a community of practice focused on professional development in the SA context?
2. How does the community of practice help to develop the teachers’ professional identity as a reflective practitioner regarding classroom dialogue within the SA context?
3. How does the landscape of practice in which this community of practice is situated influence the professional learning which takes place and the teachers’ identity development?

5.7 The Analytical Framework

The analytical framework used to read the data attempts to directly address the aforementioned research questions, and is based on conceptually grounded categories by Wenger (1998) discussed above. As will become clear through the analysis chapters, this framework required some adaptation as the analysis developed (particularly in Chapter 9 on the landscape of practice); however, the tables below provide an account of the concepts initially set out in mind of answering the research questions above. This analytical framework was reviewed by other postgraduate researchers who were interested in using community of practice theory on their research. The following table illustrates the analytical framework.
Table 5.3: The analytical framework of a community of practice based on conceptually grounded categories by Wenger (1998)

<table>
<thead>
<tr>
<th>Components of a Community of practice</th>
<th>Analytical focus</th>
</tr>
</thead>
</table>
| **mutual engagement**                | ○ Evidence of members relationship with each other and how they engage with others.  
|                                      | ○ Evidence of belonging to the community.  
|                                      | ○ Evidence of the development of teachers’ dialogue with each other. |
| **joint enterprise**                 | ○ The common object or interest (i.e. reform-orientated pedagogy or more specifically the quality of dialogue in the classroom) and how this becomes a ‘common interest’ for teachers and myself.  
|                                      | ○ Evidence of mutual accountability:  
|                                      | - How the teachers and myself value what we are doing.  
|                                      | - How the teachers and myself invest in the professional development workshop CoP.  
|                                      | - How the teachers and myself have a sense of responsibility or commitment to the CoP. |
| **Shared repertoires**               | ○ The tools that the teachers and myself use to discuss practice (such as words or concepts, video episodes, written statements).  
|                                      | - The resources and techniques that the teachers and myself use to make meanings and to negotiate them.  
|                                      | ○ Any discourses that teachers and myself use to create meaningful statements about our professional learning on the quality of dialogue in their classrooms. |
| **Meaning**                          | - Evidence of any reified meanings that are produced by the CoP.  
|                                      | ○ Evidence of any experiences (from outside of the CoP) that both the teachers and myself share to support the negotiation of meaning.  
|                                      | ○ Evidence of how the teachers and myself negotiate diverse meanings about ‘reform-orientated’ teaching and the quality of dialogue in their classrooms. |
| **Reification**                      | ○ How ideas about ‘reform-orientated’ teaching and practice take ‘form’ within the CoP. |
In this table, the framework includes the grounded categories and the subcategories in each one: for example, the main category of mutual engagement had sub categories (member relationships—belonging in community—the development of teachers’ dialogue with each other). Here, I conducted thematic analysis of the workshop discussions, teachers’ interviews, the final teacher-led seminar, and other written recommendations, and thus was able to code the data for mutual engagement by looking for its subcategories across this dataset.

Furthermore, for the analysis of the teachers’ identity development, I used Wenger’s (1998) modes of belonging, or modes of identification (Wenger-Trayner & Wenger-Trayner, 2014): engagement, imagination and alignment. This analysis once again focused on the transcripts of individual interviews with the teachers, the TDP workshop discussions, and the final teacher-led seminar. The following table provides a brief overview of the focus of the analysis, regarding these modes of identification.

**Table 5.4: The analytical framework for teachers identities’ analysis based on modes of identifications**

<table>
<thead>
<tr>
<th>The analysis of teachers identities</th>
<th>Modes of identifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engagement</strong></td>
<td><strong>Imagination</strong></td>
</tr>
<tr>
<td>‘the ongoing negotiation of meanings; the formation of trajectories and the unfolding of histories of practice’ (Wenger, 1998, p. 174)</td>
<td>‘refers to a process of expanding our self by transcending our time and space and creating new images of the world and ourselves’ (Wenger, 1998, p. 176)</td>
</tr>
</tbody>
</table>

Analysis of how the teachers’ identities developed through their participation in the TDP utilised the following concepts:
- Ways of engaging with the CoP and relationships with others (engagement)
- Imagining themselves as teachers in the classroom (imagination)
- Imagining the role of professional teacher (imagination)
- Identification with meanings and practices of the CoP (alignment).

Moreover, the analysis also incorporated concepts of CoP theory, which related to the landscape of practice, such as brokering, boundary objects, and boundary crossers.
Table 5.5: The framework for analysing the landscape of practice

<table>
<thead>
<tr>
<th>Table 5.5: The framework for analysing the landscape of practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boundary crossing</strong></td>
</tr>
<tr>
<td>Evidence of any reference to practices from outside of the CoP (e.g., classrooms) which were used to negotiate meaning. This also refers to other aspects of identity (e.g., as a parent) relating to other practices (e.g., parenting) which are then brought to bear on the meanings under negotiation.</td>
</tr>
<tr>
<td><strong>Boundary objects</strong></td>
</tr>
<tr>
<td>Evidence of any (artefacts, documents, terms, concepts, and other forms of reification) around which communities of practice can organise their interconnections during the TDP.</td>
</tr>
<tr>
<td><strong>Brokering</strong></td>
</tr>
<tr>
<td>Evidence of how my role as broker involved introducing elements of one practice (educational theory/literature) into another (the TDP).</td>
</tr>
</tbody>
</table>

These tables highlight the key CoP concepts used to read the dataset. My argument is that these concepts, which are recognised as underpinning my theoretical framework, remain relevant to my overall interest in how professional development is ‘made to work’ in a context such as that of SA. They suggest that professional development is an issue of practice-and-identity, and, as such, both the research questions and analytical framework have been constructed to capture this mutuality, notably in the case of this particular TDP.

The next chapters address the revised research questions (Section 5.6), and, in so doing, I aim at operationalising the analytical framework more fully.
Chapter 6: The Emergent Community of Practice

6.1 Introduction

This chapter aims at addressing the first research question identified at the end of the previous chapter: How does the ‘reform-orientated’ Teacher Development Programme, which forms the ‘case’ for this research, emerge a community of practice focused on professional development in the SA context? The data presented here will show the set of processes through which this CoP emerged during the TDP, by focusing on the key properties outlined in the previous chapter, namely mutual engagement, joint enterprise and the establishment of a shared repertoire. In this sense, the purpose of this chapter is centred on providing a simple authentication of Wenger CoP theory through my own interpretation of the TDP dataset upon which I will build a more complex in later chapters (e.g., by incorporating the landscape of practice).

The chapter is structured around the three properties considered key to the development of a CoP. The first section in this chapter focuses on evidence of mutual engagement within the workshop discussions, and looks specifically at teachers’ diversity (for example, teachers’ background and experiences, etc.), and the development of teachers’ mutual relationship with each other, which appeared to support the developing community. The second section looks for evidence that the teachers (and me) established a joint enterprise—a common purpose which motivated their/our engagement in the discussions and mediated the particular form of meaning-making that took place. Lastly, the third section provides evidence that, through the TDP discussions, the teachers and myself developed a shared repertoire of products (e.g. teaching strategies) that could be used to make meaning in later discussions and beyond the boundaries of the TDP. It is worth noting here that my focus on these three properties of a CoP does not mean that they are separate or operating in isolation from one other, but rather are connected and, therefore, mutually dependent upon each other. The interconnections/mutuality between them poses a challenge in analysing the data: for example, identifying data that is evidence of a specific property (e.g. mutual engagement) means reading the data in a particular way, and perhaps not paying attention to other aspects or meanings that may be relevant to other properties of the CoP.

6.2 Mutual Engagement

Mutual engagement, as a property of a CoP, highlights how a practice emerges as participants engage in the different activities that constitute the CoP—in this case, mainly
workshop discussions, which incorporated reflection on the particular practice in question, which was classroom dialogue. Furthermore, as outlined in Chapter 5, mutual engagement includes both diversity and homogeneity between members—diverse in the sense that they bring to the CoP diverse backgrounds and knowledge, but homogenous in the sense that they are united by the joint enterprise—a common interest. This suggests that developing relationships between members is an important feature of a CoP as it ‘connects participants in ways that can become deeper’ (Wenger, 1998, p. 76) for their interaction and negotiation of meanings. Therefore, this section will present examples of the teachers’ diversity based on their history, prior experience, and roles. Subsequently, it will present teachers’ conversations and reflections in the workshops in order to demonstrate the development of their relationships with one another.

### 6.2.1 Diversity of Participants

As outlined in Chapter 4 (see Section 4.5 on teachers’ prior experience), the three teachers and myself brought to the TDP diversity in our teaching experience from different Saudi cities and schools, which appeared to be an important resource for sharing stories and experiences during TDP discussions. In initial interviews, the teachers reflected on their prior experience with comments such as: ‘It was good start for me why? Because I taught all grades and this give me a view about all grades and how the lessons related to each other in these grades’ (Sultan) and ‘I spent two years in Riyadh and honestly I had many opportunities that I did not get during my study in the college. The most important of these opportunities was the meetings with local administrations to discuss problems in teaching Mathematics’ (Zayed). They also discussed their experience of teaching different grades (age groups), where this diversity seemed to impact the content of our discussions in the workshops: for example, in the second workshop, we discussed ways of encouraging students to talk:

**Researcher**  What phrases can we write to encourage students to talk in the classroom? I think the phrases that Sultan will use may differ from those Ahmad will use. We need to encourage students to talk, so what will you say to them?

**Zayed**  Teach me. I want to learn from you. How do you understand?

**Ahmad**  We might ask a student to explain to his friend.

**Researcher**  Yes. For example, if we say to a student that we need to listen to your voice, will that encourage him to talk?
Sultan  We usually say, ‘let us hear your nice voice.’

Zayed  I want to listen to your voice.

Researcher  Great

Ahmad  We might say to a student, ‘Give me the answer, and tell me even if the answer is wrong.’

Zayed  Tell me the answer, and don’t be afraid of making a mistake.

Sultan  Talk and teach me, oh champion.

The extract shows my own awareness of these teachers’ diverse experiences—my comment that Ahmad is likely to use different phrases to Sultan was based on my belief that they would need to tailor their communication to the different age groups that they taught. Sultan’s response, ‘we usually say: “let us hear your nice voice” and “talk and teach me, oh champion”’ was therefore, expressed with his student cohort in mind (lower primary). The use of ‘we usually…’ indicates the construction of or identification with a normative practice for lower primary teachers—a norm both Zayed and Ahmad built on by offering slightly more formal phrases that were tailored to their older cohort. Another example of such diversity comes from the sixth workshop, when we discussed a video episode that demonstrated Sultan’s employed use of a ‘paired discussion’ strategy (more on this later):

Researcher  Here is another episode of Sultan with the same strategy (discussion with pairs)?

Zayed  But it was less effective than Ahmad’s episode because it was in the early grades. It is more effective in advance grades such as fourth, fifth and sixth grades.

Researcher  How do we judge?

Zayed  You feel that there is individuality in the answering.

Sultan  Despite the individuality, even the less active student is giving answers.

Researcher  There are some conversations among students. What if we say that the number of students in each pair is small?

Sultan  I tried to have 3 in each group today but that was very difficult.

Here, Zayed raised the issue that there was a difference between using the paired discussion strategy in the lower grades when compared with older children in the higher grades. He further comments that the younger children in the video are not working
together, but rather are answering the task ‘individually’. Sultan counters his problematising here by stating ‘even the less activity students give answers’ suggesting that the strategy has encouraged student participation, even if such participation is not collaborative. I then suggest that the number of students in the ‘pair’ could be adjusted to encourage collaboration, to which Sultan comments he has tried ‘three in a group’ which was still ‘very difficult’. In this way, we can see that the diverse age groups taught by the teachers raised issues, which had to be negotiated and clarified – e.g. Zayed’s comment that individuality in pairs is not satisfactory was important in delineating what is to be achieved through paired discussion strategy. Such diversity in terms of teachers’ current experience was acknowledged and then utilised in the negotiation of meaning process at work in the workshop discussions.

6.2.2 The Development of Teachers’ Relationship, and Negotiating Authority/Power Dynamics

Another aspect relating to the various differences between the teachers’ in the group relates to their professional status and length of experience. Ahmad’s role as the educational supervisor gave him some authority over the other teachers—a power dynamic that had to be negotiated as the TDP progressed. In the first workshop, there were several events that indicated that Ahmad’s authority was having a significant influence on the relationship between him and other two case teachers: for instance, in the very first conversation of Workshop 1, when the teachers were asked about their perceptions of the first phase, Zayed said immediately ‘start with Ahmad’. Whilst this assertion may be due to Ahmad’s status as the oldest teacher (according to Saudi cultural norms; the oldest person should start the conversation), it also can be linked to his seniority in the group, i.e. Zayed gave priority to Ahmad based on the existing normative hierarchical relations within the school. A bit later on in the same workshop, when Sultan started his reflection about a video of Ahmad’s classroom, he said, ‘I am as a teacher I cannot talk on behalf of Ahmad, this is not to praise him or for something because I see him as top of the top’. Here, given the context and my own understanding of the original Arabic terms used here, I take this to mean that Sultan is acting deferentially to Ahmad’s authority, and is commenting on how this might restrict the reflective comments he could make about Ahmad’s teaching (I cannot talk on behalf of Ahmad). On another occasion in the same workshop, Ahmad enacted his authority role further legitimising Sultan’s above statement. Here, the teachers were watching a video of Zayed’s classroom:
Ahmad: Why did not you divide the board?
Zayed: I did not.
Ahmad: This is wrong.
Zayed: Sometimes I did and sometimes not.

Here, Ahmad asks Zayed about why he did not divide the board to organise his writing better, and then issued his judgement—'this was wrong'—thereby enacting his role as the educational supervisor with authority to evaluate other Maths teachers’ performance in the school. It is interesting to note that Zayed defends his practice here (‘sometimes I did and sometimes not’), rather than accepting Ahmad’s judgement of wrongness. Whilst this might suggest that the relationships between the teachers were negotiable (as I will show shortly), we can also see that Zayed identified the voice of the supervisor in Ahmad’s comment, and chose to use the TDP space to position himself away from it. In subsequent chapters, I will show how such positioning against the supervisor was key to their identity development through engagement in the CoP.

Such examples were a challenge for myself as facilitator of the workshops in terms of how recognise the power between the teachers and how to support their participation and accordingly create space for mutual engagement in the community. Whilst many CoP consist of different types of participants organised in a hierarchical power structure, in this case, the teachers deference to Ahmad’s authority presented a challenge to their mutual engagement—mainly because the focus of such engagement (the joint enterprise) was to critically reflect on one another’s practice regarding classroom dialogue (including Ahmad’s). At the outset, the presence of Ahmad’s authority seemed to influence how and when the other teachers felt they could talk and how they perceived the context of the discussion (i.e. as a place for critical reflection or where they might be held to account by Ahmad the supervisor). Nevertheless, there was a shift in the relationship between the teachers and myself as the TDP progressed. For example, in the second workshop, there was a humorous discussion about when a video of Ahmad’s teaching would be shown: Zayed and Sultan joked that they were the only teachers to provide negative examples of quality dialogue (‘cons’) up until this point, as shown in the following extract:

<table>
<thead>
<tr>
<th>Part 1</th>
<th>At the end of teachers’ reflections on Sultan’ and Zayed’s video episodes and before presenting an episode for Ahmad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ interaction</td>
<td>(says to Sultan with a low voice) all episodes and cons about us (he laughs).</td>
</tr>
<tr>
<td>Researcher</td>
<td>Let’s watch the episode of Ahmad.</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Zayed</td>
<td>Do not miss it (<em>He says to Sultan ‘Because it is an episode of Ahmad’</em>)</td>
</tr>
</tbody>
</table>

**Part 2**

After viewing a video episode of Ahmad’s classroom practice.

**Teachers’ interaction**

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Let’s watch the next episode; it is also for teacher Ahmad.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>(laughs)</td>
</tr>
<tr>
<td>Zayed</td>
<td>Finally an episode for you (Hahaha) I kept telling Sultan that the cons are all yours and mine, not Ahmad! (All the teachers laugh)</td>
</tr>
<tr>
<td>Researcher</td>
<td>It is not about disadvantages.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Let’s laugh a little.</td>
</tr>
<tr>
<td>Sultan</td>
<td>This is for learning, we want learning.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Yes.</td>
</tr>
<tr>
<td>Sultan</td>
<td>Honestly.</td>
</tr>
<tr>
<td>Researcher</td>
<td>This is also an episode for Ahmad, sorry.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Never mind, just proceed.</td>
</tr>
</tbody>
</table>

Here, we can see the teachers are finding space to laugh with one another about the authority Ahmad has in the group. Their use of humour to do so appears to respond to an underlying contradiction between the rules of the TDP (mainly devised by myself as facilitator) and the rules of the supervisor–class teacher relationship. The TDP creates a space for all the teachers to be critical of one another’s videoed practice, which contradicts the more typical experience of Ahmad as an evaluator of their practice (see the example above, but also my own account of his position as educational supervisor, which comes later). Another event that seemed critical in breaking down the power hierarchy between Ahmad and the other two teachers took place in the third workshop. The following extract presents the teachers’ conversation:

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Your last point is wonderful. <em>Here Sultan says something to Ahmad in a low voice and I noticed that</em>. Sultan, if you have any points please share that with us, we’d like to hear that</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sultan</td>
<td>No, no I was just kidding [<em>Laughing</em>]</td>
</tr>
<tr>
<td>Ahmad</td>
<td>No, say it. it is good actually [<em>Laughing</em>]</td>
</tr>
<tr>
<td>Sultan</td>
<td>It was just the way Ahmad stood next to the window while asking the question <em>He was leaning his body to the wall waiting for the student’s answer</em> shows dissatisfaction</td>
</tr>
</tbody>
</table>
Here, Ahmad’s comment, ‘no say it. It is good actually’, encouraged Sultan to share his reflections with other members, and, in so doing, appeared to legitimate the sharing of such critical feedback of his own teaching. Although we can still see his authority in the discourse (i.e. he has to encourage Sultan to share and then offers evaluative statements about Sultan’s input ‘Good point’), this move appeared to be important in breaking down Ahmad’s authority in the group, and as I will show shortly, the teachers were then able to engage in critical reflection of each other’s teaching quite extensively during the course of the TDP.

6.2.3 The Role of Humour as a Feature of Mutual Relationship

The onset of such humour in the early workshops appeared to mark the beginning of the teachers’ engagement in the CoP as it seemed to act as a sudden release of the contradiction between the rules of the TDP and the normative supervisor–teacher relationship. We have seen throughout the course of the previous section how the teachers used humour to negotiate Ahmad’s authority in the group in the second workshop. In the fifth workshop, this sense of humour was very much evident, as the teachers discussed their self-reflections regarding Zayed’s video episode, which they had been asked to do as ‘homework’ during the mid-break of the TDP:

Researcher Thank you for your efforts and self-your reflections on the video episode last week.
Sultan I did not write anything. I just wrote one letter: What has been discussed in the previous workshops was not applied with a red face. [Teachers laughing]
Researcher Let us see again the episode, and it was selected from phase one prior to our workshops.
Zayed (Looked to other teachers) see haven’t I told you? (it seems that the teachers had their own discussion about it)
Researcher And let’s read Zayed and Ahmad’ self-reflections and compare between them.
Zayed There was much agreement.
Sultan Zayed wrote that the teacher (Zayed) did all roles in the classroom. It was a good observation about all roles (Sultan agrees with Zayed about this critical reflection of Zayed’s role in classroom as doing all roles of...
the teacher and student). This means he is the one who prepares for the lesson and the role of providing the way of answering and the answer and as if the student was a ‘vase’. [Teachers laughing (as Sultan describing a student in the classroom as a vase which just for decoration without any role because Zayed did everything)]

Researcher Now, let see another episode for Zayed and this episode is after Zayed changes some of his practice.

Zayed Oh I lived a week of blaming myself and you have this second episode (Laughing). That is unfair… you made me live a week of guilty consciousness while you have this episode [the teacher laughs]

Researcher Let us watch and write any note

Sultan Honestly, the first thing I wrote was new Zayed (laughing)...as he gives the opportunity for answering even if it is wrong and more enforcement, also students participated with the teacher in a comfortable way and there was discussion between the student and the teacher.

Zayed I wrote that not allow students participate when their colleague talks.

Sultan Another point is that there was a student who was asked by Zayed about his opinion. In this moment of asking a student about his opinion of his response you need to require his justification for the correct answer or his explanation when he provides a wrong answer.

This humour here, from both Sultan and Zayed, has multiple functions. Firstly, Sultan is able to negotiate his relationship with me as an authority in the group in that he is trying to resist the homework I had set the teachers: ‘I did not write anything. I wrote just one letter’ (Sultan). Secondly, this humour also enables Sultan to be highly critical of Zayed’s practice, as recognised in the video episodes. His reference to not writing anything but an angry, red face refers to a lack of the change observed in Zayed’s classroom practice—criticism that is evident later on in this extract, where Sultan talks about Zayed treating students as ‘a vase’. In SA, this term is slang, and refers to people who are passive. Sultan here appropriates the red face from teacher feedback practices (his ‘one letter’) to comment on Zayed positioning students as ‘a vase’, which he had not expected to see given the discussions that had taken place prior to the mid break of the TDP. In response to such criticism, Zayed also uses humour (Oh I lived a week of blaming myself) to point out he had also been critical of his own practice when viewing the video, but had not been aware that I had an additional video showing changes in his practice. All teachers reacted to this with laughter, which enabled Zayed to concur with Sultan’s critical reflection of the passivity of the students in the video. In this way, we can see how the teachers used
humour in this extract to deal with some difficult and challenging criticism (i.e. the joint enterprise) in a way that also enhanced—rather than hindered—their developing mutual relationship with each other and me.

Another example highlighting the teachers’ use of humour was in their discussion (in the seventh workshop) about the IRF exchange structure which I introduced:

**Researcher**  The last theme was about dialogic teaching characteristics: the first characteristic is to go beyond the IRF Style; it is clear you exceeded it and it became reality for you. If I refer back to some of the discussion episodes during phase one, before and after the workshop, it is observed that the most frequent instructions before the workshops were only question-answer-respond. (There was example on the power point which was $8 \times 4 = 32$ correct, and a question: do you feel you go beyond this style?)

**Zayed**  Hahahaha! Eight multiplied by four equals 32, right. Who is next? Hahaaha!

**Ahmad**  Excellent (said ironically, as Ahmad used to respond to students by saying ‘excellent’ without posing follow-up questions).

**Zayed**  (Laughing loudly) I imagined 8 multiplied by 4 equals 32, right? Next student (laugh).

**Sultan**  (Laughing) You reminded me of listening to the multiplication table. What is the product of 2 multiplied by 5? The student would answer 10, I would say well done, and then on to the next student.

**Researcher**  Now you moved forward and exceeded the traditional style.

In this extract, I suggested to the teachers that extending the IRF exchange is a characteristic of high-quality dialogue, and they responded to this by laughing and mimicking their past practice form of questioning from before the TDP (Phase 1). For example, Zayed laughed and repeated the example: ‘I imagined 8 multiplied by 4 equals 32, right? next student (laugh)’. Here, he parodies his old practice, which notably involved short IRF exchanges, in response to which all the teachers joined in with their own examples: e.g. using response moves such as ‘excellent’ (Ahmad). Here, it may be argued that this mimicry is another example of the kind of humour that facilitated participation in the CoP, i.e. it facilitated the critical element of critical reflection and provided a type of ‘social glue’ to support their developing relationships with each other in this context.
6.2.4 Reflections on Relationships with Each Other

In the final interviews, the teachers reflected on the development of their relationships in the group, and how it had become a collective, communal space to talk about teaching Mathematics in the school. The mutual trust they had developed within the group seemed important to them in account of the CoP that was realised through the TDP (see text in bold):

- Sultan ‘Before the project, our relationship was limited to a quick chat over the break. When the project started we started discussing and sharing our points of views, we would accept an idea, reject another. Our relationship became very strong that the Mathematics teacher formed a community. We depend on each other because we benefit from each other’s suggestions and ideas.’

- Zayed ‘Our relationship was friendship, but now it becomes relationship has aim to gain. We will learn from each other and I will tell you how I see you and tell me how you see me, but when you come to my class and don’t see anything or notice anything. We will not benefit each other. For example, today Sultan and I have talked about the problems of students; this has been resulted from our meetings in workshops. Now, I know all the problems of Mathematics in the school.’

Here, at the end of the research, we see how the teachers perceived their relationships with one another as communal and mutually supportive; involving sufficient trust to be able to criticise each other’s practice. Therefore, these developing relationships between the teachers were an important process that enabled mutual engagement to emerge as a property of this CoP. This mutual engagement established their/our membership in the community, orientated towards the recognised common interest: developing classroom practice in terms of their use of classroom dialogue.

6.3 Joint Enterprise

Wenger (1998) describes the second property of a community of practice as the negotiation of a joint enterprise, which, in this case, centred on teachers’ reflective practice on the quality of dialogue in their classroom. According to Wenger (1998), the joint enterprise is the result of a collective process of participants’ negotiation, which reflects the complexity of mutual engagement (relations within the group), and which also
may be defined by them in the very process of pursuing it. Moreover, the enterprise is not a stated goal, but rather as a common purpose involving mutual accountability between community members in order to make it an integral part of their practice. In this section, I will present evidence which highlights the processes via which the joint enterprise emerged as the TDP progressed. Here, I refer to the joint enterprise as critical reflection and the development of practice using classroom dialogue.

6.3.1 The Development of Teachers’ Reflections on the Video Episodes

The aim of this section is to illustrate a shift in the quality of the teachers’/our reflections which involved a move from making both positive comments about themselves or each other towards becoming more critical whereby they felt they could see weaknesses in their teaching and more importantly, gradually instigate change (above I have shown how humour was involved in this shift which in some sense was quite sudden, i.e. workshop 2). This seemed to be motivated by their/our investment in the community’s common interest, i.e. own professional development which meant they felt it possible to engage with changing practices in their classrooms and elsewhere (see Chapter 9). Below, I present examples from our discussions which indicate this shift.

In the first workshop, the teachers viewed two video episodes—the first presented Ahmad writing on the board and taking a long time to write out practice exercises, whilst the students sat individually without doing anything. A second video also showed Sultan with his students working alone with some of them finishing the exercises and not doing anything, followed by Sultan asking his students to get blank paper to copy further exercises. Initially, I selected these video episodes to open a discussion on how to save time in order to create opportunities for students’ participation and discussion and how they might use worksheets to support this. The following extract shows the teachers’ conversation about these videos:

Researcher  What to you notice?
Zayed       The time.
Sultan     The time spent on writing, oh Ahmad years you write.
Researcher  Do you notice how your students use their time. What do you think about the worksheets?
Sultan     This is one of the disadvantages. If I had special drawers, it would be possible to prepare the worksheets in advance and distribute them to
students before starting a lesson and saving time.

Ahmad This is one of disadvantages of the textbook.

Sultan One of disadvantages of the textbook.

Ahmad It is supposed the textbook has a blank space for exercises where students solve the exercises in it.

Sultan If I had my computer and I sat in my office, I would prepare lessons for the next day, prepare the tasks, and put them in special drawers. I would then distribute them to students so I say that the teacher is not able to walk inside the school with caravan, if the classroom was equipped, the teacher would start teaching and everything would be ready.

In this extract, although Sultan appears to criticise Ahmad’s practice (oh Ahmad, years you write), he does not build on this comment but instead repeats Ahmad’s input (One of the disadvantages of the textbook)—another example of his deference to Ahmad as supervisor (see above). What is noticeable here is how the conversation here focuses on external problems which hinder the teacher such as the textbook or lack of facilities they have to teach with, i.e. ‘special draws’ filled with pre-prepared worksheets. What is noticeable here is that the teachers did not address themselves as teachers and did not make direct comments on each other’s practice other than commenting that Ahmad spent a lot of time at the whiteboard. Instead they focus on external factors which are not perceived as changeable at this stage.

Similarly, near the beginning of the TDP, there were a number of different conversations that showed the teachers’ eagerness to make positive comments about what they saw in the video episodes. The teachers did not appear to engage with the videos as a tool concerned with improving their classroom practices, and, therefore, did not seem to ‘see’ how they might change their lessons: for example, the following conversation took place in the second workshop as the teachers reflected on a video episode of Zayed’s teaching which showed Zayed talking with a student and explaining the lesson on the whiteboard. Another student is talking loudly, explaining the lesson himself and not listening to Zayed.

Researcher What you have noticed?

Zayed This is a student who his name is Faisal. He usually wants to participate.

Ahmad I have an observation. I noticed that Zayed stood in a position that allowed all the students to see the board.

Sultan Yes, it is important to stand in the right position.
Researcher  This is good observation. You need to make sure all the students can see your face during the lesson. Notice the behaviour of the student who is talking loudly. He does not give you a chance to speak and does not listen to your words

Zayed  Because Faisal sees himself as more advanced than his peers. His talking does helps other students to understand, though.

Researcher  The most important thing is to help Faisal understand how to show respect while you are speaking with other students, but still allow him to comment on the discussion.

Here, Ahmad’s observation focused on only positive aspects of Zayed’s teaching (i.e. his standing position in the classroom) and this is confirmed by Sultan (‘yes it’s important...’). My own role in this discussion is somewhat evaluative in that I confirm that they have made a good observation but then I push them towards recognising Faisal’s behaviour as a challenge. This was to encourage the teachers to think about how to deal with dominant students in discussions. However, rather than take up this opportunity to critically reflect, Zayed simply located the problem with the student (‘he thinks he’s more advanced than his peers’) and then suggests his input can be useful. This suggests that, at this stage, the teachers either were not ready or otherwise were unwilling to reflect on their own behaviour in the classroom, and instead therefore were more interested on identifying what was positive and externalising any problems (i.e. as in the students, or the text books, etc.). Sultan made a similar observation when asked in his final interview to think about how their discussions had changed since the beginning of the TDP. He responded:

‘Yes I felt that in the beginning. I always support them [the other teachers] by focusing on the beautiful side. Even myself, I used to focus on the positive sides in my criticism and ignore what was going on, but when the workshops became weekly, the ice broke but politely because the goal was to improve and how to be improved even if I was a bit hurt’.

Sultan’s account of this developing practice here is validated if we consider how the conversations amongst the group developed as the TDP progressed. Below, I highlight the shift in the quality of their/our reflections by presenting the following example as one of many. This example shows the teachers’ discussing a video episode about Ahmad’s teaching of probabilities:

Zayed  He ignored the first boy. He did not appreciate him and evaluate him.

Researcher  He continued with whom?
Zayed: The second student.
Researcher: Who got the praise?
Zayed: The second student.
Ahmad: The second student.
Researcher: What about the first student?
Ahmad: The first student gave a wrong answer!
Researcher: Here is a question: What could be negatively affected by the praise given to the second student?
Ahmad: The first student’s feelings?
Researcher: So he does not talk.
Sultan: He will never talk again.
Ahmad: The praise had two different effects.
Sultan: We supposed praise both of them for participating in the discussion.

In this example, we can recognise how Zayed and Sultan provided critical reflections about Ahmad (He did not appreciate him and evaluate him), who also critiqued himself (the first student’s feelings might be negatively affected by his use of praise). Moreover, my own role is important in supporting such evaluations: for example, I ask specific questions during the conversation in order to scaffold the teachers towards a critical understanding of the consequences of not praising the input of all children. My question ‘What could be negatively affected by the praise given to the second student?’ seems pivotal in moving Sultan towards the ideas of praising students for their input rather than evaluating their response to a question. Therefore, questions such as this were deemed important in supporting the teachers’ shift towards offering more critical comments on the quality of the dialogue in their classrooms.

To summarise, as the TDP progressed the teachers started to critique themselves and one another’s practice through observing the video episodes, and I suggest this was as a result of their/our developing mutual relations and their engagement with an emerging joint enterprise, which partly was instigated by my own comments and questions (at first, at least). Moreover, they became increasingly aware of their role and behaviour in the classroom, and how this impacted upon the quality of dialogue which took place. As I suggested earlier, the hierarchical relationship between Ahmad and the other teachers at the outset seemed to generate much positive feedback of each other; however, with the developing mutual relationship between the teachers and my own role in terms of
navigating the discussion and modelling critical reflection, we/they moved towards the critical reflections, which subsequently became the joint enterprise of their community. In the next chapters, I will present many more examples of the teachers and myself, offering critical comments of their own and one another’s practice and I will argue that this supported some real changes in the ‘dialogism’ of the classroom. Here, it is suffice to argue that there was evidence of a process by which this critical reflection emerged as a joint enterprise—a process which was located in the ‘practice’ of the TDP.

6.3.2 Teachers’ Mutual Accountability

One important aspect for this CoP is the teachers’ mutual accountability to the joint enterprise. Wenger (1998) describes relations of mutual accountability to include ‘what matters and what does not, what is important and why it is important, what to do and not to do, what to pay attention to and what to ignore, what to talk about and what to leave unsaid, what to justify and what to take for granted, what to display and what to withhold, when actions and artefacts are good enough and when they need improvement or refinement’ (p. 81). Here, the teachers’ mutual accountability is to show their sense of responsibility and investment towards the common interest of the group, i.e. to develop the quality of dialogue in their classrooms; therefore, this section will demonstrate, firstly, teachers’ mutual accountability towards their own professional learning, and, secondly, their mutual accountability towards the new meanings and practices about classroom dialogue which were produced through the workshop discussions as time went on.

6.3.2.1 Teachers’ Mutual Accountability towards Professional Learning

Teachers’ investment in their own professional learning was evident in two examples in the early workshops: the first was in the second workshop, where the teachers’ explicitly stated a perceived ‘need’ for what was happening in the group:

Sultan This is for learning, we want learning.
Ahmad Yes.
Sultan Honestly.

Here, Sultan emphasised to the other teachers that using the video episodes for the
purpose of their own professional learning should be a common goal for the group ‘we want learning’. Ahmad agreed and as such, this was an important starting point for the subsequent discussions. Moreover, the second example was recognised from the fourth workshop, when we were viewing a video episode where Ahmad discussed the definition of ‘the median’ with his students. The following extract shows the conversation between myself and the teachers about this episode:

Researcher Notice that the student has answered correctly. How can we make use of that?
Ahmad By asking ‘how did you know’, the student can benefit.
Researcher Yes.
Ahmad The student would have known what the median is.
Researcher Yes, I don’t want to concentrate on the Mathematical content.
Ahmad Yes, yes. The goal for us and you is to get the most possible benefits.
Sultan The method used by Ahmad as a lesson is perfect because it is related to a concrete level so it is unforgettable.

Here, Ahmad’s use of ‘the goal for us and you is to get the most possible benefits’ indicates his awareness that both himself and the other teachers, and also myself were invested in the TDP community and that by working together, we could maximise the productive outcomes of the group (the most possible benefits). He establishes ‘the goal’ of the TDP as a joint enterprise and in commenting on the goal in this way, he displays a sense of responsibility towards it. Furthermore, in the written statements the teachers produced at the end of this fourth workshop, they displayed a strong sense of investment and enthusiasm towards their professional learning in the TDP:

➢ ‘You [the researcher] have been an inspiration to us and have refreshed us for this term after we had given up . . . every workshop is refreshing, fun and makes teaching a great joy’. (Sultan W4)

➢ ‘Each workshop makes us happy and makes teaching and learning more interesting.’ (Ahmad W4)

Here, Sultan’s phrase ‘after we had given up’ indicates a sense of despondence he had experienced regarding the lack of professional development opportunities prior to the TDP. In addition, Ahmad’s statement that the workshops make teaching and learning ‘more interesting’ suggests he can see that what takes place in the workshops provides
some benefit. In fact, these statements were a significant moment in the development of the joint enterprise since after Workshop 4 (and the mid-break of the TDP), teachers started to take more control, initiating discussions themselves. This illustrates the teachers’ growing sense of agency in making changes in their classrooms, which became more noticeable or commented upon as the TDP progressed. I argue that this represented teachers’ increased investment in what we were doing in the community’s discussions, which I suggest stemmed from their/our critical reflections on their videoed practice in the TDP workshops.

6.3.2.2 Teachers’ Mutual Accountability for New Meanings and Practices

Since the teachers negotiated different strategies and new practices during their participation in the community, they started to show their mutual accountability for these new meanings or developed practices. For example, in the third workshop, Ahmad critically reflected on a video episode where he asked students to identify different numbers as either prime or nonprime … He stated: ‘I did not go back to the student who was wrong to thank him for his participation although he gave a wrong answer. In order to judge the situation, try to put yourself in the place of the mistaken student. It is very good to commend anyone who tries… This is a motivation. Motivation is very important’. If we contrast this comment with the earlier example detailed p. 135, where several questions were posed as a means of scaffolding the teachers towards an understanding that praising student input might be useful, we can see that Ahmad has begun to critically evaluate his own practice (I did not go back to the student) without this support, and is using such critical reflection to recognise ‘new strategies’, which might motivate students more. Thus, we can argue that Ahmad is becoming accountable for encouraging students’ active participation in classroom dialogue which connects to the joint enterprise of the TDP.

Another example of the teachers’ growing mutual accountability comes from the fourth workshop of TDP when Sultan’s made the following critical statement, ‘It is starting to be important for me that the student’s benefit and I don’t care about quantity in that regard, even if the official reprimands me.’ In the next chapter, I will discuss the significance of this statement in the development of Sultan’s professional identity as a teacher. Here, I suggest that this statement also shows his mutual accountability towards the development of good quality dialogue in his teaching, i.e. that he was so invested in
this common goal, that he felt he could handle the reprimand of the official. I selected this statement for discussion in the fifth workshop with the aim of capturing the thoughts of the other teachers, especially Ahmad, who was the ‘official’ referred to here. The following extract shows the teachers’ reflections on it:

*Sultan*  
I mean it is more important to explain the idea and discuss it, have students understand and enforce that idea from all sides, than to have the students do many exercises.

*Ahmad*  
[…] The Quality means if the student masters solving an example of the lesson’s main idea, this can substitute many exercises. This is my opinion.

*Zayed*  
I want the student to know the right way. I don’t care where that leads him. I care whether the student correctly starts the way of solving a problem, and understand the Mathematical concept […] in other words, whether he understands the concept and how to use and apply it. I don’t care about the final result.

*Sultan*  
That is why I say that I care about the student’s interest […] I mean when a student explains it to me in different Mathematical methods, I feel that he has mastered the concept even if we spent the whole time on one problem. I am not only looking here for a variety of methods; I am looking for a variety of explanation ways that a student has.

*Zayed*  
The [Mathematical] concept would be deeply understood.

*Sultan*  
I want the student to be strong in discussion, to understand what he is talking about.

The focus on Sultan’s written recommendation here appeared to produce a somewhat explicit conversation about what was significant to them as teachers in terms of how they interacted with students in their own classroom. (Note that I do not make any contribution to this conversation). It involves a series of statements from each teacher about what is important, which includes ‘have students understand’ (Sultan), encourage students to master one example of the lesson’s main idea, rather than many (Ahmad), and caring about whether the student understands the concept and how to use it (Zayed). Furthermore, the second part of the conversation between Sultan and Zayed involves reaching a shared agreement on student understanding and what this entails.

The use of the personal pronoun is very prominent in this extract and suggests the teachers’ sense of ownership of the ideas or statements being proposed. Both Sultan and Zayed state ‘I want…’ a number of times, suggesting they are expressing a desired or imagined form of practice which aligns with their focus on student understanding. Therefore, I argue, that this sense of ownership expressed their/our mutual accountability
towards the joint enterprise—they/we utilised the space given by the TDP to actively negotiate or imagine what good quality dialogue might be like in their classrooms. Furthermore, I argue that the meanings that the teachers developed and negotiated in this conversation and others were important in terms of developing the shared repertoire which I outline next.

6.4 The Community’s Shared Repertoire

6.4.1 Introduction

This section will discuss how the teachers’ and my own participation in the community developed a shared repertoire—another key property of a CoP, which are both an outcome and resource for participation. Wenger (1998) suggests that the shared repertoire of a CoP emerges by ‘producing or adopting tools, artefacts, representations; recording and recalling events … telling and retelling stories; creating and breaking routines’ (Wenger, 1998, p. 95). Therefore, this section will emphasise the continual development of a shared repertoire as the TDP progressed (i.e. a process through which the CoP emerged). I will categorise the shared repertoire into primary resources (video tool, teachers’ experiences and stories…) and, secondary, resources (teaching strategies,...). Here, the primary resources are those that were developed to engage in the business of reflecting on the quality of dialogue. On the other hand, secondary resources are the strategies and actions which were suggested during workshop discussions, tried out in the teachers’ classrooms and then brought back into the workshop discussions to renegotiate their meaning/value. The argument here is that each of these resources refers to a different aspect of the process of engaging with the joint enterprise—primary resources enabled critical reflection to happen within the discussions, whilst secondary resources focused discussions on increasing the quality of dialogue in their classrooms. However, this categorisation of resources is not to prioritise them in terms of significance to the joint enterprise since each category was mutually dependent on each other and, therefore, both were essential. Both categories of resource created a dynamic process, whereby they influenced each other; this supported the teachers and my own participation and engagement.

6.4.2 Primary Resources

6.4.2.1 Using Video as a Tool for Reflection:

One of the first and most obvious uses of a tool to develop the joint enterprise outlined
above was the use of video observations and video episodes during the workshops. From the first workshop, both the teachers and myself appeared to use what they saw in the videos to imagine a different kind of practice and new ways of teaching: for example, after watching a video that showed the spontaneous collaboration between two students in Zayed’s class, the following conversation took place:

**Researcher** Notice how the student in Zayed's classroom was discussing with his peer sitting behind him.

**Zayed** Yes, I saw him; did you see the student who was looking behind him? This student always asked and discussed with the student behind him.

**Researcher** What I have noticed in your all classrooms is that everyone has the ability to participate and work.

**Sultan** Our system is democracy, we do not have repressiveness anyone wants to learn see we defend ourselves (laughing), this is joyful chat but I want to say, there is flexibility, why? Because the subject is hard in itself, then it is not good to make the atmosphere more difficult why? Let the atmosphere be somewhat comfortable.

Here, we can see my own input is directing the teachers to ‘notice’ the peer collaboration taking place, which I then transform into the belief that ‘everyone has the ability to participate and work’. This stance is taken up by Sultan, who suggests the video is evidence that ‘our system is democracy, we do not have repressiveness’, and then moves on to imagine that ‘joyful chat’ and ‘flexibility’ may be key to make this ‘hard subject’ more comfortable. In this way, the video (plus my own noticing) enables the teachers to shift their understanding of student participation and collaboration and imagine a different kind of practice (in the next section I show how this feeds in to various secondary resources). Furthermore, it was not only me who directed the teachers to notice events in video episodes, the teachers also did this themselves as we see in the extract I presented above (p. 127/128) when Sultan reflected on Ahmad’s behaviour:

**Sultan** It was just the way Ahmad stood next to the window while asking the question *[He was leaning his body to the wall waiting for the student’s answer]* shows dissatisfaction.

**Researcher** Very nice. The teacher’s body language affects the student’ talk

**Ahmad** Good point.

Video episodes were also used by the group to observe the teachers’ practice as they adopted various new teaching strategies discussed in the workshops (see secondary
resources below). For example, we viewed different episodes where the teachers were using different kinds of question, and we discussed the kinds of student responses they received. One video episode from Ahmad’s classroom was viewed in the second week of the TDP, which showed him using some open-ended questions to discuss a student’s incorrect answers (this was initiated by a comment from Sultan early on this video that ‘we’ only listen to correct answers). The following extract shows the transcript of Ahmad’s interaction with a student in the video:

Ahmad  Is number ‘11’ a prime or nonprime number?
Student  Prime number
Ahmad  Correct

[here Ahmad continued asking students to identify different numbers as either prime or nonprime, and the students' answers were correct ]

Ahmad  Is number ’37' a prime or non-prime number?
Student  Non-prime number.
Ahmad  Well. You said that it is non-prime number, why? What two numbers have to be multiplied to equal 37? Come on
Student  (Silent) (Ahmad did not give enough time for this student to respond)
Ahmad  You said that it is non-prime number, didn't you? Justify your answer. Why is it non-prime number?
Ahmad  Fares, what is your view? Prime or non-prime?
Fares  Prime
Ahmad  Prime… Why?
Fares  Because…
Ahmad  It has two factors.
Fares  Two factors.
Ahmad  Only one.
Fares  And…
Ahmad  The same number 37. (Here he looks at student who provided the wrong answer). 1 and 37. (He talked to the student who provided the wrong answer). Are there other numbers except 1 and 37 that would result in 37 if multiplied? Of course not, then what is it? A prime number.
Ahmad  Clap the hands for Fares. (Here, Ahmad praised only student Fares but not any other student.)

Here, the following extract in the third workshop shows the teachers and my own reflections on this video episode:
This extract shows how we discussed the new open questioning strategy, which was perceived to be exemplified in Ahmad’s practice (the video episode), refining the meaning of this strategy to include ‘asking how?’ questions and making requests for ‘justification’. Sultan initially offers a description of what he sees, but then Zayed generalises from this so as to establish a meaning, which can be used across their classrooms ‘what we are always careful about is to ask the student ‘how’? when he provides an answer ‘tell me how do you get to that answer’’. In this way, asking students for justifications and explanations of how they had reached a correct or incorrect answer became strategies in themselves, which stemmed from our initial discussion of Ahmad’s use of open questions in the video. Crucially, such meanings emerged from our observation of the video episode I had selected and, as such, they formed a key part of the repertoire used in pursuing the joint enterprise.
Therefore, the video episodes were supportive of our learning about the quality of dialogue in teachers’ classrooms since they offered examples of practice that then could be critically reflected upon as an object of investigation. In this way, the videos brought the teachers’ practice (episodes of dialogue) into the workshop discussions in such a way that it almost forced the teachers and myself to reflect; hence, this was a primary resource that came to be established as the shared repertoire of this CoP. In his final interview, Ahmad demonstrated the value he assigned to this resource: ‘these workshops allowed us to witness our teaching and there were many comments on the essential skills which the teacher should have such as learning strategies and particularly learning in pairs’. Similarly, Sultan went further in his final interview to talk about his experience of viewing, and reflecting on video episodes and how this could be incorporated into an ongoing cycle of professional learning in the future: ‘the teacher can see the pros and cons of his lesson. For example, if you have a new lesson in the future about “division by 5”, you would use the reflections you had last year about the same lesson after watching the video. Watching the lesson again and reading your reflections would be the best preparation for the new lesson. I may also video the new lesson and add my notes to it. So the same lesson would accumulate tens of recordings and notes over the years’.

6.4.2.2 Teachers’ Success Stories and Experiences:

The teachers’ story-telling about ‘successful’ practices was another important part of the community’s developing shared repertoire since they were used to demonstrate how important reflection was to their developing practice and as such, they served to establish and re-inforce the legitimacy of the joint enterprise of the community. I noticed this early on in the TDP as the teachers began to implement new strategies (discussed in the workshops) in their classroom. For example, the first story was shared by Sultan in the second workshop in response to ‘trying out’ a paired learning strategy discussed in Workshop 1. Sultan stated: ‘today in my class, the exercise was about the method of calculating the perimeter of a pool. As the students found the answer, I ask the students themselves to be sure the answer was correct. For example, one of the students, Tamim, and his friend ran to me and said that they had solved the problem, and showed me that they had solved it themselves using their hands’. Here, Sultan recounts what happened in his classroom to show how the use of peer learning increased students’ participation and engagement.
Furthermore, in the third workshop, Zayed recounted an effective interaction with a student when we discussed variety in terms of the form or type of questions asked: ‘today, after I had given five minutes of introduction about the lesson and during asking questions, a student, who used to have so rare participation, participated in the lesson. I always ask him to participate but he does not respond nor does he provide any answers. [Now], imagine that this was the only student who interacted with me with high level of interaction. His interaction was great and his answers were 100% correct… I said to his classmates: ‘Clap for him’’. Zayed’s surprise here concerning his students observed classroom behaviour appears to enthuse him to share this story with the group. His comment ‘imagine that’ signals to the group the change in this student’s participation and interaction which had moved from ‘so rare participation’ to a ‘great interaction’. In response to this, Ahmad imagined himself in a similar situation stating the praise strategy he would employ in such circumstances. Ahmad said ‘from my point of view, such student who did something unexpected should have encouragement greater than clapping, such as, after the end of the lesson, taking him to the principal to write a statement or letter that says he participated today or something like that. You don't imagine how much such a statement means for the student, he will never forget it’. Zayed then agreed with Ahmad’s point making a decision to implement this strategy in his next lesson: ‘today, I will do that and take the student to the principal to support him, since you can't imagine how happy he was, as his classmates clapped four times for him’. Here, we can see the ‘success’ of the paired learning strategy, which had been tried out in practice, acting as a motivator for the teachers to further negotiate meaning (students participation) and engage with new strategies (for example, forms of praise) in order to develop the quality of classroom dialogue in their classrooms.

As facilitator of the TDP I noticed how the teachers were interested in telling stories about their experiences, therefore, in the later workshops (seventh and eighth workshops), I consciously tried to give them more time and space to share their experience and to reflect on it. I used my classroom observations and my note recording to ask teachers about specific moments or students related to advance meanings of classroom dialogue. For example, in the seventh workshop, Zayed shared his experience of teaching the Mathematical concept of rate and offered his view of the ensuing classroom discussion:

**Researcher**  Today, Zayed taught the concept of rate. How was it?

**Zayed**  I taught the concept of rate for the second time. The first time was traditional but the second involved the dialogic teaching approach.
Honestly, we expanded the discussion time. Some students began thinking about *discussion questions* while others began to agree and debate. I expect that students will never forget this subject, even after their vacation. Why? Because when one when student agrees with you and another disagrees, you as the teacher discover the learning difficulties as well as the correct and incorrect teaching points. Honestly, the classroom discussion, including managing the dialogue in the classroom, was interesting as some students took part in the discussion for the first time. They shared *different methods* for solving the problem. They raised their hands, and even the student who was attending class after a long absence took part in the discussion despite the fact that he is shy.

**Researcher**  What did you observe in terms of the students’ different ways of solving the problem?

**Zayed**  There were five different ways of solutions, including: 1) solutions proposed by the students themselves; and, 2) a cases when a student offered a solution, another student suggested a very suitable solution and then another student deduced a new way based on the previous answers. So in the end, we had five different ways of answers suggested by the students themselves.

**Researcher**  It was a good thing that you wrote all of them on the blackboard.

**Ahmad**  Honestly, although the dialogic teaching is wonderful and makes you feel happy, it doesn’t go well with the length of the period.

**Zayed**  It was a wonderful discussion with great output. When did we leave the classroom? The head teacher entered and told us the next lesson teacher wanted to come in as we took five or six minutes from the other lesson.

In this extract, Zayed reflected (with some prompting from myself) on how he had enabled students to have more time for discussion in order to think and debate different methods, they were able to build their answers together with multiple responses to the same exercise or problem. He makes several critical reflections of his own practice in his story such as how he experienced the opportunity to see the students' learning difficulties through their participation in the discussion. He also notices the possibility to include or increase participation of potentially excluded pupils (who may be shy etc.). It is clear that Zayed’s reflection that, ‘*it was a wonderful discussion with great output*’ suggests his enthusiasm for the strategy he has employed (discussion around one exercise focusing on multiple methods) and his reflections connect to his need to justify this enthusiasm by evidencing his success with statements such as, ‘I expect the students to never forget this discussion, even after their vacation’. In this way, we can see that ‘success stories’ such as this enabled critical reflection in that they involved a) teacher's recounting and therefore re-imagining their practice and b) working out what parts of this practice event are informative and/or evidence of success. Whilst this extract appeared valuable to
Zayed, it also supports my argument that such stories shaped the joint enterprise—i.e. shaped the sense making of the group about what works and what is problematic in practice. Ahmad's response to Zayed's recount was to problematize the apparent 'success' that Zayed had constructed, i.e. he problematizes the time taken to conduct student discussions such as this (I discuss the time issue further in Chapter 7). Zayed does not see 'time' as a problem (on this occasion) and insists the cost of delaying the next lesson is worth it for such a 'wonderful discussion and great output'. He re-affirms the apparent success of the strategy used and in so doing, makes a significant contribution to the community's negotiation of what holding quality dialogue entails. In chapters 7 and 8, I will show how instrumental this kind of success was for the teachers' developing professional identities.

The argument here is that teachers’ success stories were important opportunities to comment on their own developing practice—they showed a sense of a lived experience for the teachers as they crossed the boundary between the TDP and their own classrooms (see chapter 8). Thus, these stories indicate their desire to document the changes they are witnessing in their own classrooms which they perceive have come about because of the strategies negotiated within the CoP. In this sense, I suggest the role of these success stories reflects the importance of the teachers’ developing practice to the whole CoP—had the teachers not opted to use their critical reflections to try out new strategies in their classroom then it is difficult to see how this CoP would have developed in the way it did.

### 6.4.3 Secondary Resources in the Shared Repertoire

During the discussions in the TDP workshops, we discussed a number of different teaching strategies which can be said to have become part of the shared repertoire. Here, these teaching strategies are considered as secondary resources since they were negotiated during workshop discussions and also tried out in the teachers’ classrooms. The following table lists the teaching strategies discussed:

<table>
<thead>
<tr>
<th>The teaching strategies</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair-learning</td>
<td>Change in the classroom arrangement so as to support students to talk in pairs to increase their participation.</td>
</tr>
<tr>
<td>Praise</td>
<td>Change in the meaning and the use of praise by teachers—</td>
</tr>
</tbody>
</table>
from praising only correct answers towards praising all students for different kinds of participation.

**Collective talk (We instead of I)**

Change in teachers’ talk (for example, teach me, tell me, explain to me) toward using (teach us, tell us) and using we instead of I. Shifting in teachers’ classroom practice toward a more collaborative construction of knowledge rather than it being one directional from only teacher to student.

**Asking open questions**

Change in teachers classroom questions from closed type of questions toward more open questions.

**Follow Up moves**

Change in the follow up to students’ responses in classroom interaction towards building on them or probing them rather than evaluation.

In the following section I will present some analysis of one of these teaching strategies in terms of how the group (including myself) developed its meanings in order to pursue the joint enterprise of reflecting on quality dialogue in the classrooms. The teaching strategy discussed here is paired learning because it is a highly visual example of the cultural difficulties facing the teachers in transforming the quality of dialogue in their classroom (these difficulties will be discussed more in later chapters) but it also highlights the importance of the teachers’ developing practice to this CoP. I have not discussed the other strategies due to limitations on the word count but data relating to them can be found in Appendix N.

6.4.3.1 Paired Learning:

At the beginning of the research (phase 1), in all three of the teachers’ classrooms, all students were seated individually facing the whiteboard at the front (see the photographs below). The atmosphere in the classroom was quiet; students worked alone and did not talk about their work with other students. In the first workshop I presented these photographs to the group to prompt a discussion about the layout of the classroom and how students were seated individually.
Here, there was some evidence that the teachers’ perceived quietness and student isolation in the classroom as not ideal. For instance, Zayed commented ‘there is no interaction. You feel that the students are looking for help.’ suggesting that the students might benefit from opportunities to participate more in lessons. Zayed’s reflection here formed a starting point for change in the teacher’s awareness of how classroom layout and student arrangement might support their participation in classroom talk. As the first workshop progressed, the discourse became mixed and at times contradictory in terms of the value they/I put on changing the classroom toward collaborative working arrangements. Ahmad, for example, believed that there are disadvantages with regard to students learning in groups, namely, that ‘the students don’t make an effort to concentrate or to work because they already know that other students in their group will help them answer the question’.

This indicates he believed peer collaboration might make some students more passive but at the same time he stated that it had advantages with peers able to assist each other: ‘it better for those who understand after the second or third example when students who understand from the first example are with them.....the students would understand better from their peers who could explain topic to a smaller group’. In this discussion, Sultan and Zayed also discussed the kinds of activities and tasks that group work could promote. According to Sultan, ‘for me, seating in groups for just individually solving exercises, I don’t think that groups are advantageous. I think groups are advantageous for discussion when you put them together to solve a problem together’. In summary, this discussion involved consideration of the pros and cons of group work with some consideration from Sultan of what needs to be in place to facilitate collaboration amongst students.
Earlier I referred to my presentation of a video episode that showed spontaneous collaboration between two students in Zayed’s class which took place in the first workshop and I presented the teachers comments on this video episode as evidence to highlight the criticality of using the video in the TDP (as a primary resource). But these comments (presented again below) also demonstrate how the strategy of paired learning came to be a secondary resource in the group out of the above discussion on group work:

**Researcher** Notice how the student in Zayed's classroom was discussing with his peer sitting behind him.

**Zayed** Yes, I saw him; did you see the student who was looking behind him? This student always asked and discussed with the student behind him.

**Researcher** What I have noticed in your all classrooms is that everyone has the ability to participate and work.

At this point, the teachers and my own comments displayed a change in understanding of student participation—i.e. from a belief that this could be increased through group work towards recognising that students could work productively in pairs. Ahmad said ‘the most important thing is to collaborate with your peer’. Moreover, Zayed and Ahmad suggested that in future 'students sit in pairs' and they would 'use the strategy of learning in pairs'. Therefore, Sultan suggested to the other case teachers at the end of first meeting that 'the most important thing for us is to organize the collaboration work' and went on to say that there should be a focus on 'changing students' behaviour'. Ahmad further emphasised the value of this strategy by saying ‘When working in pairs, from my point of view, it is wrong if I say that the first five students who finish will be the excellent. This will lead to competition between them. I consider the student who finishes the last as the first one and consider him as excellent’. Therefore, in the TDP dialogue, there was a shift from a belief that group work was not possible because of the classroom layout towards actively attempting to incorporate it in the form of paired learning in to their own lesson planning. Here, the argument is that 'working in pairs' as a strategy or new meaning was developed in the first workshop and became part of their shared repertoire.

**6.4.3.2 Reification of the Paired Learning Strategy**

For a CoP, reification is important in terms of the negotiation of the meaning in that it
enables such negotiation to happen and new meanings to be created utilising shared understandings which have already been established. Wenger (1998) defines reification as when ‘a certain understanding is given form. This form then becomes a focus for the negotiation of meaning’ (p. 59). We have seen in the previous section how during the workshop discussions both the teachers and myself reflected on the value of using paired learning as a means to foster student participation and collaboration. But according to CoP theory, this participation is not enough for this strategy to become part of the shared repertoire and subsequently used as a means to create new meanings/strategies as part of the joint enterprise. Wenger’s perspective of reification suggests that new meanings must be given form in a way which encompasses a 'taken for granted' or shared meaning amongst members if they are to be part of the shared repertoire, i.e. they must become embedded in the practice. For example, the use of success stories which I referred to earlier as a primary resource in the shared repertoire was done so by myself and the teachers without conscious awareness of the value of such stories for the joint enterprise (i.e. critical reflection).

Likewise, there was also evidence of such reification in relation to paired learning in the later stages of the TDP. For example, in the sixth workshop, the teachers no longer talked about pairs explicitly, i.e. as a way of encouraging students’ voice and participation or as way to support learning environment but rather they embedded the term 'pair' in discussions of other aspects of their reflective commentary. The following extract comes from a discussion of a video episode involving Ahmad teaching multiplication:

**Sultan**

First, when Ahmad started correcting the solutions for the whole-class, he took a group of ideas from each pair as he pointed them. The second part is the feedback which is the most important thing, i.e., to correct the concept for the students. One of the pairs also has given the teacher an idea about a point of weakness with the students. So Ahmad was able to know a problem and he focused on it.

In this extract, Sultan refers to paired learning in passing as he describes what he sees in Ahmad's video episode. He does not feel the need to discuss what this strategy is or how it might be implemented but rather uses the term ‘pair’ as a cultural form which already has an established meaning which the group now shares. Sultan is therefore using the paired learning strategy as a tool for reaching another purpose, i.e. to make a point about the need to look for students common mistakes and then discuss them in the whole class discussion. In this way we can see how this specific teaching strategy became reified
within the CoP as it emerged so that initial meanings were embedded and then utilised for making sense of the ‘new’. N.B. it is important to note that such secondary resources were not merely terms referred to in the workshop discussions but were actual strategies, realised in the teachers’ classrooms, and therefore they indicate the teachers’ developing classroom practice outside of the TDP.

6.5 Chapter Summary

The evidence presented in this chapter indicates how the activities which constituted the TDP became supportive of critical reflection regarding the teachers’ use of dialogue in their classroom. Furthermore, such critical reflection appeared to support some real changes in the teachers’ use of dialogue in their classroom (dialogue being a central component of reform teaching). My analysis of the key properties of a CoP: mutual engagement, joint enterprise and the use of a shared repertoire—has enabled me to ‘see’ the processes by which this took place (through the emergence of a CoP). For instance, I have highlighted how the video episodes enabled critical reflection because it brought the teachers developing practice into the discussions. My argument is that the processes observed here are crucial to professional development in a CoP such as this, since simply assembling a group of teachers does not guarantee professional learning will take place. In the next two chapters, I move on to discuss how participation in this CoP brought about some professional identity development for two of the teachers involved: Ahmad and Sultan.
Chapter 7: Ahmad’s Developed Identity

7.1 Introduction

This chapter and the next address the second research question which I stated at the end of Chapter 5, namely: How does the community of practice help to develop the teachers’ professional identity as a reflective practitioner regarding classroom dialogue within the SA context? This chapter is about the development of Ahmad’s identity as a teacher and how this development was partly mediated through his participation in the CoP that was formed during the TDP. Firstly, I present evidence on how Ahmad told of his teaching identity as an authoritative knowledge deliverer and emphasised students’ passivity in his classroom at the start of the research but as someone who was motivated to change his practice. Secondly, I present evidence which illustrates he experienced some success in this respect. Here, I present two examples which, I argue, reveal Ahmad being critically reflective regarding the quality of dialogue in his classroom. Finally, I also suggest that this new teacher identity involved conflicted alignment with the CoP as Ahmad engaged in a negotiation between two professional roles of supervisor and reflective teacher.

7.2 Ahmad’s Beliefs in the Initial Interview

In his first interview Ahmed described and engaged with a teaching identity which involved acting as a deliverer of knowledge: ‘it is interesting, actually it’s a feeling inside me that I am interested in delivering a piece of information…’ He also identified that the role of students was to pay attention to the teachers’ talk: ‘the most important thing in Mathematics is that the student should pay attention’ and that the student ‘enjoys if he pays attention’. Moreover, he stated:

‘15 years ago, I had a student that I will never forget he always look straight at me when I am teaching he reminds me about a child watches Tom and Jerry Cartoon who concentrate on only with the cartoon and leave everything in his life behind him. This student concentrated on the lesson’s teaching and when I finish he used to smile at me. I’d be very happy when I see his smile that I know that the lesson is successful’.

Not only does this excerpt explain what Ahmad means by ‘students’ paying attention’, i.e. it involves listening to the teacher’s talk with concentration but it also indicates what counts as 'successful teaching' for Ahmad at this stage—i.e. that which captivates the
students so that they pay attention to what he says. Moreover, although this event was 15 years ago, Ahmad still remembers it—valuing this smile as a sign of successful teaching based on passivity and attentiveness of his students. We see that in the previous chapter how success stories became an important part of the shared repertoire in the TDP. Here we have a long standing success story which appeared to continually have informed Ahmed's professional identity in the classroom for a considerable period of time.

Ahmad also spoke of his role in classroom discussions as evaluator and corrector of student responses. He said 'Actually, I look for the wrong answers in order to correct them and in the meantime to make those who are not raising their hands not to raise the same wrong answers I might ask another student or make him choose another student whom he thinks knows the correct answer'. Here we can see Ahmad perceived that students’ input into the discussion was either to provide correct answers to the Mathematical questions he asked or be corrected if they made an error. This indicated that getting the correct answer was important and there was little recognition at this stage in furthering interactions with students so that incorrect responses or errors could be explained or discussed.

As one might anticipate, this identity and the expectations associated with it came in to conflict with the expectations of teacher and student set up by the new reform curriculum/textbook. For example, Ahmad did not appear to use the Talk task set out in the new textbook very extensively in his teaching which he justified saying: Some of them are suitable and some of them are more difficult than the lesson itself. A perception that might stem from the fact that these tasks were more open ended and could not be answered through procedural reproduction of routine solutions/methods, but rather demand concepts and arguments. In addition, he perceived the purpose of these tasks was to teach the student some form of self-reliance (‘to depend on himself’). As I have outlined in Chapter 2, this was not the intended purpose of the Talk task but perhaps reflects or fits with Ahmad’s understanding of learning as an individual or independent pursuit.

Furthermore, many of these beliefs were also evident in Ahmad’s practice during Phase 1. Here, I observed Ahmad engaging in highly controlled IRF exchanges where a question was posed (usually procedurally orientated), a student would provide a correct/incorrect response, Ahmad evaluated it as such and then another sequence would begin. This kind
of tightly controlled series of exchanges did not provide opportunity for students to use talk to extend their understanding and it became the focus of some of our TDP discussions (using video episodes from Ahmad’s classrooms in phase 1).

However, I also argue that Ahmad appeared motivated to change his practice at this point in the research too. For instance, he described one previous training course which he had found favourable: ‘because every teacher of the group presented a lesson and taught it using tools and I did a lesson about division using cubes […] it was over a two week period with great benefit’ because ‘each teacher had to participate through selecting a method and a lesson, and then teach that in front of other teachers and so on’. This shows how Ahmad saw some value for professional development programmes where they involved active participation from teachers and the opportunity to observe and be observed in their own teaching practice (lessons etc.). In the first workshop, when we reflected on a video episode of Japanese lesson study Ahmad and the other teachers noticed the Japanese teachers’ participation and collaboration and began immediately to discuss how they might implement it in their school. Therefore, I argue that at the outset of the TDP Ahmad was motivated to get involved in professional development and potentially to change his practice from the start.

7.3 Ahmad’s Changing Identity

In this section, I present evidence of how Ahmad saw himself after participation in the TDP and therefore, how his professional identity as a teacher changed through engagement with the joint enterprise outlined in the previous chapter. According to Wenger (1998), identity development is a process that requires people to be reflective about their own learning and acknowledging where they have come from and where they are going. Such reflections were apparent in Ahmad’s final interview where he commented on the change he has experienced: ‘the change is significant and I feel it in fact, I wish I have had this research or experience since the beginning of my work in the first and second year. Why not?’ He then further stated: ‘I wish that I have had dialogic teaching in my early days of teaching as well as the majority of Mathematics teachers’. Ahmad’s comments here show how participation in this CoP (this research experience) has made him a different teacher from what he was earlier in his career. Moreover, his reference to the ‘majority of Mathematics teachers’ suggests he sees such professional development as beneficial to the profession more broadly.
In later sections, I present examples which show how the key properties of the CoP contributed to this identity change. In the extract below, he discusses the usefulness of the TDP workshops as the main reason for this change:

‘In the beginning of the workshops, I believed that it [the TDP] was a burden and just talk…the situation was courtesy and we were saying: he [the researcher] has to do research, let's cooperate with him but after some workshops, maybe since the third workshop or the third and the fourth videoed lessons. After the usefulness that I felt inside me as a teacher, it was really interesting and useful and the students’ increased their satisfaction about me. This is the most important thing for you as teacher. I was satisfied about the project as it contributed to reaching lesson objectives. Honestly, we found that we are lucky…we all felt the difference, I felt the difference in student's understanding’

Here, Ahmed directly connects his participation in the TDP workshops to his teacher identity where he says ‘the usefulness that I felt inside me as a teacher’. Moreover, his reference to student satisfaction indicates a shift in how he positions students when compared with his initial interview. Rather than placing students in a passive role, here he is recognising the importance of having a good relationship with students.

In the final seminar, Ahmad recommended the teaching strategies (shared repertoire) negotiated during the TDP to the other teachers present: ‘I want you to try it when you finish your schedule. The idea of dialogic approach is not there in the students’ curriculum, really guys, 19 years as a teacher I never smiled through my 19 years of experience as I did when I used this method’. Here, Ahmad’s statement shows how he values and even objectifies ‘a dialogic approach’ as something other teachers could try—a term which was negotiated in the workshops after being introduced by myself. In addition, it is also apparent how he acknowledges a change in his thinking about his own identity as a teacher (‘19 years as a teacher...’) which has produced a shift in job satisfaction (I never smiled so much in 19 years). I argue, therefore, that through his participation in this developing CoP Ahmad perceived some success in changing his practice and—in part at least—there was a change in his professional identity as a teacher. This development involved becoming a teacher who has adopted a new way of doing dialogue with students in his classroom.

7.3.1 Ahmed’s Shifting Beliefs about Students’ Role

As already mentioned, one of the most important changes I observed in Ahmad's case was the shift in his espoused beliefs about the students’ role in classroom discussions. For
example, in line with the meanings negotiated within the TDP workshops, Ahmad came to believe that students can learn together with each other, not just with the teacher. In his final interview, he said ‘In the past, we used to say: do not look to your colleague's answer. Now we say why not? He came in order to learn from his colleague, so, even some of our key perceptions have changed, and, of course, this is the right. If he shares the information from his colleague and learn from his colleague who explain to him, there is no problem with that?’ This was a significant shift since it recognised that the student does not merely need to pay attention and passively accept his authority as knowledge deliverer but that they can instigate their own learning.

Moreover, Ahmed felt he had managed to change the students’ role in his class discussions: ‘In the past, teaching a lesson was by me with slight participation by the student, in other words I was giving them the knowledge with no effort from them, but now teaching the lesson is provided through drawing the knowledge out from students which achieves the lesson’s objective and students can reach such objectives by themselves with slight assistance from me through proper guidance’. Furthermore, Ahmad also believed that increasing student participation allowed all students to access Mathematics even those who he had previously thought ‘there was no hope’: ‘I believed that there was no hope with some students due to some reasons like their thinking so I said to myself that this student is hopeless to be good in Mathematics, however, through dialogic teaching it is evidence that any student can be good at Mathematics, reach the Mathematical concept and find more than way for answering and getting the same answer’.

The significance given to the students as 'others' in defining who he is as a teacher can also been seen in the following statement where Ahmed puts himself in the students' shoes: ‘I may be looking at you but my brain is not with you. I end up convinced that I am not good at Mathematics and Mathematics is not good for me! On the contrary, if I start talking and discussing and I am allowed to do so once, twice and thrice and to contribute to achieving lesson objectives’. According to Wenger (1998, p. 185) the work of imagination as a mode of belonging in the construction of an identity includes ‘recognising our experience in others…being in someone else’s shoes’. He also argues that ‘Imagination is another process for creating such a reality’ (p. 177). Arguably, Ahmad’s statement above is suggestive of this process. By placing himself in the students’ shoes, Ahmad compares two different student roles—one in which the student is 'paying attention' but 'my brain is not with you' and one where the student is 'talking and
discussing' and thereby contributing 'to achieving lesson objectives'. Therefore, through this imagining we see how Ahmad shifted his beliefs about the value of student participation and how it might move them away from believing 'I am no good for Mathematics'.

Taken together these comments illustrate Ahmad’s recognition or reflection on how he has changed his beliefs about students, which he presents as a positive evaluation of what he has achieved through participation in the TDP workshops. Below, I show some examples which indicate his engagement in critical reflection in the workshops (i.e. the joint enterprise) which I argue played a role in producing the changes outlined above.

### 7.3.2 Changing Practice and Changing Teacher Identity

In this section I provide two examples of how Ahmad crossed the boundary between his own practice in the classroom and the community of practice which was emerging in the TDP. This is to demonstrate that this boundary crossing was important to developing Ahmad’s professional identity as he participated in this research. This boundary crossing included implementing strategies which became part of the shared repertoire of the CoP, such as asking open questions. Additionally, I will show how Ahmad brought back to the community some of his experiences of implementing these strategies and how these experiences formed the success stories which became part of the shared repertoire which were central to the mutual engagement of teachers in the CoP. Therefore, I will argue these success stories were important for Ahmad's alignment and imagination as a mode of belonging and again show how the teachers’ developing practice was significant to the way in which this CoP worked.

#### 7.3.2.1 Asking Open Questions with Pairs:

This first example shows Ahmed adopting a critically reflective approach in interpreting his own use of questions and this appears to be supported by the mutual engagement and shared repertoire of the TDP. I begin this example in the third workshop when Ahmad and other members discussed one of his video episodes which included the following dialogue:

**Ahmad**

The mode is the most repeated of data, the mode is what? (The teacher pointed to the student)
Student  Five.

Ahmad  Five, yes it is the only number repeated twice (he wrote the answer on the board next to the exercise)

The teachers’ and my own discussion of this interaction follows in this extract:

Researcher  What do you notice?

Zayed  Ahmad asked a question but also answered the question.

Researcher  Who answered?

Zayed  Ahmed

Researcher  The student has answered. What did Ahmed do then?

Zayed  He did not reinforce.

Sultan  He repeated the answer

Ahmad  I didn’t ask the student ‘why?’

Researcher  This is an important point.

Sultan  Ahmed did not discuss.

The extract shows how Ahmad aligned with the group’s reflections on the quality of discussion taking place in the video. All the teachers critiqued what Ahmad did not do to support discussion in the video episode, such as answering the question and repeating the answer. Then, Ahmad joined and extended the discussion to include the significance of ‘why?’ questions. Here we see a self-critical stance adopted by Ahmad in observing his own practice—which appeared to be becoming an important part of the professional identity that was being constructed through his participation in this emergent CoP. At the end of this third workshop Ahmad wrote that in future he would ‘Focus on questions that require explanation, description, or justification’ and ‘give students enough time to respond after questions’. Here, I argue that Ahmad made these decisions to change his practice in response to the critical reflections apparent in the extract above and therefore, it appeared that the joint enterprise of the CoP was changing his practice (decision making). Moreover, this seemed to be a shift in his identity as a reflective practitioner which he spoke about in his final interview: ‘I was afraid of it [criticism] and I was saying to myself ‘God forbid’. I was afraid that my colleagues would say something about my way of teaching. I had this feeling at the early workshops [...] but as we proceeded through the workshops I started looking for criticism. I became yearning to hear criticism from my colleagues to develop myself and always said to them: thanks, well done.’
The following extract shows how the critical reflection on the quality of talk we have seen above impacted Ahmed's teacher 'identity in practice' in the classroom. This lesson (p. 2-L5) preceded the 6th workshop of TPD and involves Ahmad’s interaction with student pairs regarding fraction comparisons using the same sized representation (see appendix O to see the full interaction between Ahmad and the pair students). Ahmad’s interaction with students working in pairs took 18 minutes of the lesson (p. 2-L5) time.

2 Ahmad Here you (addressing both students) divided it, and such parting is excellent, but for the highlighting, how many parts do [we] need to highlight?

3 Student B One

4 Ahmad Why?

5 Student B It is because it wants 1 of 2.

6 Ahmad What is written in the numerator?

7 Student A One.

8 Ahmad And the denominator?

9 Student B Two.

10 Ahmad Then how many I should highlight?

11 Student A One part.

12 Ahmad Heroes, you (addressing both students) continue your work.

21 Student A A half is less than three quarters.

. .

22 Ahmad Why the half is less than three quarters?

23 Student A Because we take 3 from this (he pointed at the highlighted shape that represents three quarters), and we take 1 from this (he pointed at the highlighted shape that represents the half).

24 Ahmad Ok, which is larger, three halalas or the Riyal (Saudi currency comprising 100 Halalas)?

25 Student A The Riyal.

The analysis of TDP discussions shows Ahmad was becoming increasingly interested in student participation and cooperation when solving the exercises, giving students a chance to solve the exercises together while he was observing them and other pairs. In the above on lines 2 and 6, we see Ahmed use the questions to develop the progressive sequence of the discussion. The ‘why’ question is also used for different purposes such as in lines 4 and 22 to encourage students to reflect on what they were doing and to
encourage students to explain their understanding. In addition, in line 24 he asks: ‘which is larger, three halalas or the Riyal’ which indicates some recognition that these different monetary units can cause students problems. What is interesting here is the evidence of Ahmad’s boundary crossing from the TDP (outlined above) to his own classroom. This involved taking on board a critical understanding regarding the quality of his questioning strategy (as can be seen above) and attempting to implement change in the classroom. Therefore, I suggest the type of reflection on practice which was possible in the TDP discussions was crucial in developing his professional identity as a teacher—and was a process which aligned with the ‘practice’ of the TDP and was shared by the other teachers.

7.3.2.2 Different Mathematical Ways of Answering:

This second example of Ahmed's boundary crossing between the TDP workshops and his own classroom highlights how his developing professional identity involved constructing a different view of what Mathematics is with his students. I noted at the beginning of this chapter that Ahmed started out with a belief that students should provide correct responses and should be made aware when incorrect responses have been provided. The example below indicates Ahmad’s shifting practice which now focuses on different methods which can be used to reach the same solution. The following extract shows Ahmad’s interaction with one student (Abdullah) in relation to the question (3 minutes, how much does it equal in seconds):

9 Teacher Ok, what is your opinion Abdullah? What is the result?
10 Abdullah 180 seconds.
11 Teacher Excellent… how did you calculate it?
12 Abdullah By addition
13 Teacher Raise your voice
14 Abdullah I added the minutes
15 Teacher You added the minutes… how?
16 Abdullah I added the seconds of minutes
17 Teacher Excellent… teach us… we want to add with you. (The teacher walked to the board to write how Abdullah added the seconds)
18 Abdullah I added 60 plus 60 plus 60 (the teacher writes what Abdullah says on the blackboard)
19 Teacher Why did you choose 60 here… why didn't I add fifties or seventies (the teacher raising his hand to the students in a way requiring their explanation of the number 60 and the possibility of choosing other
Because the minute has 60 seconds

Ok, we are going back to Abdullah… teach us how did you add? (Here, the teacher stood beside what he wrote previously from Abdullah’s answer $60 + 60 + 60$)

I added 60 and 60 and I got 120

connects between 60 with 60 and writes their output 120… then, he looked toward Abdullah

I took 20 from 120 then I added 60 it equals 180

How?

I took 20 (the teacher pointing to 120) and put it aside

How much left?

100

Then what?

I add 60 on 100

I add 60 on 100 …how much it become? (With a loud voice)

160 (the teacher writes it on the blackboard)

The total is 160

Then I added 20

Here, I put back 20 to 160 and it becomes? 180, excellent, well done (The teacher laughed smoothly while he writes on the blackboard.)

This extract comes from the last lesson observed in the project (p. 2-L7) which occurred in the final week of phase two and after the eighth workshop. Again, we can see Ahmad's use of open questions (for example, lines 9, 11 and 19) which enables Abdullah to present his method for finding the solution 180. The whole class discussion that this extract comes from lasted 30 minutes during which Ahmad enabled 8 different students to come up with as many different methods to reach the same solution (180 seconds). This indicates that Ahmad no longer simply practiced posing questions which had only one correct answer but rather he posed more open problems which could be solved in several different ways.

This lesson came immediately after a discussion of the possibility of encouraging different ways of reaching a solution in workshop 8, which also provided the teachers with some lived experience of doing this. As a modelling exercise, I gave the teachers a subtraction sum to solve ($1012—815$) and then asked about their different ways of
answering it. The full transcription of the teachers’ answers and the different ways they reached their solutions are shown in Appendix P. The following extract shows some of this discussion (1012–815) particularly about Ahmad:

7 Researcher How about you, Ahmad?
8 Ahmad I added
9 Researcher What did you do?
10 Ahmad I need 85 for the 815 to become 900, and then a 100 to become 1000, so that is 185. By adding 12 it becomes 197 sorry 185 and 10 equals 195 plus 2 equals 197. Oh yes 197.
11 Researcher 197
42 Ahmad Here is a quicker way. I imagine that the 1012 is 1015 and later I subtract the (3) that I have added. The difference between 1015 and 815 is 200 minus 3 =197. This is better and quicker
43 Researcher Any other ways?
48 Ahmad 1000 minus 800 get 200, and 200 plus 12. No it is not suit.
49 Zayed Yes, yes one moment (with voice to encourage Ahmad to continue his method)
50 Researcher One moment Zayed, continue Ahmad.
51 Ahmad 1000 minus 800 is 200, and 200 plus 12.equal 212, then 212 subtract 15 equal 197
52 Sultan Number line and the backward counting.
53 Zayed I like your idea. What is it from 1012 to 812? 200 and then we subtract 3 and the answer is 197
54 Researcher Any other ways? What would you get if you apply all these ways to the number line? And what do you notice about the discussion that just took place? We asked a question and the answer was 197 but did we care about the answer or the something else?
55 Ahmad The ways of thinking.

Here Ahmad provides three different methods in answering the subtraction sum I posed (lines 10, 42 and 51) and is therefore, highly supportive of the lived experience of classroom dialogue I was trying to create. This is recognised by Zayed who responds to one of Ahmad’s suggested methods in line 53. Ahmad’s method 10, 4 emphasises the importance of developing students thinking which he perceived as different to finding the correct answer (i.e. he responds to be question ‘did we care about the answer?’). If we recall Ahmad's initial beliefs about teaching Mathematics at the beginning of the research which emphasised correct responses from students, we can see that he had begun to value
a new, more dialogic way, of teaching Mathematics through participation in the TDP which he had some success of trying in his classroom too. At the end of this workshop, the teachers were encouraged to share examples of student participation from their own classrooms. Ahmad reflected on his experience by saying ‘one of the results of dialogic teaching is the cumulative discussion where I build on any idea by a student through a question … the plan of the lesson could change based on students to share examples of answering… even me it is impossible for me to teach them all these methods but they have these methods when they have discussion with each other’.

My argument here is that these reflective statements (reflecting back on TDP participation) indicate that Ahmad was becoming a more critically reflective teacher which was key to the professional development which this CoP was trying to instigate. This involved becoming a different kind of Mathematics teacher since success in developing their practice was key to the developing CoP (hence the success stories). Ahmad explained this shift as follows: ‘In the past, I relied on algorithms as Mathematics more than discussing concepts but after the workshops it becomes clear for me that student’s understanding of the concept is the achievement. If the student understands the Mathematical concept, he will move to the algorithms smoothly. Therefore, the student is able to solve a problem with different ways without relying on algorithm and my answering way as the teacher’. Here, this statement shows how Ahmad locates himself in a different kind of teacher-student relationship than before—rather than be an authoritative deliverer of knowledge—Ahmad emphasises the students’ ability to answer problems with their own methods as crucial—methods which are not those of the teachers—the student now has expertise in the relationship.

In summary, these two examples suggest that boundary crossing between the TDP and Ahmed’s classroom was crucial to his developing professional identity as a teacher. Such boundary crossing involved implementing the strategies which formed the shared repertoire of the TDP (see previous chapter) in practice, and then reflecting on and objectifying such ‘practice’ in future workshop discussions. This participatory process involved a becoming for Ahmed—becoming a different kind of teacher to that which he narrated in the initial interview. I argue this process involved developing alignment of Ahmed's identity with the CoP in that he adopted and acted upon criticisms of his own practice (the joint enterprise) and also implemented some of the strategies negotiated in the CoP. Furthermore, this process also appeared to involve becoming a different kind of Math teacher which was also interconnected with the strategies discussed in the TDP.
workshops. Nevertheless, as I will now show this was not full alignment in that there were moments where Ahmad doubted the legitimacy of the joint enterprise, i.e. he questioned the feasibility of improving dialogue in his classroom.

7.4 Ahmad’s skepticism through TPD

This part will show how Ahmad was skeptical about the new strategies which, as I have highlighted in the previous chapter, eventually became part of the shared repertoire of the CoP as secondary resources. I argue that Ahmad’s identity as a teacher involved negotiating a balance between the identity promoted in the TDP—a critically reflective teacher pursuing the possibility of improving the quality of dialogue in his classroom and his identity as a supervisor—evaluating other teachers and ensuring the authority of the curriculum was upheld. Of course both aspects were in conflict and needed careful navigation. Therefore, I suggest that whilst Ahmed adopted a role that was engaged with the CoP, his alignment was one of potential conflict.

7.4.1 Time and Teaching Competence

On several occasions, Ahmad displayed concern regarding the new teaching strategies and the meanings attached to them (part of the developing shared repertoire). His concerns focused on two issues: the time taken to implement such strategies in the classroom and the teachers’ ability or competence in doing so. Firstly, the issue of not having time to implement the strategies was frequently voiced by Ahmad as he was concerned with completing all the lesson exercises and all the lessons in the textbook (see table below).

Table 7.1: The frequency of the time and teaching competence issues raised by Ahmad

<table>
<thead>
<tr>
<th>The issues</th>
<th>Frequency</th>
<th>The topics</th>
<th>Workshops</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time</strong></td>
<td>5</td>
<td>Sharing learning objectives</td>
<td>W1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using Teamwork or pairs</td>
<td>W2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussions with students</td>
<td>W2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open classroom questions</td>
<td>W4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Classroom discussion</td>
<td>W7</td>
</tr>
<tr>
<td><strong>Teaching competence</strong></td>
<td>3</td>
<td>Selecting exercises</td>
<td>W1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using different levels of exercises</td>
<td>W4</td>
</tr>
</tbody>
</table>
This may have been driven partly by his identity as supervisor—i.e. arbitrator of the curriculum/textbook and good practice at the local level. For example, in the early workshops, Ahmad raised this issue to caution the other teachers who wished to give time to sharing learning outcomes with students which might include talking about the lesson’s concepts: ‘it is interesting to learn about the lesson’s topic or concepts through exploring. However, as long as this exploring not being cause to waste time (workshop one)’. Another example comes from the second workshop where Ahmad and the other teachers positively reflected on using pairs in classroom but Ahmad concluded the conversation by saying ‘but it [pairs] consumes time and effort’. However, as I have shown previously, Ahmad engaged with using the pairing strategy in later workshops and lessons and actively promoted it in the final seminar which indicates some change or even conflict in his beliefs about this strategy.

This concern was articulated more directly in the fourth workshop as we discussed the lack of open classroom questions used in Saudi classrooms. He said ‘realistically speaking, our curricula cannot be implemented with the current number of school weeks. There is pressure. I actually would like to have discussion the students for the longest time possible. But when I teach a lesson, I keep in mind that I have to finish what the lesson had planned for the day. I keep in mind that I still have 6 chapters ahead, each of which consists of several lessons’. Here, Ahmad’s statement shows adherence to a professional identity which gives authority to the pace of curriculum and completing the lesson plan implying that these should take priority in his own classroom practice. These beliefs were seen to challenge the new practices and strategies emerging through the teachers’ collective participation in the CoP and my introduction of such strategies—which as shown in the previous chapter gave more control to the teacher over their own practice. This tension was evident in Ahmad’s written reflection provided at the end of the seventh workshop ‘honestly, although the dialogic teaching is so great and makes you feel happy, it doesn’t go well with the length of our teaching period.’

In reflecting back on his experience of the TDP, in his final interview Ahmad again voiced his concern about the time allocated to discussions and dialogue further: ‘I noticed that I use the talk strategies only when you [myself as the researcher] are attending the class. When you don’t, I finish the curricula but give more time to some concepts which I
believe the students need to understand in full detail and which I teach by dialogic approach with the students without prior planning. Having these discussions is interesting but time is a killer’. Here, it is clear that Ahmad was still aware of the issue of time and its constraint on implementing the kind of approach discussed in the TDP. He indicates how he noticed himself in the presence of me in his classroom and changed his practice accordingly. However, when I was not there, he reports that he reached a compromise—so that whilst he did not implement ‘these discussions’ in full—he did adopt a certain amount of agency as a teacher in deciding which concepts needed to be discussed more in-depth. Therefore, I suggest there was a sense of conflict in Ahmad’s account of his practice as a teacher—between wanting to use more dialogic strategies but still adhere to the pace of the curriculum/textbook. Of course, the extent to which this concern about time is linked to his role as a supervisor is unclear, but nevertheless, it is interesting that it is Ahmad who voices the skepticism in the group rather than Zayed or Sultan.

Another concern raised by Ahmed throughout the TDP which did appear to be linked to his role as supervisor was the teachers’ abilities to implement the new strategies discussed. Here, his comments relate to a generalised notion of who the teacher is rather than any of the case teachers or his own professional identity and we might suggest that such comments were again informed by his role as supervisor charged with observing and evaluating others practice. For example, he challenged a suggestion from Sultan in the first workshop which was: ‘I hope that the teacher is able to have one exercise that he can discuss deeply’ (first workshop). Sultan’s suggestion was aimed at tackling the problem of time and covering the sheer quantity of exercises set up by the textbook. Ahmad questioned this by saying ‘this way of selecting exercises is successful but is each teacher able for this?’ which demonstrates some skepticism that teachers are competent enough to select the right exercise for 'deeper understanding'. Another example is from the fourth workshop where Sultan suggested the teachers use three levels of exercises to suit students’ different abilities (differentiated teaching). Ahmad responded to this, saying: ‘but there is a problem that could all teachers implement this method?’ Here, these two examples indicate that Ahmad’s adherence to the pace of curriculum related to his doubts about Saudi teachers’ competence to achieve lesson objectives if they started to ‘choose’ which part of the textbook to teach which indicates his scepticism regarding allowing teachers’ agency in their own practice.

Moreover, within the workshop discussions, Ahamd’s role of evaluator of other teachers’
practice (as supervisor) was sometimes quite visible. Below I present three examples where Ahmad used the words ‘wrong’ and ‘should’. I have focused on these words because they were used in the context of evaluation of others practice as right or wrong rather than critical reflection on practice.

1. In the first workshop Ahmad noticed in one of Zayed’s video episodes, which was discussed in Section 6.2.3, that he did not organise the whiteboard. Ahmad said to Zayed ‘this is wrong’.

2. In the middle of the TDP when the teachers individually wrote self-reflections and observations on one video episode involving Zayed. Ahmad used ‘this is wrong’ four times. For instance, *one of the students wanted to ask a question, but the teacher didn't give him the opportunity to complete his question and instead interrupted him to explain an idea. This is wrong* and also, *In all of students’ participation and answers, no one was thanked for their answers with encouraging words. This is wrong*. (See Appendix E for all observations).

3. Ahmad also used the words ‘the teacher should...’ or ‘the teacher is supposed to...’ on several occasions. For example, in the self-reflections generated during the middle break of the TDP, Ahmad used ‘should’ when he reflected on Zayed’s teaching. Here, these examples show how Ahmad’s identity as supervisor continued to come in to play through his participation in the community since he still used an authoritative language (for example, ‘teacher should’ and ‘this is wrong’) in his reflections about the other teachers’ teaching.

Also, there was an interesting comment made by Ahmad in the sixth workshop when he reflected on one of his own video episodes which involved his students working in pairs. Ahmad said ‘the teacher discusses common mistakes in students' solutions. The teacher also commanded some of the distinguished answers which indicate the student's increased understanding of the learning process’. Here, Ahmad refers to himself in the third person rather than using the pronoun I. He used the word ‘the teacher’, which may suggest that Ahmad was performing his supervisor identity which usually meant commenting on others' practice rather than talking about himself. This indicates the interplay of the two roles (supervisor and reflective teacher) he negotiated as he participated in the workshops and suggests that the process of becoming a new kind of teacher identity involved conflicted alignment with the CoP—he aligned with the joint enterprise but also with his supervisor role too which at times created conflict with the
joint enterprise—for example, not providing sufficient time to engage in quality dialogue. Therefore, I argue that whilst Ahmad was enthusiastic about his experience of participating in the TDP workshops and was motivated to try out new strategies, there was also some skepticism which may be connected to his role as the supervisor.

7.5 Potential Change to Ahmad's Supervisor Identity

Despite the evidence regarding Ahmad's conflicted alignment—there was also some evidence to suggest that he perceived development in his role as a supervisor in addition to experiencing change in his professional development. Firstly, He said that ‘In the last year, [for teachers’ assessment through classroom observation] I wrote directly the teachers’ evaluation mark and then looked at the teacher’s shortcomings. But this year, I start to evaluate in a gradual way, therefore, the process of evaluation is now directed toward the correct way and the process of evaluation really becomes excellent. This is because my beliefs and perceptions have changed and if I had had this perception last year, the situation would be different and the evaluation’s criteria would be different. ‘. Arguably, this indicates Ahmad perceives a change in his practice as supervisor since he reports that he now evaluates other teachers on through a longer process rather than an immediate judgement. He does not give information on the nature of the evaluation criteria he now uses but in describing an evaluation in Zayed’s classroom he said: the level of students’ achievement was clear form their participation and more than half of the students participated in good way. This revels that there is effort by the teacher’ suggesting that student participation is a key part of his new criteria, which, I argue, is linked to the discussions I presented above on this topic. My argument here is that Ahmad’s alignment with the CoP enabled him to be aware of certain strategies for teaching and as a supervisor he began to suggest that teachers need to use them in their classrooms.

7.6 Chapter Summary

In this chapter, I have shown Ahmad’s motivation to change his own practice at the outset of the TDP, which was then realised through the support of the CoP. I have presented some evidence which suggests the strategies negotiated in the workshops were ‘put to work’ by Ahmad and his final interview suggests he perceived a change of identity as a teacher which he links to the CoP and as a supervisor. Implicit in this account are the
various key characteristics of this CoP which seem to underpin Ahmad’s experience—namely:

- The legitimacy of my own role as facilitator which in the first instance, encouraged him to attend the group as a matter of ‘courtesy’ to support my research;
- The themes I introduced from the research literature (for example, open questions, paired learning) which became part of the shared repertoire and which Ahmad tried in his own classroom;
- The selection and use of video episodes which Ahmad became critical towards (for example, he noted his lack of ‘Why’ questions);
- Experience of success in developing his practice (success stories) as he crossed the boundary from his classroom to the TDP
- The space for dialogue created by the workshops which enabled Ahmad to imagine himself in the student’s shoes.

From this, I suggest that Ahmed was both supported to engage in professional development through participation in the CoP but in doing so, also helped the group develop as a CoP at the same time. Nevertheless, I have also highlighted some skepticism from Ahmad regarding the strategies (secondary resources) negotiated in the workshops and I have also how Ahmad sometimes performed the role of supervisor by evaluating the other teachers’ practice rather than critically reflecting. This provides evidence that Ahmad’s ‘becoming’ as a reflective practitioner was arguably a form of conflicted alignment. In Chapter 9, I discuss these issues further when I consider how the teachers’ identity development and the emergence of the COP was situated in the landscape of practice—Ahmad’s role as supervisor was a key part of that landscape. In the next chapter, I highlight Sultan’s experience of the TDP in order to draw comparisons with a teacher who was not in this role.
Chapter 8: Sultan’s Professional Identity

8.1 Introduction

This chapter is the second which addresses how the TDP supported the teachers’ identity development in this particular context. I show the (re-)construction of Sultan’s professional identity through his participation in the CoP. Firstly, I will present the outcome of this process—i.e. his identity as a critically reflective practitioner who actively aimed to contribute to teacher development beyond the TDP involving other teachers and a sense of accountability to his profession. Moreover, this chapter explains why this was the case for Sultan’s professional identity in terms of his motivation to develop his practice prior to participation in the TDP. Then, the chapter presents different examples of critical moments in Sultan’s trajectory in the emergent CoP and how his readiness prior to and membership in the TDP led to these critical moments. At the end of the chapter, I will show the main differences between Sultan and Ahmad’s experience of the TDP which led them to have different experiences. Thus, the identity development evident with both teachers provides an interesting comparison and adds to our understanding of the TDP as a whole.

8.2 Sultan’s Identity as Reflective Practitioner about Professional Development

As outlined above, one of the key outcomes of participating in the TDP for Sultan was the construction of a new or more developed professional identity as a reflective practitioner regarding his use of classroom dialogue. This appeared to reflect an important shift in his beliefs about the role of the teacher and students in classroom discussions. I will discuss these through the following sections, which will firstly, present an account of the professional identity Sultan became through participating in the CoP before then going on to provide an account of the process which underpinned his becoming. For this reason, I am not presenting Sultan’s experience of the TDP in chronological order (as with Ahmad) as I wish to present the kind of reflective practitioner he had become before highlighting the process of becoming.

8.2.1 Being a Reflective Practitioner about the Quality of Classroom Dialogue

Sultan gradually became more interested in the quality of talk which took place in his classroom as his participation in the CoP progressed. At the end of the TDP Sultan
described a shift in his professional identity as follows: ‘I was the one who talk and teach the lesson’s ideas in order to attract students attention’ and ‘It used to be only me who led the classroom lesson and took students to one direction or the other.... Because of the workshops giving information was no longer my goal’ [final interview]. As with Ahmad, we can see here that Sultan recognises a distinct change in his practice as a result of participation in the TDP and this change involves a move away from his former practice where he was in control of the ‘lesson’s ideas’. He contrasts this with his new practice as follows: ‘in dialogic teaching [his new perceived practice] students expand and come up with the next steps and now, they are in control’. Furthermore, the student ‘becomes a guide for the teacher and other students at the same time and he becomes a teacher for some students’. This is similar to Ahmad in that it displays some recognition that the kind of strategies discussed in the workshops involved some re-positioning of the students’ role in class discussions. A recognition that was also evident in Sultan’s classroom practice where (with some support from myself) he tried to encourage students to demonstrate their ideas for the benefit of the whole class.

For example in lesson six of phase 2, Sultan gave his students more than 10 minutes to solve ‘what are the two numbers whose sum is 9 and its difference is 5?’ in pairs or groups. However we both noticed that the students were finding it difficult as only a few pairs could solve it and only with support from Sultan. I had noticed through my classroom observations that Sultan usually preferred students to solve problems on the whiteboard at the front of the class, so I suggested that he ask those who had correctly solved the task to talk to others about it.

32 Teacher Kalid and Faris come here (in front all students) and all of you look
33 Kalid Seven plus two is nine and (he talked so fast and his talk was not
34 Faris (he looks to the teacher) slowly slowly teacher (he disagreed with
35 Teacher Ok Faris
36 Faris Seven plus two equal nine and seven minuses two is five.
37 Teacher Kalid will write the answer in the board. Look here whose ask me
38 Kalid (write on the board 7 + 2 = 9)
39 Teacher Kalid give the pen to Faris to write the other one
40 Faris (write on the board 7—2 = 9)
41 Teacher Faris explain what you did
42 Faris Teacher seven minuses two is 5 and add two with seven become nine
43 Teacher Greet Faris and Kalid
Sultan’s language in this extract exemplifies the strategy of inclusivity negotiated in the fourth workshop whereby he uses a more collective rather than individual voice (for example, line 48 tell us all). Moreover, he also shows willingness to move away from the lesson plan (paired learning) in order to encourage active participation from the students. This is an example of Sultan’s shifted practice which involved giving more time for classroom discussion in a variety of ways, not only as pairs. Through my classroom observation, this way of supporting participation was increasingly evident in Sultan’s final lessons. Moreover, like Ahmad, there was some evidence that Sultan felt accountable to the joint enterprise of the CoP—this was evident in his written recommendation from the fourth workshop (mentioned in Chapter 6):

‘It is starting to be important for me that the student’s benefit and I don’t care about quantity in that regard, even if the official reprimands me.’

Here I argue that his written reflection signifies Sultan’s growing agency as a teacher in the classroom—i.e. that he will make decisions about his own practice regardless of the views held by those in authority. However, Sultan also made comments which suggested he had become an advocate for professional development more generally. In the example below from the final seminar of the TDP, he discusses using video episodes as a tool for professional development suggesting he had begun to consider the advantages and disadvantages of different methods for doing this:

Sultan …the researcher presented various video episodes and each of these
episodes had a selected instructional case for our benefit.

Teacher A  Did the research video each lesson?
Sultan  There is something called the video club, how? You video your lesson where you discuss it with your colleagues, what it should be and what shouldn't be in your classroom practice.

Teacher A  Teachers from the same major?
Sultan  Yes, to evaluate your whole lesson. This is a video club but what we did was that the researcher selected parts of the video recording as instructional case and he puts it for discussion. At first, You will see yourself in strange way and you will find the final outcomes gradually appear in an awesome way.

Teacher A  Would you notice your mistakes?
Sultan  If the teachers use the video club, then you will develop yourself when you observe yourself and your actions. But for this research, the video episodes aim to reach the cumulative interaction and the dialogic teaching. For example, when you ask a question with a concern about algorithm but if you ask the student how? Such as how he got the answer? Then he will give you a method that you do not know about it (Sultan continued this conversation through giving different examples of teaching strategies that he learns through TDP)

This extract indicates Sultan’s awareness of different professional development models based on using video (for example, video clubs, the TDP) and how these models are beneficial for teachers. However, what is fundamental in Sultan’s developing identity is how he emphasises the gradual improvement brought about by observing his own teaching ‘At first, You will see yourself in strange way and the final outcomes gradually appear in an awesome way’. As such, I argue that he was presenting himself to the other teachers in the seminar in two ways: i) as someone with expertise or knowledge of different models of professional development and ii) as someone who recognised his own professional transformation which he believed was mediated by observing his own teaching on video.

Further investment in his own professional development was evident in Sultan’s spontaneous attempt to record (audio only) his own teaching towards the end of the workshops. This was a surprise to both myself and the other teachers and he told us that he had started to record his interaction with pairs of students to improve the quality of his classroom talk with a particular focus on his use of questions. In the last two weeks of the research project, Sultan recorded around 4–5 audio episodes from different lessons. The following extract shows Sultan’s motive for doing so:
Researcher  Why did you by yourself start to audio-record? What makes you do this?

Sultan  The classroom questions, I wanted to observe the way students think about the type of questions I ask.

Researcher  Did you develop an interest to research and study these questions?

Sultan  Yes, I now have interest to videoing or recording and documenting so that I can evaluate, improve and show everybody.

Researcher  Very interesting. Are you now a researcher teacher?

Sultan  Why not? I am the only one who can study my class and no one else can do this except if he lives with me in the school. I am most knowledgeable about my class, and its problems and Mathematical problems. I can motivate every student using the way he prefers. [Sultan final interview]

Wenger (1998) argues, ‘membership in community of practice translates into an identity as a form of competence’ (p. 153). This competence has three dimensions which are accountability to enterprise, mutuality of engagement, and negotiability of a repertoire.

The example above demonstrates evidence of all the three dimensions of competence in Sultan’s developing identity. Firstly, it illustrates Sultan’s sense of accountability to the community’s joint enterprise (becoming reflective practitioners about classroom dialogue). According to Wenger (1998, p. 152) accountability to an enterprise is when an identity has a tendency to come up with engaging in certain actions (using video or audio recording) and valuing certain experiences (reflections on classroom questions and students’ responses) over others. Sultan’s spontaneous recording of his own practice showed an investment in the joint enterprise. He was not required to do it but spontaneously took on this task because he wanted to develop his own dialogue and share with the teachers.

The spontaneous nature of this action suggests the motivation to think about his own classroom practice was part of his professional identity (way of being a teacher in this group). This motivation was highlighted in his final interview where Sultan argued, ‘if I watch it alone I would definitely critique myself as a teacher but with the constructive critique of others, there would be a greater chance for improvement’—suggesting again some accountability to the group of teachers and its capacity to resource his developing practice. Secondly, Wenger (1998, p. 152) argues that in terms of mutuality of engagement, identity is ‘a form of individuality defined with respect to a community. It is a certain way of being part of a whole through mutual engagement’. Sultan’s statement above ‘I am the only one who can study my class’ suggests some detachment or
individuality from the group and this individuality is further evident when we consider that none of the other teachers behaved in this way. However, at the same time arguably, this behaviour was a sort of participation by proxy since he is using the tools of the community and the meanings attached to the teaching strategies which developed in the workshop discussions. Moreover, he reported that he intended to ‘show everybody’ his recordings. Therefore, I argue that his actions (audio recording his own lessons) were evidence of the ‘individuality’ of the identity he was constructing but simultaneously defined by being part of the whole group. Thirdly, from Wenger’s perspective, negotiability of a repertoire is when ‘sustained engagement in practice yields an ability to interpret and make use of the repertoire of that practice’ (Wenger 1998, p. 153). I have suggested above that Sultan was using the tools and meanings negotiated within the community when audio recording his own practice. The appropriation of such tools into his professional identity was very much evident at the end of the TDP where Sultan wrote a recommendation based on his experience: ‘I recommend that every teacher audio records his class to discover the strengths and weaknesses’

8.2.2 Sultan as a Developing Mathematics Teacher

As was the case with Ahmad, it was also apparent that Sultan saw himself as a reflective Mathematics teacher. In his final interview, Sultan argues that Mathematical subject knowledge enables a different kind of awareness of classroom questions and dialogue:

**Researcher** Could you explain what would you see in a video episode?

**Sultan** In this moment you will see things that only the subject teacher can see. For example, when we were talking about dialogic teaching in Mathematics I personally had an additional focus on algorithms that were taught in class, and how they were taught. I had additional questions to ask and proposals for methods of teaching algorithms.

**Researcher** So during the workshops you were watching the episodes for the teaching methods and at the same time you were focusing on the Mathematical subject.

**Sultan** And this improves that. When you have a clear understanding of algorithms your dialogue would be very elegant. At the same time, when you have a clumsy understanding your questions would be very awkward in the dialogue.

**Researcher** Try to explain your idea again?

**Sultan** A person who is not specialized in the subject watches the episode would be interested in the Q and A process and the good questions the students ask so he would feel the interaction. This is the view of the non-specialized observer who isn't interested in algorithms or Mathematical
subject. However, when you give the episode to a Mathematics teacher the teacher would be interested in the dialogue and the Mathematical subject. Both are related to each other. I say that if the presentation of the Mathematical content is elegant and sophisticated questions and dialogue would also be sophisticated and elegant as well.

**Researcher** What if the teacher understands the Mathematical subject such as concepts and skills

**Sultan** The teacher will be able to play based on the content by asking nice questions in different directions and with the ability to control the direction of questions. This is as playing with a ball, the teacher through it to the student who return it back to the teacher and so on with different directions.

**Researcher** When the teacher is aware of the Mathematical subject the teaching method, process, questions, and discussions become more elevated.

**Sultan** I can attract the students by throwing the ball and if I continue to do so all eyes will turn to focus on the teacher waiting for him to re-throw the ball. Everyone would be ready to catch it. The ball is the content and the way to the throw it is the question. The teacher should also know to which student the ball should be thrown.

**Researcher** Wonderful imagery.

This extract demonstrates that although the joint enterprise of the TDP was to become reflectively aware of the quality of dialogue in the teachers’ classrooms, Sultan was also keen to discuss Mathematical subject knowledge (for example, algorithms) and connect this to the groups’ reflections on the videos. He argues that two types of knowledge are linked to each other (i.e. subject knowledge and pedagogic knowledge) and that an awareness of this connection leads to ‘very elegant’ dialogue. Elsewhere in the final interview, Sultan was asked about what teachers need in terms of professional training, he stated: *‘the teacher needs a good Mathematical knowledge in terms of posing questions because if the teacher selects proper exercise and proper questions, this will enrich greatly the classroom’*. Here, I argue that this belief in the importance of subject knowledge was part of Sultan’s alignment as a mode of belonging of his identity with the broader context of the community’s practices. In Ahmad’s case—he realised through changing his teaching that he could teach Mathematics differently (multiple methods). Whereas, here, Sultan expresses a desire that the joint enterprise of the TDP should be developed to incorporate what we might call pedagogic content knowledge—a way of teaching that integrates subject knowledge and pedagogy more fundamentally. This is evidence of Sultan’s attempts to align the CoP with the broader context of teaching Mathematics in this school and arguably, this is influenced by his developing practice
which is teaching Mathematics. This is one of fundamental differences between Sultan and Ahmad’s alignment as I will discuss shortly.

8.2.3 Sultan’s Identity as a Teacher Trainer

Sultan also reported in his final interview that some of school’s other teachers had made inquiries about what the group were doing in the TDP workshops. Sultan provided one story about a conversation he had with another teacher in the school, which he used to show me his sense of how much he had changed during the TDP:

Researcher So do you expect the project to have influence over the other teachers and the school's policy?

Sultan A great extent of change has already taken place. It caused some teachers even say: ‘what happened with them? What is happening?’ There are too many things to mention but I cannot remember. For example, the science and Arabic language teachers were often asking: ‘why are you video recording the classes?’ I said ‘to watch them and discuss some points.’ Once, I visited an Arabic language class, and asked the teacher; ‘what is the title of the lesson? What is the goal of the lesson?’ I wrote down the answers and started asking students some questions. The students interacted and were enjoying the class although it has only been 6-7 minutes. I said to the teacher ‘look these are the results of the workshops.’ I swear that was incredible. When you share with students on the board (let us learn) and starts ask questions.

Researcher This means that you use class questions, students’ participation and sharing lesson aim. Yes, that is nice.

Sultan And this was only one class and I have never taught Arabic before. I asked them good questions and created an interaction with grade five. The teacher said ‘how about you sit with them, and I will sit in the back.’ He wanted to see what would happen. This was one of the training workshops benefits. I said to him ‘try to have them answer instead of you giving them the answer. Try to ask questions and suggest ideas, and have them share their questions and ideas. It is not necessary to get to the right answer at once.

Researcher Yes and without telling them it is the right one

Sultan If this happens don't tell them this was the right answer. Turn to another student and repeat the same question for him. If the student repeats the answer for you then this means that the answer has become conviction. Turn to a third student. This one would not repeat the answer because he'd think that you are re-posing the question because you are not getting the answer. Continue posing the question to other students, and let them say what they have. This way you would be able to know more about your students; who is positive, who is uncertain etc. In fact, after this class, the teacher told me that now he asks why and how-questions.
Researcher What you did in the Arabic class was to involve the students’ participation and you provided a way of posing questions which make students aware of their responds and doubt the right answers.

Sultan Even the student who provide correct answer will rethink about his answer and his ways of it

Researcher If he is sure, he will confirm his answer.

It is evident here that Sultan placed value on sharing the experience of participation in the TDP with other teachers and sort to pass on the teaching strategies and to negotiate their meaning further as they were used in other, non-Mathematics classrooms. Here, Sultan reported that training other teachers through lived experience was insightful for both him and them.

Therefore, I argue that the professional identity that Sultan constructed through his participation in the TDP was not simply one which aligned with the community (i.e. in becoming a reflective practitioner about classroom dialogue), but it went beyond this towards advocating professional development more generally across the school. This enabled him to imagine a new role where he might train other teachers to be reflective practitioners in their own classrooms and to encourage them to become more than merely teachers: ‘the development program inside the school is 100% positive because it is a continuous development, and it motivates the teacher to discuss something new every workshop. The teacher becomes a class supervisor’. Here, Sultan imagines ‘the teacher’ in the identity of supervisor in his own classroom, i.e. as someone who is responsible for improving teachers’ practice in Saudi schools.

8.2.4 The Summary of Section

This section has illustrated the professional identity that Sultan developed through his participation in TDP. It has highlighted that Sultan developed his practice around classroom dialogue in alignment with the support offered by CoP, but also went beyond this joint enterprise to develop an interest in teacher development more widely. In the next two sections I will try to explain why this was the case in order to implicate some key characteristics of this CoP. Firstly, I will present evidence about Sultan’s professional background prior to his participation in the TDP workshops. This evidence is to show Sultan’s motivation to engage with professional development (the TDP joint enterprise). This includes Sultan’s unfulfilled desire to improve himself and his conscious awareness
of the complex landscape. Secondly, I will present examples of critical moments of Sultan’s trajectory in the emergent community which supported his alignment with the joint enterprise and more importantly, the kinds of imagination necessary to develop practice in a context such as this.

8.3 Sultan’s Motivation towards Professional Development

I will argue in this section that there were two main reasons behind Sultan’s apparent motivation to engage with professional development at the start of the research. The first he describes as his unfulfilled desire to improve himself as an undergraduate student and novice teacher 14 years previously. The second relates to his conscious awareness of the complex landscape in which the teachers and the TDP were situated which seemed apparent from the beginning of the research.

8.3.1 Sultan’s Unfulfilled Desire for Professional Development:

Sultan had originally aspired to study for his undergraduate degree at King Saud University, which is considered The Kingdom's top institute for Higher Education (opened in Riyadh in 1957). However, he did not achieve this and studied his degree in Tabouk Teachers’ College as he needed to be near his parents. Moreover, the first year of Sultan's experience as a novice teacher was in the town of Qatif, located in the eastern region of the Kingdom of Saudi Arabia. This location allowed Sultan to apply to an educational Masters programme in a foreign university—a rare opportunity in Saudi. He applied and was accepted to study at the Arabian Gulf University in Bahrain close to the Saudi eastern region. However, he passed up this opportunity because again he wished to live near his family: ‘The Mainstay of Education accepted my request to work in Tabuk, so I couldn’t miss it because I really missed my family.’ So here I argue that Sultan tells of his history as a student and then teacher as one of un-fulfilment. It is significant since such a longstanding interest in gaining further qualifications was not common among Saudi citizens at the time of his early years as a novice teacher.

8.3.2 Sultan’s Consciousness of the Complex Landscape:

I also argue that Sultan's motivation for professional development was connected to his conscious awareness of the complex landscape for teachers and teaching Mathematics in Saudi which I interpreted from his comments in the first interview.
Firstly, Sultan perceived a gap between what was learned in his pre-service bachelor degree programme and the local and real practice of teaching in the school and classroom. Sultan said, ‘There is a big difference between what I learned in college and what I found in my work as a teacher. In college, it was theoretical and there were beautiful words’. Sultan outlined two issues relating to this gap which were, firstly, the absence of any discussion about the curriculum or teaching methods during the university education programme (Bachelor of primary education) . A second issue was a lack of knowledge amongst teachers regarding teaching methods or strategies: ‘most teachers are weak in teaching methods, and I am one of them’. Moreover, Sultan valued reflection on his teaching methods as he argued, ‘teaching methods are the most important thing, so you must focus on them 100 times because the adult understands but the child needs easy delivery of the information.’ Here, I suggest that Sultan showed a critical understanding of who he is as a teacher (‘and I am one of them’) which aligned with the practice of critically unpacking the quality of classroom dialogue (the joint enterprise) which took place during the TDP workshops.

Secondly, I argue that Sultan recognised the absence of teachers’ agency in the classroom. This was one of the main differences between Ahmad and Sultan’s beliefs before and during their participation in TDP. In his initial interview, Sultan argued, ‘the teacher needs trust by his Ministry’. He also considered that the lack of trust in the teacher was the reason he felt the need to demand students answer the textbook’s Talk task in written form, as opposed to using them to begin discussion with students—his practice at the start of the TDP. He argued that the Talk task was frequently misused in this way ‘because our problem is trusting, they [the Ministry/supervisors] require the papers,…’. I asked Sultan what he meant by ‘papers’ to which he said: ‘it means that they [the supervisor] must see the student’s textbook is full of answers’.

I suggest therefore, that Sultan felt a tension at the start between having freedom to use dialogue with his students and the need to produce lots of written work for others. Also, Sultan connected his lack of freedom over his teaching to the wider culture of the society in addition to the demands of the Ministry or the school supervisors. He said ‘the problem is that the society wants the papers, so if you solve one or two exercises, the society will not accept that’. My interpretation of this comment (including the original Arabic text) is that Sultan perceived society to be parents who require teachers to cover the curriculum
through completing many textbooks exercises, in order to prove successful learning has taken place. Sultan also commented that when a novice teacher starts his teaching, he will find himself choosing between two options ‘either you just criticize [the system] or you adapt to the situation.’ This demonstrates how Sultan saw little room for teacher agency in the school since criticising or adaptation both required no further action to improve practice.

Therefore, we can contrast this tension or conflict, which was evident at the start of the TDP for Sultan, with Ahmad’s case who initially did not question the emphasis on the quantity of written exercises students were required to do. As the TDP progressed, he did start to recognise this conflict (hence his frequent references to time pressure)—but even then he did not criticise the emphasis on quantity in the way that Sultan does here. What we see with Sultan then—at the start of the research—is a critical understanding of the role of the teacher in the classroom and how this role is framed by the socio-political context in which they were operating. It is this critical awareness which I suggest provided a different motivation to engage in professional development which then shaped his participation in this CoP.

8.4 Critical Moments in Sultan’s Trajectory in the Emergent Community

This section will now consider how Sultan’s motivation to engage in the TDP affected his participation in the group discussions and how it influenced the trajectory of this emerging CoP. Below I present some examples which show this influence as critical moments. It will present three examples show the alignment of his identity with the community but also how imagination was part of his becoming a new kind of teacher as identified above.

8.4.1 Example 1: Sultan’s imagined new practice

Firstly, in the first workshop, Sultan’s reflections on Japanese lesson study included possibilities and ways to implement such an approach in their school. For example:

<table>
<thead>
<tr>
<th><strong>Researcher</strong></th>
<th>What do you think about the video?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sultan</strong></td>
<td>From my point of view, this idea—whereby there are many classrooms for each grade to enable the teacher to teach a lesson and then observe the same lesson with different teacher in different classrooms—is good for the school. Therefore, the same lesson is the main focus to be videoed and discussed. For example, if the lesson were taught by Zayed today it would be taught by Ahmad tomorrow. Then I would teach it on</td>
</tr>
</tbody>
</table>
video and we would have a discussion about the lesson. This rotation between the teachers creates a cumulative experience through the years as we rotate. We have in our school just two classrooms for each grade, which means we can’t have a rotation through all the teachers. So, I might suggest that the ministry makes stage one (first, second, and third grades) into a separate school so as to have many classrooms.

Zayed: The idea of separating grades is another issue. I think that the real situation in the school is that everything is isolated, such as the grades, whether the early grades or high grades, even the teachers.

Sultan: I mean that we have many classrooms.

Zayed: I got your idea. You mean that it is necessary that each grade is taught not by one teacher but by more than one so that they gain more experience.

Sultan: If Ahmad teaches a class of 1st grade, a class of 2nd grade, and a class of 3rd grade and if Zayed and I do the same, the rotation process will be easy between us and we will be able to adapt the school timetable for the rotation. In the long run, why not the school become a research-based school?

Here, I suggest that Sultan tried to create a new reality for the teachers in terms of their professional development and how they might operate as reflective practitioners within the school (i.e. how Japanese Lesson Study could be made to work in their own context). This new imagined reality constructed for the teachers by Sultan led him to raise the question ‘why not the school become a research-based school?’ Considering this alongside his expressed interest in giving teachers agency in their own classroom and the value he placed on teacher collaboration in professional development outlined earlier—we can see these beliefs informing his participation—he communicates to the other teachers an imagined way of doing reflective practice which is informed by these beliefs. Zayed's responses suggests to me that he has accepted Sultan's imagined practice as he offers a summary (I got the idea...) which Sultan then builds on in to a new understanding of what the school could become (a research based school) through professional development practise.

8.4.2 Example 2: Sultan voices critical awareness of current practice

Secondly, Sultan frequently made observations which seemed to display his critical understanding of the broader context (the education system). On several occasions Sultan compared the role of the teacher as deliverer of the textbook to a train which only has one way to move: for example, ‘The teacher is required to follow the assigned lesson plan in the same way as a train which must be in the same way [1st workshop]’. The following
extract shows how the other teachers responded on this comment:

**Sultan**  
…I hope that the teacher is able to have one exercise that he can discuss deeply the exercise as he want but the problem is the crisis of trustworthiness…there is no trust in the teacher. The teacher is required to follow the assigned lesson plan in the same way as a train which must be in the same way….

**Ahmad**  
This way of selecting exercises is successful but is each teacher able for this?

**Zayed**  
Yes, this is the main point.

**Sultan**  
This is the crisis of trustworthiness.

**Zayed**  
It is not the crisis of trustworthiness. You do not guarantee the amount of knowledge here in each lesson. The textbook restricts me in terms of the exercises and requires me to try to deliver them to the student or make him/her understand them.

In the extract, both Ahmad and Zayed seem to express some disagreement with Sultan's argument that there is a lack of trustworthiness in teachers which impacts their agency, i.e. their choice of exercises to focus on. Ahmad doubts the teacher’s ability to select only a few exercises and not follow the whole textbook lesson, whereas Zayed argues that the textbook is a resource for the teacher’s actions in the classroom in order to make students understand the lesson rather than act as a ‘guarantor of knowledge’. Moreover, Sultan raised this image of a train again in the fourth workshop: ‘*there is someone who sits on top and wants you to work like a fast train [4th workshop]*’ and on another occasion he compared teachers’ lack of freedom to being in the Chinese Army ‘*I am upset that someone wants everybody to be like the Chinese army; all should take the same exact steps*’ [fourth workshop]. After this comment, Sultan explained some ideas which he hoped to implement in his classroom such as allowing more time for classroom discussion by selecting fewer exercises. I argue here that Sultan used these images and his observations to bring his critical awareness of issues facing Saudi teachers to the table for the community’s discussion. The immediate response by the other teachers was that they did not reflect on these images; however Sultan's suggestions did influence the content of future workshop discussions which I will highlight below.

**8.4.3 Example 3: Sultan Promotes Reflection in Action**

This final example highlights Sultan's input to the joint enterprise in terms of how the CoP came to establish reflection on classroom dialogue as an important focus—which included consideration of themes I had introduced such Dialogic Teaching. This came
from a discussion in the seventh workshop after they had viewed a video episode where Zayed had used an open question to discuss units of measurement in relation to money. Here, Sultan talked about ‘the silence moment’:

**Sultan**  
There is an advantage in the dialogic teaching. I do not know if the rest felt it; they might not have paid attention to it. You experience a silence moment while students discuss, and there are things that are programmed in your mind when you handle dialogue and students engage in discussion.

**Ahmad**  
Things that benefit you in the lesson.

**Sultan**  
They benefit you in the lesson itself and in asking questions.

**Researcher**  
This is a momentous point. I shall clap (the researcher claps slightly).

**Ahmad**  
Yes, for sure (confirming the idea in the reflection).

**Sultan**  
Previously, I used to say that all you aspire to is reaching the lesson aim, but when you listen to the students with enjoyment and mutual respect for the whole classroom, you begin to experience silence moments in which you listen to his words and read his ideas and then new questions and new actions come to mind.

**Researcher**  
This is called reflection. There is a theory called ‘reflection in action’ when the teacher is teaching lessons, and when reflection occurs after the lesson, it is called ‘reflection on action’. That happened in Zayed’s lesson, which helped him choose a question for discussion. What made you choose to ask how many Dinars (Jordanian currency) 45 Riyals (Saudi currency) equal?

**Zayed**  
This problem was based on students’ talk. It was from the student Ibrahim.

**Sultan**  
I am sure Ahmad and Zayed experienced the state of reflection.

**Researcher**  
The task we elaborated upon today was suggested by the student Ibrahim when I asked about ratio examples and he said, ‘Teacher, this is the same in currency, one Dinar equals five Riyals’.

**Researcher**  
How did you process this example?

**Zayed**  
I made the following problem for the students: if I have 45 Riyals, how many Dinars does 45 Riyals equal?

**Sultan**  
Now you feel while listening to students as if you are constructing a building. You ask yourself if students require more effort.

**Ahmad**  
You evaluate subconsciously.

**Sultan**  
Students have many things. All you need is to listen to them.
I argue that this extract is one of the most important elements of Sultan’s participation and illustrates his developing identity as a reflective practitioner and the influence he had on the emerging CoP (reflected in my enthusiastic response). Here he brings his successful experience of implementing the strategies negotiated within the CoP (listening to students, asking new questions) in his own classroom into the community’s conversation to construct further meaning, i.e. by using it to interpret Zayed’s example. Note how I respond to his comment on the ‘silent moment’ by reference to the professional development literature (in the next chapter I discuss my role as a broker in more detail). Sultan then further defines the meaning of such reflection in action by offering an image of ‘constructing a building’ to benefit the ‘silent moment’—this is then taken up by Ahmad who re-defines the silent moment as ‘subconscious evaluation’. Therefore, I argue that at this point, Sultan is instrumental in negotiating the joint enterprise of the community, i.e. in defining what being a reflective practitioner in the classroom might look like. Moreover, it appears that the imagery and imagination he uses here is a crucial part of the process in establishing this as a success story in the group.

8.4.4 The Summary of Section

In this section, I have presented evidence regarding Sultan’s professional identity which was apparent in his participation in the CoP. My argument is that Sultan’s developing professional identity and his motivation to engage with professional development meant that he played a significant role in contributing new meanings to the CoP (for example, strategies for students’ participation), imagined metaphors to characterize current practice or expectations (for example, the image of being on a train journey), new possibilities for professional development (for example, re-organizing the school structure for Lesson Study), and ways to align as a reflective practitioner (for example, in the silent moment). Below, I consider how this professional identity differed to Ahmad’s in order to explain what participation in a CoP such as this TDP means for teachers’ identity development—given that we know this development is not uniform across the group.

8.5 A Comparison of Ahmad’s and Sultan’s Identities

Although, both teachers show alignment with the CoP in terms of implementing the different teaching strategies that support their joint enterprise, (i.e. to improve the quality of dialogue in the classroom), there appeared to be some differences between them regarding their alignment with the CoP and the extent to which they displayed imagination as a mode of belonging. Arguably, Ahmad's trajectory was one of conflicted
alignment with the CoP where he negotiated his membership alongside his role as a supervisor in the school. This was evident in his repeated concern with maintaining the proper pace through the textbook and completing all the exercises. Therefore, although, Ahmad appeared motivated to develop his practice at the start of the research and had some success in doing so—this was problematic for him and he did not fully embrace these changes. In contrast, Sultan’s stronger alignment with the CoP related to his specific motivation and desire to change not only his classroom practice but also teaching as a profession and therefore, his participation in the workshop discussions was more constructive offering many of the meanings/ideas which were taken up as part of the shared repertoire of the CoP.

Moreover, imagination is important in both teachers’ accounts as it enabled them to ‘see’ their practice in new or different ways. In the previous chapter, I showed Ahmad imagining himself in the students’ shoes in order to understand how they might develop conceptual understanding. In this chapter, I argue that Sultan showed imagination by using imagery to bring his critical ideas to the discussions (for example, his critique of the adherence to the textbook) and it is this that enabled his identity to be more durable beyond the community towards promoting reflective practice with his profession more widely (for example, creating a research school). This imagination seemed important to developing the community’s shared repertoire (for example, teachers’ reflection on video and teaching strategies) in order to achieve the common interest of the community. For example, Sultan’s awareness of the reflection in action was an important contribution to the teachers’ discussion at the last workshop.

8.6 Conclusion

Both this and the previous chapter have attempted to address the second research question: How does the community of practice help to develop teachers’ professional identity as a reflective practitioner regarding classroom dialogue within the SA context? In doing this, I have highlighted how both professional identities for Ahmad and Sultan developed with the support of the emerging CoP, as discussed in Chapter 6. Through their membership of this CoP, the teachers appeared to mutually engage by building relationships; arguably, it was these developing relationships that enabled Sultan to offer critique of teaching in SA, which otherwise might have been difficult to do—especially in Ahmad’s presence as the supervisor.
Moreover, Ahmad also developed his identity as a teacher using more interactive dialogue in his classroom, but also as a supervisor. This potentially indicates an interesting tension in the CoP, which arguably connects to the contradiction in the SA education system, which was referenced in Chapter 2. We might expect Sultan’s resistance to the supervisor (interested in quantity over quality) to conflict with Ahmad’s comments as supervisor representing the accountability culture of SA teaching. I suggest that Sultan’s use of imagery in the discussions was important in negotiating this tension, as it involved imagining a different way of teaching in SA in all subjects—not only Mathematics—which is captured in his suggestion that they become a research school.

Key to this account is the various components of the CoP, which enabled the processes, which subsequently produced both teachers’ identity development. As shown, the dialogue in the workshops between the teachers and myself was important, as this allowed different beliefs and values to come together; the videos also played a role in facilitating such critical dialogue. However, I also suggest that the teachers’ success in implementing some changes in their classroom (using the shared repertoire) was significant, not only to the development of CoP but also to their identity development. The teachers transformed their perceptions of what was possible as they began to identify with the regime of competence emerging in this CoP, with my own legitimacy in introducing these strategies from the research literature also central.

In the next chapter, I discuss these issues further as I explore the role of boundary-crossing, as experienced by the teachers, and my own brokerage of the Maths education literature.
Chapter 9: The Complex Landscape of Practice

9.1 Introduction

The findings in this chapter address the third research question presented at the end of Chapter 5: How does the landscape of practice in which this community of practice is situated influence the professional learning, which takes place and the teachers’ identity development? According to CoP theory, ‘as communities of practice differentiate themselves and also interlock with each other, they constitute a complex social landscape of shared practices, boundaries, peripheries, overlaps, connections, and encounters’ (Wenger, 1998, p 118). This chapter aims at highlighting this complexity by considering the SA landscape in which this CoP was situated, as outlined in Chapter 2. It will include consideration of my own role in the TDP in brokering new teaching strategies and approaches to professional development as I crossed the boundary from the academic research community to the TDP. It also will explore various boundary objects, such as the new reform textbook and, more specifically, the Talk Task, which had been translated from the US, and which the teachers were attempting to negotiate in their practice.

I also will discuss teachers’ experience of boundary-crossing, not only back and forth between the TDP and their classrooms, but also across other boundaries (such as from school to home/family life). In the final section, I discuss how Bakhtin’s dialogism addresses a key limitation in CoP theory, which is that it fails to capture how the social representations of ‘others’, and particularly the ‘addressees’ of one’s participation (dialogue) are significant to development and professional learning. Here, I use dialogism with CoP theory to show how the landscape of practice is made present in the local discourse of the TDP workshops.

9.2 The Role of Researcher as Broker

As shown in Chapter 6, during the research, the three teachers and I gradually created a professional learning CoP through the workshops and other activities, which made up the TDP. Here, I argue that my role as researcher and facilitator of the professional learning community brokered between this community and the Mathematics educators’ community. Brokering is a way of connecting between different communities of practice by people as brokers who ‘can introduce elements of one practice into another’ (Wenger, 2000, p. 235). Brokering requires enough legitimacy to influence the development of a practice (Wenger, 1998). As a broker in this community, there were a number of reasons
that suggest my role was given this legitimacy: firstly, I had been a primary Math teacher prior to my PhD, which meant I was seen as knowing the context of Maths teaching in Saudi. Moreover, Zayed as one of the case teachers, had been a friend since we were undergraduate students, and so there was an existing relationship of ‘trust’ already established, which I could build on. I believe that trusted relationships and connections such as this are important in terms of building new professional relationships and networks. Secondly, I also had status within the group based on my role as a lecturer in the local university. Thirdly, I brought objective knowledge of classroom dialogue from the research community—an expectation manifest in my status as a PhD student studying overseas. These factors gave me status or perceived expertise, which, I argue, encouraged the teachers firstly to participate in the research and, secondly, to listen to the questions and points raised during the workshop discussions.

Below I highlight my brokering role in more detail in terms of the research-based themes it allowed me to introduce to the TDP workshop discussions. These themes underpinned my interpretation of the intended meanings of the ‘reform-orientated’ textbook, and specifically the Talk Task (which I will shortly describe as a boundary object), which I was attempting to broker with the teachers in this TDP. I also discuss my introduction and selection of the video episodes as a tool for reflection, which, again, brokered the teachers’ practice as a boundary object in particular ways. I argue here that my role as broker was a necessary component of this developing CoP because it brought the ‘reform-orientated’ interest in classroom dialogue (which underpinned the new curriculum/textbook) in to dialogue with the teachers’ practice (as situated in the SA context).

9.2.1 Introducing New Meanings into Teachers’ Community

As identified above and in Chapter 4, my brokering introduced research-based themes on classroom dialogue into the TDP workshop discussions (Figure 9.1) because I perceived them as relevant to the textbook/curriculum the teachers were trying to use. This process was critical to shaping the content of the dialogue between the teachers and myself. Themes included different concepts (e.g., classroom talk and dialogic teaching) and teaching strategies (for example, learning in pairs and classroom questions?), and I have shown in Chapter 6 how these concepts became part of the shared repertoire of the community—taking on their own meaning and crossing the boundary into the teachers’ classroom practice.
For example, the theme of questioning and the different forms of questioning teachers might use (open-closed, yes-no-maybe, etc.), and their effect on ‘dialogue’, constituted knowledge from academic research that I introduced into the CoP (Kawanaka & Stigler, 1999; Cotton, 2001; Koizumi, 2013). The following extract shows the case teachers’ reflections on these types:

**Researcher**  Questions can be categorized according to frequency of use. Yes/no questions are some of the most commonly used questions.

**Sultan**  Yes/no questions are too plain

**Researcher**  The second type of question seeks short answers such as numbers and words. The third and least commonly used type is the type of questions that requires explanation, illustration, and details.

**Zayed**  These are the Talk Task questions. These are the questions we are talking about.

Here, I suggest my presentation of different types of questions provokes a critical response from the teachers regarding the value of each type (for example, ‘too plain’). This kind of discussion was important since strategies such as ‘asking open questions’ became part of the community’s shared repertoire which were then implemented or ‘tried out’ in the classroom. What is perhaps more interesting here is Zayed’s final assertion regarding the Talk Task questions, which indicates that he recognised my motivation in...
presenting ‘questioning’ as a theme. He appears to recognise how this is relevant to the textbook, and therefore attempts to make it meaningful to the context in which he is operating. Below, I discuss this further when considering the textbook as a boundary object. Here, I suggest my role in introducing specific themes serves the purpose of putting the intended meaning of the textbook ‘on the table’ for discussion—which then generates dialogue about what is and is not possible in this context (for example, dealing with ‘time pressure’).

Moreover, there was some evidence to suggest that the teachers were aware of the need for ‘brokers’ in their professional development, so that changes such as the new curriculum could be ‘made to work’. In his final interview, Sultan recommended that Saudi universities establish programmes or professional communities for this purpose:

**Sultan**
I believe that this programme [the TDP] must be implemented in all schools but not through the Ministry’s way of professional development. It needs another provider such as the universities which we have increased numbers of them. So, I recommend that one member from each school participate in small community at the university and then implement it in the school.

**Researcher**
Why do this in the university? […]

**Researcher**
So what would be the role of the university toward schools?

**Sultan**
The university can invite one teacher from each school to participate in such programmes to learn about new things. This is because the universities are the most places that have knowledge and everything new in the world. On the other hand, the roles in the Ministry are almost administrative roles with less chance for teachers’ development.

**Researcher**
What do universities have more of?

**Sultan**
They have updated teaching methods and the research always is new. So, if the universities make a weekly workshop for some teachers and offer them more knowledge and those teachers take that to schools, they will support the school’s communities.

Here, it appears that Sultan is skeptical of the value of professional development run by the Ministry of Education since he believes the ‘administrative roles’ mean they do not have access to ‘knowledge’ and ‘new research’, which he presents as valued or required in terms of supporting school ‘communities’; therefore, he implies the university has more legitimacy as a broker in this context because it generates the knowledge he perceives teachers need to develop their practice (a need which has presumably become recognised through participation in the TDP). To establish a brokering arrangement, he suggests that teachers might move between the university workshops where knowledge is
offered and the school community in his school. Once again, we see his imagination in how he constructs this brokering role, which is to be enacted by a teacher rather than myself and, therefore, ‘scaled up’ from his experience in this particular CoP. Such imagining again provides evidence of Sultan’s developing professional identity (outlined in the previous chapter), and it is possible that my legitimacy as a broker in this TDP and the ‘success’ of my brokerage in developing their practice was critical in forming this (for example, Sultan’s comment that ‘this programme’ should be implemented in all schools).

### 9.2.2 Brokering Process by using Video Tool

My selection and use of video episodes in TDP discussions was an important aspect of my role as broker. This was a key feature of this TDP as I had reviewed a considerable body of research that stressed the value of using video episodes for teachers’ professional development and reflective practice (van Es & Sherin, 2002, 2008; Star & Strickland, 2008; Lewis et al., 2006; Lewis, 2009). However, this was not part of the school and teachers’ professional practice prior to the research; therefore, my brokering role involved establishing the use of video and video episodes as objects for reflection. I was able to use both my knowledge of dialogic teaching and the Saudi teaching context to select purposeful video episodes that would be provocative for the teachers to discuss. I also was able to video the teachers’ implementing strategies, such as paired discussion and then offer this ‘new’ practice as another stimulus for discussion (see the figure below). Therefore, I argue that my selection of video episodes as a broker in the TDP involved establishing how knowledge from research on ‘reform’ teaching and its emphasis on dialogue may or may not be put to work in these teachers’ classrooms. By showing such episodes to the group, I then offered these interpretations of their practice (through the lens of classroom dialogue) to the teachers as an object of negotiation, and out of such discussions came a motivation to ‘try out’ some of the strategies that formed the shared repertoire of the group.

Figure 9.2: The brokering process by using video tool
Even after the TDP had been completed, the video, as a tool for teachers’ learning and professional development, appeared to hold significant meaning, which they would use in future. For example, Zayed said, ‘it is evidence without doubt it [video recording] is effective tool to evaluate my performance by firstly myself and then others’. Furthermore, he added ‘now I can video myself and evaluate it, and I don’t have to wait for the researcher to say to me: You got these and that. Now I evaluate myself and I know what I do. In the past I wished this thing but I couldn’t do it, and I tell you that it’s possible that in the next semester I’ll do the same project and make videos of my lessons and I hope I am still confident enough to start the experiment and not stop’. This demonstrates the significance of the video and the use of video episodes in forming the new professional identities outlined earlier. Although I have not discussed Zayed’s case specifically, I suggest here that he intends to take this practice forward as a means of evaluating his ongoing professional practice. Therefore, I argue that a significant outcome of my brokering role was to develop the teachers as reflective practitioners with the confidence to engage in their own professional learning. Using the video as a tool in this process appeared to have meaning for the teachers even beyond the TDP.

**9.2.3 Section Summary**

In this section, I have highlighted the significance of my own role as a broker in this particular CoP which enabled me to introduce my own interpretation of the ‘reform’ emphasis on dialogue in the new curriculum to the TDP discussions. In order to do this, I used my knowledge of the research literature on ‘reform-teaching’ and classroom dialogue, and accordingly introduced themes and specific video episodes that illustrated how my interpretation might look in practice in the teachers’ classrooms. The apparent
success’ of this brokering is indicated by the teachers in their final interviews, where they suggest ‘scaling up’ or extending the practices established in the TDP in the future. In the next section, I argue that this brokering was necessary to negotiate the meaning of the textbook tasks (particularly the Talk Task) as a boundary object because of the contradictory landscape of practice detailed in Chapter 2.

9.3 The Role of Boundary Objects

In this section, I discuss the role of boundary objects in shaping the emerging CoP and thereby the new professional identities that the teachers developed. According to Wenger (1998), boundary objects refer to artefacts, documents, terms, concepts which are utilised by more than one CoP and help establish the interconnections between different CoP in the landscape of practice (Wenger 1998). Star & Griesemer (1989) argue that boundary objects ‘have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation’ (p. 393). They believe that managing boundary objects either within or between different CoP ‘is a key process in developing and maintaining coherence across intersecting social worlds’ (p. 393). In this section, I discuss two distinct boundary objects—the textbook and the video episodes of their practice. The textbook as a boundary object initially posed particular problems for the teachers in terms of how to implement or maintain its reform orientated intentions in the SA context which I detail below. In Chapter 6, I have already discussed the role of the video episodes as part of the shared repertoire of this CoP, but I will also discuss its function as a boundary object in this chapter.

9.3.1 The New Reform Textbook Curriculum

From the CoP perspective, I consider this textbook to be a boundary object moving between two (or more) different educational systems. The use of the textbook by teachers in this study created different problems, which are connected to its function as a boundary object. For example, the purpose of the Talk Task followed the pedagogic principles of the US reform approach (McGraw-Hill, 2012) in terms of facilitating discussion between pupils. However, initial interviews with the teachers indicated that this purpose was not obvious, and was not used in this way in the classroom. Ahmad & Sultan consequently both moved towards using the Talk Task to initiate discussion with students, rather than
as an additional independent written exercise for high-ability students. Zayed also reflected on a similar change in his use of this task:

‘What I got about the purpose of this task was the student’s feeling about his ability to talk. I became aware of its importance during one of the workshops. Now, it becomes clear to me that Talk Task is something different of what we want and think. Now, the student talks about what the textbook aims of it such as talking about for example, the concept of the area and what is it? this task is about Mathematical things that the student talks about them and explain them and, therefore, I see what the student has got and others as well with more explanation, so all that is through talk’ [final interview]

As was the case with Ahmad and Sultan, Zayed’s reflective comments here indicate the role of the TDP discussions in shifting his awareness of how the Talk Task could be used to promote classroom discussions and how this then mediated his interpretation of his own professional practice (‘I see what this student has got….through talk’). But crucially this was made possible by the existence of the talk task as a boundary object in the first place and the way it presented a pedagogy emphasising dialogue which contradicted the typical approach used in Saudi classrooms. It was this contradiction and my role in brokering it for discussion which arguably initiated the discussions around how the Talk Task could be used (for example, in the second workshop—see Appendix D) and then motivated the teachers to develop their use of the textbook in the way Zayed refers to above.

This process is clearer if we consider another problem the teachers raised in relation to the textbook during the workshops—this was the structure of the textbook and the number of exercises to be covered in each lesson. As noted previously, initially the teachers felt they must complete all exercises and this did not allow them to have time and space for dialogue with students—again indicating that the textbook has a different meaning in this context when compared with the ‘reform’ orientated pedagogic principles upon which it is based. For example, in the first workshop, Sultan argued ‘I am required by 13 exercises in one lesson and correct them as well. Thirteen exercises multiplied by 10 students equal 130 ....multiply by 20 students equal 260 exercises, this is a massive count’. And in the fourth workshop Ahmad made the following comment when reflecting on video episodes about the development of classroom questions.

'Realistically speaking, our curricula cannot be implemented with the current number of school weeks. There is pressure. I actually would like to have discussion the students for the longest time possible. When I teach a lesson, I keep in mind that I have to finish what the lesson had planned for the day., I teach and
put in mind that I have to finish today’s lesson because I still have 6 chapters ahead. Each chapter consists of several lessons. In the West, I think they have more school weeks to teach the curricula and this gives you more time to complete the task’.

Here, we can see in Ahmad’s reflection, when he compared the current teaching practice in Saudi schools with what he perceived to be happening in the West (presumably the US, from where the textbook was seen to originate). He juxtaposes the pace of the Saudi curriculum with the imagined practice mediated by his knowledge of the textbook curriculum’s intentions (the boundary object), and suggests this presents a conflict with implementing these intentions, which is not easily resolved in the SA context. Sultan reflected on Ahmad’s problematizing by saying ‘we (as teachers) must try to balance’.

This suggestion was then continuously proposed by Sultan to the group—insisting that the teachers should try to select certain exercises in accordance with the student's level rather than cover them all. He said

‘A certain exercise can achieve the lesson’s objective. My lesson today was about area calculation. Length multiplied by width equals area and that is all. Some students don’t master measurement units. For example, one student writes 3m x 4m = 12 m² and that is all. On the other hand, I may ask another student to find the area of a shape that has a length and width of 3000 cm and 4 m, respectively. The student would be able to convert cm to m or m to cm and give us the answer. This latter student then has a higher skill than the former’

As an outcome of this discussion, Sultan concluded the fourth workshop by writing the recommendation regarding quality over quantity which I discussed in the previous chapter:

‘I care about the student’s benefit and quantity does not mean anything to me, even if I would be reprimanded by the official’.

This recommendation was then selected by myself as one of the fifth workshop’s themes, which the teachers then discussed. At this point, the teachers’ negotiation of this recommendation showed a shift in how they dealt with the textbook as a boundary object. This shift demonstrated a move from simply suggesting the idea of selecting exercises towards more definite decisions to change their classroom practice.

For example, Ahmad reflected on Sultan’s written recommendation, stating that, ‘quality for Sultan is more important than quantity. The quality means if the student masters solving an example of the lesson’s main idea, this can substitute many exercises. This is my opinion.’ Here, in this shift, I argue that Ahmad realised this change in practice as
important for engaging in quality talk with students and, in so doing, re-invented the meaning ascribed to the textbook and its function in his own teaching practice (quality not quantity). The statement ‘This is my opinion’ suggests a strong affiliation to this strategy indicating it is now part of Ahmad’s professional identity.

Similar evidence of this was apparent in the final seminar which included the following group interaction between Ahmad and some of the other teachers external to the TDP:

**Researcher**  What are the dialogic teaching opportunities and obstacles? After discussion, what do you, as a group, find to be the greatest challenge? (five minutes of discussion).

**Teacher A**  In my opinion, the obstacles are time constraints and the large number of lesson ideas. For example, I liked what we heard about how to convert three minutes to seconds, but this idea took a lot of time to discuss. When will the student be able to convert between days and hours, or between years and months?

**Teacher B**  And vice versa.

**Teacher A**  The lesson has many ideas and exercises.

**Ahmad**  I agree with you on the time constraints point. However, as far as many lesson ideas, excuse me, but I don’t agree with you. Why? Because if the student understands the concept, he can solve problems and conclude on his own. Our problem is that we reduce the value of students’ minds.

**Teacher B**  Sure.

Here, we can see non TDP teachers raise the issue of ‘time constraints and the large number of lesson ideas and exercises’, which they felt obliged to cover—(suggesting that this was a conflict well recognised in the landscape of teaching practice in Saudi schools). In response, Ahmad again presents his resolution to this conflict, i.e. the selection of good exercises. Therefore, we can see how Ahmad draws on the shared repertoire of the community (the strategy of selecting exercises) to perform his new identity as a teacher interested in the quality of dialogue in his classroom. His desire to do so to the ‘other’ teachers (who arguably were more skeptical) suggests a degree of commitment to this new identity born out of mutual accountability to the joint enterprise of the TDP community.

Again, I argue that the development and presentation of this ‘selection’ strategy as a solution to the time constraint problem was developed through negotiating the conflict, which the textbook raised in this particular context where a reform curriculum/textbook
was super imposed on to a pedagogic culture which emphasised repetition through completing numerous individual exercises. In the USA, the intentions of this textbook relate to a student-centred approach which encourages students to take an active role in their learning through a focus on critical thinking and problem solving (as discussed in Chapter 1). For the teachers in this study, this conflicted with their established practice, which emphasised algorithms and drill practice. Reflecting on the textbook and the purpose of the Talk Task through the discussions involved a re-imagining of how it could be used to foster quality dialogue rather than reproduce traditional Saudi practice. This required some brokering work by bringing in themes from the research literature into the TDP workshops, and therefore, the teachers and myself were able to negotiate its meaning in the SA context so that it maintained at least some of the intentions of the reform-orientated approach on which it was based.

9.3.2 Video Episodes as Boundaries Objects

The video episodes also played an important role as a boundary object in this TDP since they acted as representations of the teachers’ classroom practice (i.e. recorded in the lessons) which then crossed the boundary into the TDP discussions. As discussed in Chapter 4, there are many differences between the teachers’ classrooms (such as different groups of students, different age ranges and curriculum content). Therefore, these differences potentially made it difficult for the teachers to share experiences and reflections during the TDP workshops which the video episodes then assisted with because they brought ‘practice’ into the discussions as an object for reflection.

For example, in Section 6.2.2 I discussed a video episode from Zayed’s classroom which showed the value of dividing the whiteboard. Ahmad valued this way of using the whiteboard whereas Zayed did not attach the same value to it. Here, the use of the video episode offered the opportunity to negotiate the meaning of this practice within the workshop discussion so that it might be transformed, retained, or modified.

Moreover, the video episodes enabled the TDP members to track the development of the teachers’ practices through as they participated in the CoP. Here, the participants were able to see what and how new meanings or teaching strategies were implemented in contexts outside of the TDP workshops (teachers classrooms). This was evident in Section 6.4.2 as I presented some successful implementation of paired learning.
The changed practice or successful implementation of a strategy was not only to consider teachers' classrooms contexts, but it was also to see the effects of what was learnt on the TDP context and to continue the negotiation of meaning regarding classroom dialogue. Therefore, this use of video enabled the dynamic interplay between the teachers' experience of classroom practice and the Community's competence. Moreover, it was necessary for the video episodes to be selected by me as facilitator in the TDP in order that they provide 'practice' examples of the meanings/themes being discussed. This required my brokering since I had to select videos which provided enough stability as a boundary object to allow them to work as such – i.e. they had to clearly show practice which was 'real' to the teachers - but also exemplified the kinds of meanings I wanted to discuss in the group. Here, the video episodes were taken from the classroom and assigned implicit meanings by myself drawing on knowledge from mathematics education research which then became explicit through our reflections in the workshop dialogue. Therefore, the video episodes had to have enough stability to maintain the link between the teachers’ classrooms and the TDP but also had a different meaning when viewed in the 'moment' (TDP workshop). They played a vital role in enabling us to critique different meanings (e.g. the teachers' authoritative role) and to create or imagine new meanings (e.g. collective talk, pair learning). Therefore, I argue that video episodes as boundary objects support the potential learning through crossing the boundaries of these contexts in terms of creating space for dialogue between them.

9.3.3 Section Summary

This section has highlighted the status of the textbook as a boundary object (textbook) and particularly, the Talk task which represented the intentions of a ‘reform-orientated’ pedagogic/curriculum approach. Such intentions were negotiated in the workshops in order to see how they might be realized in these teachers’ classrooms in SA. However, this presented a series of contradictions for the teachers because of the contradictory landscape of practice in which they were operating where the ‘reform-orientated’ approach was instigated with very little teacher training and in a context dominated by traditional teacher-authority led practice. Therefore, the intentions behind the textbook (as a boundary object) needed to be brokered by myself drawing on knowledge of the research literature on ‘reform teaching’ in the US and my selection of video episodes of their practice (another boundary object). This suggests that implementing a reform approach in a context such as SA is difficult and requires specific forms of professional
development where brokering plays a significant role. This is necessary to maintain some of the intended meanings behind the reform approach as it is ‘made to work’.

9.4 Contradictions across the Landscape of Practice

I so far have shown how my brokering both of the textbook meaning and the video episodes in this CoP was a necessary component of the teacher development which took place. But this raises the question as to why such brokering was necessary? In the US, where a ‘reform’ curriculum has also been implemented, I am aware that much teacher training (pre-service and in-service) has accompanied this implementation with varying degrees of success (Polikoff, 2012; Cobb et al., 2003). As indicated in Chapter 2, such training did not initially accompany the introduction of the reform textbooks and teachers/schools have therefore, been left to instigate this curriculum by themselves. This raises many contradictions, especially when we consider the gap between the ‘reform’ pedagogy and the traditional teacher-dominated approach to teaching, which I have discussed elsewhere in this thesis. I have so far shown how contradictions between the different teachers’ beliefs and practice emerged and were negotiated in the TDP discussions (for example, Ahmad’s concern about time pressure and adhering to the textbook which contradicts Sultan’s emphasis on selecting tasks). Below, I consider further contradictions that emerged because of the way the CoP was situated in the landscape of practice—I argue these contradictions also connect back to the SA context described in Chapter 2—i.e. ‘reform’ versus tradition.

9.4.1 Students’ Perceptions of Classroom Dialogue

In Chapter 2 I discussed the culture of Saudi society and family relations and how this related to classroom dialogue and this was also discussed in the workshops where the students were constructed as boundary crossers moving from family to school bringing with them expectations and experience of somewhat passive forms of behaviour (figure). Below I present some examples of how this movement and the students’ status as boundary crossers (as perceived by the teachers) shaped the CoP.
Early on in the first workshop, when the teachers and myself reflected on a video episode that showed very little student collaboration or interaction with each other, Sultan immediately reflected on the limited input the students had in the dialogue stating ‘You are in the Middle East; you know the traditions…society’s culture’. In the second workshop, both Ahmad and Sultan elaborated on this theme:

**Sultan**

You know what my father used to say: ‘Men are like closed boxes and their tongues are the keys.’

**Ahmad**

Do not talk (he explains what Sultan’s father means by the closed boxes).

**Sultan**

Do not talk and close your mouth (he explains the meaning by the closed boxes)

This statement regarding Sultan’s father indicates how he perceived a cultural barrier to promoting dialogue in classrooms i.e. families do not encourage their children to talk. Moreover, Zayed argued that Saudi society (and presumably the education system) has a problem if it wants to promote conversation and dialogue skills amongst students who are mostly enculturated into a silent role by both the family and school system: ‘It is due to the culture of respect. Can you interrupt your father while he talking? No. Can you interrupt your older brother while he is talking? No. So, when we start the lesson do not interrupt your friend’. Here, I suggest that the teachers recognised the students as moving across the home—school boundary and they perceived this as raising a challenge to their joint enterprise—i.e. how to develop high quality interactive dialogue with students who
are enculturated into being silent ‘closed boxes’? Therefore, they appeared to see their students as boundary crossers inscribed with the conversational norms of the home culture who then presented a contradiction.

Similar issues were also discussed by the teachers in the final seminar. For example, one of the new Math teachers in Ahmad’s group said ‘maybe it is a cultural problem in terms of dialogic culture; often there is no dialogue, but opinions are imposed. Therefore, the student in the classroom finds it difficult to give his opinion’. Moreover, a teacher in Zayed’s group said that ‘I think it’s the culture where the student’s opinion is not considered or listened to’. Another participant in Zayed’s group added ‘generally, we can say it’s the environment, either in the school by teachers or outside the school by family, which causes students’ opinions to be ignored’. Moreover, in the final interview, Zayed explained:

‘We need reciprocal talking and to let the student talk and express what is in his mind. It is a society and society culture problem, we have grown up and it is the problem still. And we don’t talk in our father’s presence, we don’t talk in adults’ presence, and if we talk they look to us as guilty, and in my opinion this is the reason that often students don’t talk’.

These statements indicate a shared belief that the culture of Saudi family and society influenced the expectations and behaviour of students (as boundary crossers) who typically adopted a traditional passive non-interactive role which did not support and was even juxtaposed to the teachers’ joint enterprise—i.e. their pursuit to improve the quality of dialogue in their classrooms. The strategies which formed the shared repertoire of the group focused on increasing student input to discussions—the expectation that children should be silent in many families and society was therefore, perceived to be a significant barrier.

However, the teachers did not merely accept this as an insurmountable problem but began to believe that their joint enterprise of improving classroom dialogue could bring about changes to family roles and expectations. The following conversation which took place in the third workshop indicates the teachers’ imagination in terms of how they might address this contradiction and change both school and family culture so that parenting practices might align more with the teaching approach they were trying to develop:
This reminds me of a sentence you said, Sultan, about planning the questions: Do you expect the teacher to plan the questions like planning the lesson?

Ahmad

Of course

Sultan

But it will consume so much time. We are not dealing with one level in the school, or let's say that if I enter a standard classroom in which the student’s family is ready, the student is ready and the society supports the student then I must plan and prepare my questions in order not to seem superficial in front of them. But there is a degree of superficiality in the society (he might mean no interest with education and not critical about their role for schools) and I use a different method every day, what does this impose on us? Let's say a type of …

Ahmad

Coexistence

Sultan

Coexistence with situation

Ahmad

Adaptation

Sultan

Adaptation to the situation, but if the classroom environment is clear and explicit, and I, as a father, have prepared my son for the lesson and have prepared my son mentally for the lesson

Ahmad

And there is a following up in the house at least

Sultan

For all the students

My reading of this—and particularly the Arabic original—suggests that Sultan is highlighting the barrier to classroom dialogue that the family and society presents in terms of a lack of readiness for discussion (in this case, using effective questions). However, Sultan also proposes that the family (fathers specifically) should mentally prepare students for the lesson, with Ahmad agreeing by suggesting an emphasis on dialogue should be followed up in the home. Here, I argue they are recognising students as boundary-crossers, which poses a contradiction for their joint enterprise, but they also are imagining a resolution to that contradiction, which seems to be around making the classroom environment explicit and clear, and educating parents on how to prepare their children.

In another example, Zayed spoke of how he’d started to give advice to students’ parents on how to improve the social interaction with their children:

‘Today, I told a kid in my class, ‘Stand in front and solve this.’ He couldn’t. Then I started a dialogue, asking him, ‘Why won’t you try? Why won’t you write?’ I said, and when he’d solved it, I told him, ‘Aren’t you smart?’ He smiled at me and his smile opened my heart. Surprisingly, his father came to the school for the first time, I said to him, ‘Today, so-and-so happened to your son with me, I hope you talk to him today, ask him: What do you want for dinner? What do you want to wear? Where do you want to hang around? Please let him give his opinion.’ He
replied, ‘Why?’ I said, ‘I wish you had seen what he did.’ Then I asked, ‘How is he doing at home?’ He replied, ‘At home, he is silent and quiet and obedient’… ‘This is our problem,’ I said, ‘We see him obedient then we think he is polite, and this is what we think is right! No, do you know what he thinks? Do you know what he wants? Do you know what he needs? Do you feel him? Let him express himself and pay attention to his opinion.’

This story shows Zayed implementing the kind of changes suggested by Sultan and Ahmad above. He recounts how he has used his new found insights on dialogic teaching and the success he has experienced in persuading students to participate in dialogue to educate the parent on how to have a dialogue with his son. Therefore, I suggest that he attempts to resolve the contradiction between the approach to dialogue they are trying to implement and the passive role that he perceives his students have been enculturated into. Moreover, by telling this story, he acts out a teacher identity which goes beyond teaching Mathematics but is about transforming the personality of the student and the family practices which they experience in the home.

In addition, at the end of the TDP, Ahmad commented on how ‘the student’ had changed his behaviour not only in the classroom but at home as a consequence of the practices he had put into place during the TDP process:

‘But now [at the end of the TDP], the student takes the lesson from the teacher and in the home he tries himself to modify this situation, for example, he speaks and talks even if his father or elder brother tell him not to, his conscious mind speaks: I convinced the teacher himself, participated with him and helped him to explain the lesson, so I must speak. So I say to you that the dialogic teaching builds the child’s personality, the issue is more than education, it will affect the personality of the student and you will find that the child speaks without fear or psychological problems and imagine how this student’s growth is in Mathematics.’

Here, I argue that Ahmad perceives his new dialogue-based classroom practice (associated with his new professional identity) to be transformative shifting the meaning ascribed to students as boundary crossers, i.e. that students took what they had learnt in the classroom across the boundary into the home or family’s community. This approach has ‘built the child’s personality’ so that they can speak ‘without fear of psychological problems’ beyond the boundaries of education. Therefore, in this example, he recognises that the pedagogy he has implemented has brought about durable changes in the child who then asserts himself in the home (and subsequently changes family relations).
Arguably, therefore, the teachers perceived the boundaries between the CoP and the other communities in the landscape as permeable: whilst their joint enterprise was, at times, constrained by the difficulties Saudi culture and family expectations raised, they also felt that that they could produce change in the culture through the developed student as boundary crosser. I suggest that the negotiation of these contradictions can be explained by some key characteristics of this CoPnamely, the video episodes which I brokered by selecting them (on this occasion, the video which showed the children working silently), my brokering of the themes that promoted discussion and the negotiation of a new shared repertoire (Secondary resources) and the successes the teachers experienced in changing their own practice.

9.4.2 Teachers Crossing Boundaries

In this section, I consider the teachers’ own crossing of boundaries within the landscape of practice and the way this produced contradictions which were negotiated in the joint enterprise of the CoP. The argument of this section is that the development of the CoP and teachers’ professional identities occurred not only because of their reflective practice on the quality of dialogue in their classrooms, but also because we (including myself) had to negotiate what quality dialogue might mean in this particular context. Here, I discuss both the teaching community existing within the school in which the teachers were working, and their accountability to the supervisor who evaluated their teaching. I also will discuss how participation in the TDP impacted the teachers’ role as parents in their family life—crossing another boundary from school to home (and vice versa).

9.4.2.1 Boundary-crossing from the School Teaching Community to the TDP:

I have presented many extracts of data which have shown the teachers discussing their classroom practice and therefore, their role as boundary crossers between the TDP and their own classroom practice as this was built into the design of the TDP. We have shown how this was a key characteristic of this developing CoP as we have seen how the successes ‘in practice’ (success stories) appeared quite significant in developing the teachers’ professional identities. However, in addition, the teachers were also part of a wider professional community of teaching staff in their own school and at times the boundary between this community at the TDP raised contradictions for the teachers. For instance, they discussed the shared pedagogic culture of the school as juxtaposed to the joint enterprise of the CoP in terms of producing ‘quality’ in classroom discussions. For
example, when the teachers were presented with a video of Japanese Lesson Study in the first workshop, Zayed reflected that ‘the real situation in the school is that everything is isolated even the teachers’. This comment was followed by the discussion of the photographs of seating arrangements in Ahmad’s classroom which I presented in Chapter 6. Here, Sultan commented:

‘I think it is an accumulation from several lessons let’s say that in the first, second and third lessons by other teachers, then Ahmad comes and gives the students the fourth lesson. Here we see an accumulation….here is a culture that Ahmad cannot resist. For example, I have tried to distribute grade three into groups last semester but then the main classroom’s teacher comes and refuses this arrangement’.

This extract refers to the discussion on paired dialogue which I previously outlined. Here we can see that Sultan perceives a contradiction between implementing group work (i.e. moving desks—the arrangement) and the expectations of the class teacher who ‘refuses this arrangement’. In addition, he sees this as a difficult ‘accumulative’ pressure to ‘resist’ – a pressure which was reiterated on a number of occasions. At a later point, Sultan referred to this as ‘systematic oppression’ embedded in the culture of teaching in this school. He explained this as:

- **The politeness culture. Among teachers, the belief is that politeness is silence.**
- **In school, no one talks and you must clasp your hands.**
- **There is a master of the classroom and we will punish those who speak.**

Arguably, Sultan believed that this kind of culture prevented students from talking or having their voices heard in the classroom and posed a contradiction with the more discussion based strategies (such as group work) which they were trying to implement in their classrooms. This again highlights the complexity of the landscape in which the teachers and the TDP was situated. Not only were they trying to develop a reflective approach to classrooms discussions in a traditional teacher-led pedagogic culture, but they also felt there was resistance from other staff to the kinds of changes they wished to implement and this created problems in crossing the boundary from TDP to the classroom. This is particularly pertinent when we consider the wider policy context all the teachers in this school were facing i.e. the implementation of a reform curriculum and textbook which emphasised student talk through various tasks and exercises.

During the TDP workshops, there was very little focus on solutions to this perceived lack of support from colleagues. Sultan did suggest the value of persuading the main
classroom teacher\(^4\) to teach students the ground rules of good quality classroom dialogue. He commented that the Main Classroom Teacher ‘is with his students four or five lessons per day,’ whereas ‘the problem with Mathematics is that the class is only 45 minutes per day.’ (i.e. this was insufficient to develop students talking skills alone). But this kind of suggestion was limited and Ahmad responded to it by saying ‘it is not the same idea higher grades, 4, 5 and 6. They have different teachers’ meaning there is no one main classroom teacher to persuade in this way.

As shown in a previous chapter, Sultan found it difficult to work out to how to deal with this lack of support. Zayed also indicated this in the final seminar by saying ‘One of problems I suffered was that when I let students sit in pairs, the next teacher who came after me let the students go back to their individual positions’. However, interestingly Ahmad did not encounter such difficulties: ‘I talked with other teachers to not change students' arrangement and leave students share knowledge’. Arguably, this may be because of Ahmad’s identity as the supervisor of Mathematics teachers in the school and the length of his teaching experience which gave him more authority over other teachers.

During the final project seminar, in a group interaction involving Zayed—some of the other teachers in the school raised the issue of their contrasting pedagogic approaches and stated their belief that students (and families) would not accept such diversity.

| Researcher | What are the main obstacles or difficulties on the students’ side? |
| Teacher C | How will the family be convinced about this? And the student may not be convinced. |
| Zayed | Why won’t the student be convinced? |
| Teacher C | Because an Arabic teacher tells the student only to look to written texts and read them. The Quran teacher tells him to listen. With these methods accepted as the norm, when you approach teaching the dialogic way, the student won’t accept it. |
| Teacher D | Right. |
| Teacher C | The student won’t accept it. |
| Zayed | So, we can say the difference between teachers’ teaching methods has an affect on students. |
| Teacher D | Generally, we can say it’s the environment, either in the school by teachers or outside the school by family, which causes students’ opinions |

\(^4\) At Saudi primary schools for grades one, two, and three have a Main Classroom Teacher teaches for all subjects except Mathematics and science.
to be ignored. However, if the student experienced difficulty with other teachers, he can find freedom with you and won’t be an obstacle for you. That may also be a motive for dialogic teaching.

Here Teacher C discusses the difference in classroom norms between Arabic and Quran lessons and the dialogic approach the case teachers were trying to implement which he perceived to be a problem (‘The student won’t accept it’). However, Teacher D responded more positively suggesting some students may appreciate the opportunity to experience a different pedagogic approach, if they have found ‘difficulty’ in other lessons. As a result of this discussion, Zayed suggested having different professional development communities in the school between teachers with different common interests. He said ‘I hope science teachers and other teachers do the same thing. With those who teach the same class, with Ahmad for Mathematics subject and with the science teachers, I have the feeling that we can benefit each other’. Arguably, therefore, Zayed is attempting to resolve the contradiction between these different pedagogic approaches by promoting group orientated professional development communities which could then reflect on the common goal of each group, whatever that might be.

I suggest these examples indicate the teachers’ mutual accountability towards changing the school culture, which they suggested prevented students from talking in their classrooms. As presented in Chapter 6, the CoP objectified certain strategies as a kind of shared repertoire which I brokered through introducing research themes and video episodes and then we had negotiated and developed through the discussions. Some of these strategies were perceived as directly countering the traditional Saudi teacher-centred teaching culture which they perceived was common amongst their colleagues. For example, one written statement said ‘Unleash the students’ for classroom talk emphasising ‘unleash’ as a way to give students more freedom than they might otherwise experience. The following statements were also written as the outcome to the final workshop.

- Sultan ‘Students in the classroom need to have freedom of expression and talk and accept the thoughts of others’ (w8).

- Zayed ‘Encourage student participation in general, regardless of whether they provide correct and wrong answers and ideas, and praise the involvement, not to consider it as inactive or valueless’ (w8)
9.4.2.2 Accountability to the Supervisor:

At the end of Chapter 8, I pointed out the tension between the supervisor (Ahmad) and supervisee (Sultan) and how that was evident in the data set. As in many other countries, this exemplifies teachers’ accountability to the supervisor—i.e. vertical power relationships where a former teacher who has experience and is selected by the educational administration can evaluate teachers’ performance. This is a central part of their professional identity which again raises contradictions with the more horizontal power relations I was trying to broker in this CoP. Therefore, I argue the supervisor was a key part of the landscape for the teachers and his authority to judge the quality of their teaching was frequently raised in the TDP discussions. It was as if the supervisor was always present, even when not there in person—and they appeared to feel that the perceived pedagogic beliefs of the supervisor were at odds with the changes they wished to implement. For example, in the second workshop Sultan commented on a video episode which showed the change in their classroom after implementing the paired discussion strategy:

‘There is an atmosphere of learning. There is an atmosphere of learning [he means when students were isolated and work individually without any voice in classroom] That's what I was told by the educational supervisor. He said, if the needle falls, we need to hear the voice of the fall of the needle. I put the students into groups and I discussed that with the educational supervisor, but he said grouping is not a proper method’

Here Sultan discusses an encounter with his Supervisor (not Ahmad) which pinpoints the contradiction the teachers felt between their expectations and the joint enterprise of the CoP (i.e. improving the quality of dialogue in their classrooms). The voice of the supervisor saying ‘if the needle falls, we need to hear the voice of the fall of the needle’ is presented in opposition to the strategy Sultan had put in place ‘paired discussions’. Moreover, in the third workshop, Sultan again highlighted how the recommendations of supervisors contradicted his new professional practice.

‘There are some supervisors who would say to you: ‘choose the exercises one day before the lesson’. It is difficult for me to do that because the situation of the lesson dictates what I do and I may choose the exercises just to find that they are easy for the students, or they may turn out to be very difficult for them’

These kinds of comments from Sultan do not seem surprising given the new professional identity, which he appeared to construct through engagement with the CoP. As I outlined in the previous chapter, this contradiction appeared to motivate Sultan to take an
affirmative decision to disregard the supervisors’ view and focus on the quality of talk which took place in his classroom. Moreover, I suggest that Sultan was enabled to do this because the TDP provided a safe place to resist the vertical power relationship of the supervisor-supervisee—safety which was manifest in the legitimacy of my brokering role (with the mandate of the Ministry—who funded my PhD).

Obviously, the figure of the supervisor is clearly implicated in Ahmad’s conflicted alignment with the CoP referred to in Chapter 7. An example of this conflict was evident in the sixth workshop, where the teachers and I discussed engaging more students with one problem and that this could take some time in the classroom. Ahmad reflected: ‘If the supervisor comes to this class I would tell him: this problem has taken long time, he would say: this is unacceptable’. Here I suggest that although Ahmad recognises the conflict between time and the supervisor’s expectations—he does not seem to challenge the supervisor’s authority. Unlike Sultan, who appears more comfortable in doing so Ahmad did not move beyond observing this conflict—and therefore, we see a different pattern of alignment with the CoP. In this case, I argue there is a contradiction between Ahmad’s vertical accountability to the Ministry of Education and the horizontal power relations of the CoP. Nevertheless, it is also important to remember that his relationship with the Ministry necessarily involves implementing the ‘reform’ curriculum, as it is they who have adopted the textbook. Therefore, I argue that Ahmad is faced with a situation where he must accept this ‘reform’ approach but does not yet know how to practise this in his supervisor role. In Chapter 7, I presented some evidence to show how he was starting to change his evaluations of other teachers’ practice but this will entail a fundamental shift in supervisory practices more generally which involves re-writing the expectations of teachers for example, regarding students’ silence—‘if the needle falls’.

9.4.2.3 Boundary Crossing as Parents:

As mentioned earlier, the teachers’ awareness of the contradiction between the expectations placed on students by families and by different teachers inside the school and their more dialogic practice, also seemed to encourage them to think about their own roles as parents. Here, I argue that their experience of their own boundary crossing from the TDP to family life seemed to become internalized in their identity as parents or family members. That is to say the desire to involve students in dialogue went beyond improving their own teaching practice into the way they conducted family life at home. For instance,
at the end of the final workshop, Ahmad stated ‘I want to admit something that it [dialogic approach] has affected me at home and with my children. My son now talks with comfort, and I listen to him more. This approach builds the personality’. Here, Ahmad’s statement indicates how he believed he had changed his identity as father and the kinds of family practices he engaged with in the home. Ahmad now argued that this change included talk with his children more and more listening on his part.

Zayed also made similar comments in the final interview ‘Now my son has more space to do things without saying anything to him, and this treatment has never existed before in the past’. These comments suggest the teachers’ conscious awareness of their shifting practice as parents at home which they connected to their experience in the TDP. Therefore, I argue that their participation in this CoP produced some quite fundamental shifts in their identity—not only did they develop new ways of being a Maths teacher but this was somehow internalised—they felt it had transformed the identities they enacted in other areas of their lives. This perhaps suggests a deeper or more durable change to their identity which is concurrent with the kinds of social change they wanted to instigate in transforming the family culture and expectations of ‘the students’ they taught. Here, I am arguing that as the teachers became aware of ‘the students’ as boundary crossers moving between the contradictory practices of a traditional family life and a discussion based pedagogy inside school, they became aware of their own parenting practices at home. They became conscious of how this might potentially conflict with the joint enterprise of the CoP and as such, transformed their parenting to align with it.

9.4.3 Section Summary

My analysis of the landscape of practice has highlighted the teachers’ sense of accountability to the supervisor which indicated their position in a vertical power relationship with the Ministry of Education. This conflicted with the horizontal power relationships operating in this CoP—a conflict which seemed to be most evident in Ahmad’s comments as he occupied a dual role of supervisor and CoP member. Again, this has implications in terms of how such a CoP works in a context where mechanisms of vertical accountability (such as the supervisor) are dominant. Here, I suggest again that brokering is supportive in negotiating such conflicts, particularly where such brokering has the mandate (legitimacy) of those in power.
Finally, I have also highlighted further contradictions in the wider SA culture which were apparent in the TDP discussions via the landscape. These include contradictions between the ‘reform’ emphasis on fostering dialogue and i) the pedagogic beliefs of other teachers in the school and ii) the opportunities for dialogue in the family where children are expected to listen to their elders and not dialogue with them. I argue here that by brokering and then negotiating the meaning of ‘dialogue’ and ‘discussion-based teaching’—the teachers became conscious of these contradictions, which then produced some changes in their practices beyond the classroom.

9.5 Bakhtinian Complement to Some Limitations of the CoP Theory

Clearly CoP theory has offered a great deal in this thesis in terms of deepening our understanding of why and how the TDP enacted professional development for the teachers and also the conflicts and challenges that occasionally occurred. However, there are some limitations of the theory in terms of understanding the complexity of the teachers’ emerging identities and how they were mediated by the landscape of practice. This section discusses these limitations using Bakhtin’s theory of dialogism and the three concepts of otherness (self/other), the multiplicity of voices (heteroglossia) and addressivity. Here, I intend to show how the TDP discussions did not only involve teachers becoming reflective practitioners through participation but they were also a tool for the development of individual consciousness through dialogue. Therefore, I argue that professional development might require a certain kind of dialogic participation rather than just participation.

9.5.1 The others, heteroglossia and addresses in teachers’ reflective discourse (on practice)

In the previous section, it appears that the presence of the ‘Other’ (for example, students) played an important role in enabling the teachers to reflect on their own practice critically and that these 'others' were tied into the landscape of practice. This is not particularly discussed in CoP theory which emphasises what individuals do in and through participation in practice 'in the moment' rather than how forms of participation are given meaning through reflection (where more distributed 'others' who are not present immediately come in to focus). Therefore, to understand the significance of these 'others' in shaping both dialogue and identity, I turn to dialogism - i.e. Bakhtin, Volosinov and
Holland *et al* (1998). As Holquist (2002, p. 18) argues 'In dialogism, the very capacity to have consciousness is based on otherness. This otherness is not merely a dialectical alienation on its way to a sublation that will endow it with a unifying identity in higher consciousness. On the contrary: in dialogism consciousness is otherness.' Here, Bakhtin sees consciousness as produced and manifest in the relationship between self/other. Therefore, the development of consciousness is influenced by the social interaction with others’ thoughts, utterances, and actions and I argue that this consciousness is an important part of identity formation.

Before this discussion can continue, however, the question 'who is the Other?' must be answered. The following discussion seeks to identify the possible 'Others' who appeared critical in shaping how the teachers came to understand their identity as the TDP emerged as a CoP.

The student(s) is one of the most prominent 'Others' in the landscape of practice since even though they were not present physically in the TDP workshops, they appeared to influence the teachers' discourse about themselves as teachers and their decisions regarding how to develop their teaching. The students presence as the 'Other' appeared important and beneficial for the teachers when considering what will happen in the classroom when applying the new techniques and strategies (shared repertoire). For example, the following extract shows the interaction between teachers as they reflected on Ahmad’s video episode [3rd workshop]:

**Ahmad** .....and I did not go back to the student who was wrong to thank him for his participation although he gave a wrong answer.

**Researcher** Your last point is wonderful

**Sultan** You know, when Ahmad said he did not go back to the student who participated, he was right about that.

**Researcher** Going back to this student is the core of dialogic teaching

**Ahmad** Yes, I should go back and thank him for trying to participate

**Sultan** Let me tell you that next time I find myself in Ahmad’s place I will go to the mistaken student and say, ‘without your wrong answer we wouldn’t be able to get the right answer. Be sure that you and your answer are what lightened our way: you are the brave knight who sacrificed himself so that we know the right answer

**Ahmad** In order to judge the situation, try to put yourself in the place of the mistaken student.

**Sultan** Yes, yes I did.
Ahmad

It is very good to commend anyone who tries…. when I go back to the student who committed a mistake, other students get motivated and say to themselves ‘the teacher returned to the student so let me participate.’ This is a motivation. Motivation is very important.

In this extract, Ahmad uses the imaginative ‘put yourself in the place of’ a student to emphasise how important it is to include a student's perspective in their judgement of their teaching practice. Therefore, I suggest that the concept of the student(s) as the 'Other' created a dialogue within the teacher's discourse which shaped the formation of their identity in this CoP. They imagined how their teaching would be received by its audience and this audience became critical in defining ‘what works’. Subsequently, this apparent impact on the student was also reported back into TDP discussions after a strategy had been 'tried out' so that the students as 'others' became a critical part of 'success stories' (shared repertoire) which facilitated the teachers’ critical reflection. Therefore, this dialogue was simultaneously an internal (identity development) and external process (evident in the TDP discussions). The student as 'Other' and the subsequent dialogue with him continued to inform the development of new strategies, the conceptualization of new meanings and changes in the classroom environment and their expectation of the student(s) roles and duties. By using dialogism to understand the role of the student-other in the workshop discussions we can therefore, see how these 'others' became 'others in myself’—they were the imagined audience which the teachers developed their practice for (following Bakhtin 1981).

My analysis above suggests that whilst the students are physically a more distal 'audience' for the dialogue in the TDP they are actually quite intimately involved in the construction of the teachers' identities. This connects to Bakhtin's concept of addressivity. Bakhtin (1986) argues that each utterance has an addressee which could be anyone such as individuals, groups, specialists and non-specialists and so one. He argues that the addressee has an influence on ‘Both the composition and, particularly, the style of the utterance’ and ‘how the speaker or writer senses and imagines his addressees, and the force of their effect on the utterance’. (p. 95)

In this study, we might think of 'others' as addressees i.e. who the teachers are addressing as they author their 'becoming' or develop their new professional identity. Whilst the students are significant others there were also several other groups of addressees. Firstly, for any teacher, the other two teachers and I were key addressees or audiences in that their utterance was directed towards those immediately present. Therefore, there were three immediate audiences for each teacher in the TDP, myself as facilitator (and the
identity/position associated with this), the other teachers (colleagues) and Ahmad as supervisor. Each audience implicated a particular power dynamic. Sultan argued that these audiences were important in reflecting on the video episodes: ‘if I watch it alone I would definitely critique myself as a teacher but with the constructive critique of others, there would be a greater chance for improvement’ [final interview]. Here, Sultan’s comments suggest that the critique of other teachers and myself in the TDP have become an internalized voice and part of his own reflective critique.

Secondly, there were also other teachers/the Mathematics’ teaching profession who were indirectly addressed in the TDP through many reflections and comments such as those that began with ‘the teacher should…’ (a fairly frequent reference in the TDP discussions). For example, Sultan illustrated the usefulness of implementing the TDP inside the school ‘the development program inside the school is 100% positive because it is a continuous development, and it motivates the teacher to discuss something new every workshop’ [at the seminar]. Here I suggest that Sultan perceives an imagined audience of other teachers who might be interested in this kind of professional development—he appears to address this audience—which enacts the kind of new professional identity which he appeared to develop through participation in this CoP (i.e. an identity of advocate for professional development). The reference to ‘it motivates the teacher’ indicates a more abstract generalisation from what has occurred concretely in the workshops he had experienced and in making this step he addresses the teaching profession more broadly rather than those present in the discussion.

Thirdly, I have previously mentioned the Ministry of Education as a crucial institution in the landscape of practice which mediated the teachers’ understanding of what they could do in the classroom (vertical accountability). As already stated, this was emphasised by Sultan who, from the outset, stated he wanted more trust or agency as a teacher from the MoE and to develop this relationship between them: ‘our problem is trusting, they [the Ministry of Education] require the papers, as I had said it is problem of trust no more’ [3rd workshop]. Here, it is clear that Sultan is othering the Ministry and supervisors as an audience who are not like him. Moreover, this shows how he suggests that the Ministry is an authoritative ‘other’ which was crucial for the kind of identity that Sultan became.

Fourthly, the role of the educational supervisor is yet another addressee whose significance in shaping the teachers' dialogue has been shown throughout the data analysis. The supervisor is important, not only as a representative of the Ministry of Education, but also as a colleague especially because Ahmad is considered as a
representative of this educational supervision within the school (for Mathematics). The
presence of the educational supervisor within the dialogue which constituted this CoP was
clear and consisted of: (1) references to the educational supervisor and how they might
position their new strategies for them as the audience (for example, Sultan reports that he
will disregard the supervisors judgement of his teaching) and (2) Ahmad’s presence in the
group (immediate audience) and particularly his dual role as a CoP member and
supervisor.

With respect to the first of these, the supervisor was seen as someone who must be
addressed because of the teachers’ vertical accountability i.e. he had the authority to
measure or evaluate whether the new teaching strategies were providing satisfactory
results. If we return to the comment made by Sultan above: ‘what I was told by the
educational supervisor. He said, if the needle falls, we need to hear the voice of the fall of
the needle’

Here, using dialogism to interpret this comment we see how Sultan
ventriloquates his supervisor’s voice (from the past) in order to position his identity away
from it and in doing so, he addresses 'supervisors' as an audience with resistance to their
authority. According to Bakhtin, there are two types of ideological discourse or voices
which are authoritative and internally persuasive. Bakhtin (1981) argues ‘the dialogic
interrelationship of these categories of ideological discourse are what usually determine
the history of individual ideological consciousness’ (p. 342). Here, there is dialogue
between these voices and the argument is that others can create an authoritative voice
which mediates the teachers’ identities. So for instance above, I argue that Sultan
ventriloquates the supervisor to resist their authority and in doing so takes an ideological
stance which is internally persuasive—I am a teacher who can (perhaps better than my
supervisor) reflect on the quality of discussions in my classroom.

The argument is that ‘others’ in the dialogue are not of equal status and this can
sometimes result in conflicting voices with tensions and contradictions which shape the
play of the dialogue. For example, my analysis has shown how Ahmad switches between
the voice of the supervisor, evident in his skeptical and cautious comments regarding the
changing role of the teachers, and the identity of reflective practitioner where he enacts
critique of his own and others’ practice. In Chapter7, I have argued that this conflict
(conflicted alignment) has produced change and development of Ahmed's identity as the
principal teacher who plays a role in educational supervision. This multi-voicedness

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4 The cultural significance of ‘the needle falls..’ means a way of requiring the quietness and being silent to
extend of hearing the sound of its fall.
evident in some of Ahmad's data therefore helps us to understand the conflicted alignment of his identity. This entailed negotiating a power dynamic produced by the authority of the supervisor role/voice which he had to use. As a consequence, Ahmad seemed to move towards transforming both roles (supervisor, reflective practitioner) as a means to resolve the conflicted alignment discussed in Chapter 7.

9.5.2 The Others and teachers’ landscape of practice

I could include many other ‘others’ who were also evident in the data I have discussed (for example, the role of the researcher, parents) but what is important here is acknowledging the role of ‘others’ in the development of the teachers’ identities in their landscape of practice. Here, I argue that in order to accommodate the landscape of practice in an account of identity development there needs to be recognition of how that landscape is made present in the local discourse of professional development (in this case the CoP which formed through this TDP). I have suggested here that this occurs through dialogue with ‘others’ who occupy different positions in this landscape. The argument then is that professional development is not only a process of participation in reflective practice dialogue whereby teachers can negotiate meanings introduced by the relationship between the CoP and the landscape of practice. But it also involves negotiating these imaginary ‘others’ through dialogue which then becomes part of an internally persuasive discourse (the other in me). Therefore, I conclude that this dialogue is a crucial part of the work of this CoP.

9.6 Chapter Summary

By analysing the landscape of practice in this chapter, I have been able to discuss how the wider context shaped the conversations and dialogue which took place in the workshops. My analysis suggests that for these teachers operating in this context, the landscape of practice created contradictions which were negotiated in the workshops such negotiations were supported by my brokering of their practice (video episodes) and the intentions of the ‘reform orientated’ textbook (research themes) which was necessary because of the limited teacher training put in place to implement the ‘reform’ textbook/curriculum and because teaching in SA is typically teacher-dominated which is arguably, the opposite of what the textbook intends.
The evidence I have presented here suggests that negotiating such contradictions brought about change not only in the teachers' identities as teachers but also in other roles (for example, as parents). This suggests evidence of transformation and development which cannot be accounted for by CoP theory alone. By using Bakhtin's dialogism I have been able to show how the landscape of practice was realized in the discussions in the workshops as the teachers engaged in different forms of discourse with others—authoritative and internally persuasive. The teachers positioning in relation to these others seems to be important in explaining how 'internally persuasive' the workshop discussions were and therefore, I argue that such dialogue with others was a significant part of how this CoP brought about professional development.
Chapter 10: Discussion and conclusion

10.1 Introduction

This chapter discusses the study findings in relation to the research questions that underpin this study, and then goes on to outline how such findings make a key contribution to the research literature on professional development. The chapter is divided into five sections. The first section addresses RQ1, and summarises the processes through which a CoP emerged in this context, which can be seen through the properties of mutual engagement, joint enterprise and shared enterprise. Here, I will discuss the nature of the ‘practice’ in question, before discussing the key components of this CoP, which facilitated its development. The second section addresses RQ2, and further discusses how this CoP supported the three teachers as they attempted to change their classroom practice and consequently, their professional identities as reflective practitioners. The third section addresses RQ3, and argues that the landscape of practice was crucial in shaping the work of this particular CoP. In the last two sections, I discuss how the findings make a key contribution to the research literature on teacher education and professional learning, teacher education in SA, and the use of dialogic teaching in non-Western contexts. Finally, I also will discuss the implications and recommendations for SA policymakers, teacher trainers, and teachers, as well as provide suggestions for further research in this area.

10.2 How does the ‘reform-orientated’ Teacher Development Programme, which forms the ‘case’ for this research, emerge a community of practice focused on professional development in the SA context?

This study has demonstrated the emergence of a CoP that supported a particular professional development practice—the use of classroom dialogue. Throughout this thesis, I have argued that this developing CoP was very much situated and mediated by the particular circumstances in which these teachers (and myself) were operating; a situation in which the teachers were attempting to implement a new reform pedagogy/curriculum in a context where traditional teacher-centred teaching was commonplace. This specific context created contradictions with which the teachers (and myself) had to contend, and which required brokering in order to negotiate the meaning of what classroom dialogue might look like when using a reform pedagogy in SA.
In this first section, I will explain why I have identified this CoP as emerging, and the significance of this development for/on teachers’ participatory experience and their identity development. As argued in Chapter 6, this emergence can be seen through the properties of mutual engagement, joint enterprise, and a care for a shared repertoire, and I have presented evidence of the processes underpinning these properties, which I now summarise.

Firstly, I have shown how mutual engagement was facilitated by developing collegial relationships between the teachers and myself as we engaged in increasingly reflexive discussions concerning the quality of dialogue we were both witnessing (in the video) and experiencing (in the classroom). Developing collegial relationships as emergent—whilst the teachers knew each other before the TDP began, they had not had the opportunity to come together to talk about and develop their teaching in this way, i.e. in practice. Moreover, the development of the teachers’ relationships was enhanced by their diversity of experience, which seemed to impact the content of the discussions in the workshops. I also was a newcomer to the group, bringing a certain status and expertise that resourced or shaped our discussions; this also presented a challenge (to all of us) in terms of my own need to belong to the community (in order to facilitate our practice). My analysis indicates that, as time progressed, the teachers and I increasingly responded to and developed each other’s ideas, negotiated problems, accepted each other’s reflections, and shared stories and laughed together about their own practice. In particular, the use of humour was an important resource (part of the shared repertoire) for establishing participants’ mutual relationships within the emergent community. This provided a release from a contradiction that seemed to become apparent in the group early on, notably between the horizontal power relations where all members can critique each other’s horizontal power relations (except perhaps myself) and the vertical accountability of the supervisor-supervisee relationship (i.e. between Ahmad as the supervisor and his supervisees).

This use of humour indicates the significance of the emotional engagement of the teachers and myself, which is supported by the research of Koellner-Clark & Borkok (2004), who found that laughing was a key indicator of success in developing a professional community with teachers; therefore, breaking down the power hierarchy within the group, and between the teachers and myself, was a key process in establishing mutual engagement. Developing these social relationships between teachers acted both as
a resource and driver for the emergence of this CoP. It was a resource in that feeling safe in this community was important for it to emerge as the participants needed to feel comfortable in sharing their own experiences of the classroom and past personal experience in order for the CoP to operate. However, these developing relationships also acted as a driver of the CoP because they enabled the teachers and myself to come together in such a way that fulfilled a collective ‘need’ to tackle the real problem outlined previously—i.e. implementing reform teaching in a traditional teacher led pedagogic/curriculum culture.

Secondly, the work of the group to establish mutual engagement (defined by developing relationships) also involved the formation of a joint enterprise (improving classroom dialogue) and an awareness of how to achieve it. It enabled the teachers and myself to develop knowledge relating to quality dialogue and skills as reflective practitioners, as we attempted to imagine how various strategies might be implemented in this context—this was the common interest and enterprise of the community. Therefore, the joint enterprise of this CoP was emergent too, i.e. it emerged gradually through the teachers’ and my own participation in the TDP in two ways. Firstly, the legitimacy offered by my brokering work supported critical reflection (as opposed to just reflection) which meant we focused on discussing and negotiating the problems that faced this joint enterprise rather than just identifying multiple problems which were external to the teachers’ practice and therefore, outside of their control. Secondly, through the teachers’ growth of mutual accountability towards professional learning and the new meanings and practices regarding dialogic teaching (the shared repertoire) which were being negotiated. For example, the teachers displayed their mutual accountability towards particular secondary resources such as questioning strategies and paired learning (as shown in Chapter 6).

Moreover, some meanings that had been negotiated in the workshop discussions became reified so that they took form and could be used (without explanation) at later points in the workshops. This highlights how the development of the third key property of a CoP—a shared repertoire—was also central to what took place here. In Chapter 6, I presented this repertoire in the form of primary and secondary resources, which were negotiated and developed in the TDP workshop discussions. Primary resources were central to the ‘practice’ in question—for example, video episodes, success stories—which facilitated professional development regarding classroom dialogue. Secondary resources are the strategies or practices negotiated and then ‘tried out’ in the teachers’ classrooms and then
brought back to the discussions. This emphasises how important the teachers’ developing practice was to this CoP as, arguably, it was the ‘real changes’, which the teachers saw in their own classrooms that gave momentum to the discussions. Yet such real changes could not have happened without the opportunity to ‘imagine’ changes in their practice first (through the workshop dialogue) which arguably, was supported by my brokering of their videoed practice and the research themes which I used to broker the intended meaning of the ‘reform’ textbook.

By identifying the TDP as an emergent CoP, we can begin to understand this process of emergence as taking place in gradual phases. It began firstly as a potential or hypothetical CoP; it emerged as a CoP though the TDP workshops and then became a realised CoP when the teachers and myself reflected back on what had taken place. Wenger et al (2002) refer to this when they draw a distinction between the ‘potential’ phase, the ‘active phase’ and the ‘dispersed’ phase in accounting for how CoPs come into existence and how they become self-sustaining or established in the landscape of practice. The first of these—the ‘potential’ phase—occurs when members experience a similar situation (for example, participating in the first and/or second workshop) without the benefit of an established shared practice (in this case, engaging in critical reflections/discussion) but where members start to discover commonalities in their experience (Wenger et al., 2002). For instance, the teachers and myself shared a common experience regarding the lack of facilities in school (for example, office or department/computers) during the first two workshops without being critically reflective in terms of implementing change. My role as facilitator is important here since it was me who initially brought this group of teachers together and established the rules of this TDP and, therefore, I make the suggestion that my intentions in so doing were key to forming this group as a potential CoP.

In terms of an active phase (Wenger et al., 2002), this refers to how the group engaged with the now established joint enterprise of the CoP which in this case are represented by the examples of critical reflection discussed in Chapter 6 and the use of success stories to reflect on the value good quality classroom dialogue had for these teachers and myself. Furthermore, Wenger et al. (2002) argue that the ‘dispersed’ phase is the final stage where ‘...members no longer engage very intensely, but the community is still alive as a force and a center of knowledge’ (p. 6). Given that this was a finite TDP which finished once I had left the school and returned to Manchester, it might be argued that this CoP did not become sustainable because I was no longer around to focus the discussions between
the teachers. However, there was some evidence from the teachers’ final interviews that suggested that the shared repertoire and joint enterprise might continue afterwards and, I argue, this was mainly due to the teachers’ identity development in becoming new kinds of teachers as mediated by this CoP (as shown in chapters 7 and 8). This concurs with what Wenger et al. (2002) identify as typical activities for a CoP in this stage where members communicate, stay in touch, hold reunions and call each other for advice.

10.3 How does the Community of Practice Help to Develop the Teachers’ Professional Identity as a Reflective Practitioner Regarding Classroom Dialogue within the SA Context?

The second research question considers the extent to which the CoP supported the development of the teachers as we engaged in professional development regarding their use of classroom dialogue. Here, I argue that this identity development, which took place over time as the teachers participated in the TDP discussions, was mediated by the development/emergence of the CoP. The process of establishing the joint enterprise, developing mutual engagement (signified by developing relationships) and producing a shared repertoire were instrumental in Ahmed and Sultan’s attempts to change their practice. I have shown how both teachers engaged in critical reflection in the TDP discussions and therefore, their capacity for reflection was not only supported by the CoP but it also contributed to the CoP too. This is exemplified in the teachers’ reflection on critical moments which seemed to shift their outlook as discussed in Chapter 6 (Section 6.3) on their mutual accountability towards professional learning.

This identity development involved the teachers reflecting on their role in the classroom in different ways (i.e. shifting from an authoritative teacher overseeing passive students towards a teacher which encourages more active participation from students), but it also involved developing engagement with professional learning in the school. In relation to the latter, their perception of what professional learning might be like and their role in making that happen went beyond the typical professional learner role assigned to teachers in SA schools (as passive recipients of top-down one off training events).

Wenger (1998, p. 153) argues that ‘membership in community of practice translates into an identity as a form of competence’. Here, I argue that the evidence regarding the three modes of identification (engagement, imagination and alignment) highlighted in chapters 7 and 8 has demonstrated how the teachers identified themselves with the regime of
competence in this particular CoP. This regime of competence involves the new meanings and teaching strategies that supported the improvement of classroom dialogue which the teachers attempted to implement and then reflect on in the TDP discussions. Moreover, I argue that identifying with this regime of competence involved crossing boundaries (into the classroom but also in to other practices in the landscape) and also practising agency in relation to the vertical power relations of accountability, which are experienced by many teachers across the world. For example, in Chapter 7, I suggested Sultan’s sense of resistance against the supervisor, which he viewed as being necessary, as he pursued the joint enterprise of the CoP. Such power relations were also implicated in the different ways the teachers developed their identities in relation to this CoP and this implicated different forms of participation. My analysis has highlighted these differences in terms of their imagination and alignment which I will now discuss as a means to identify the key characteristics of this CoP, which were connected to the teachers’ identity development.

10.3.1 Engagement as a Mode of Identification

In terms of engagement, both teachers attended all of the workshops, engaged in community conversations and discussions, and the activities of writing recommendations and suggestions for their teaching practice. In Chapter 6, I have also shown how both teachers engaged in offering reflections on their own videos and developing these reflections towards being critical. Moreover, they engaged in the process of implementing the new teaching strategies and offered their experience of these strategies for reflection within the group outlining their advantages and challenges. This direct engagement in the different social activities which comprised this CoP appeared to support the teachers learning about their own competence. According to Wenger (1998, p. 173), engagement is ‘active involvement in mutual processes of negotiation of meaning’. Therefore, this CoP was a place for the teachers and I to negotiate what teachers do in classrooms and how they could improve their teaching to be more dialogic. The teachers became actively involved in the reflections and the negotiation of meanings as I brokered ideas about ‘reform’ dialogue through my selection of video episodes and research themes. This negotiation of different meanings became a routine in their school life which seemed to move towards adopting reflective practice about teaching in relation to classroom dialogue more widely (for Sultan at least).

10.3.2 Imagination as a Mode of Identification
The teachers’ use of imagination as a mode of identification has been a central theme throughout this thesis which suggests that imagining change is crucial to changing practice. Imagination is ‘creating images of the world and seeing connections through time and space by extrapolating from our own experience’ (Wenger, 1998, p. 173). The CoP (e.g., reflections on video) offered the teachers the space to construct images of their classrooms which could then be objectified in discourse and subsequently in practice. As the teachers developed their reflections towards being critical about their own behaviour/practice, they created images of a new form of classroom practice which even connected with other aspects of their lives and other identities (such as at home as parents, society, mathematics teachers from different countries). In doing so, the teachers frequently compared their current practices with an imagined ‘ideal’ (partly brokered by myself).

Additionally, and more significantly, the teachers began to see their teaching practice and themselves from different perspectives through their imagination of how the new meanings and teaching strategies could be seen by others, such as others in the TDP (video episodes), students, other teachers, parents and supervisors. This was an important way that the teachers orientated themselves (identities) towards the new competence of the emergent community of practice. My analysis of the role of ‘others’ in shaping the teachers' professional identities (presented in Chapter 9) is relevant here since this captures the imagined ‘addressees’ of the teachers’ practice which was evident in their dialogue. Moreover, in Chapter 9, I have suggested the use of imagination was significant in addressing some of the contradictions which were realised in the TDP discussions through its position in the landscape of practice (the SA context outlined in Chapter 2).

### 10.3.3 Alignment as a Mode of Identification

Professional development in this 'case' was not just a matter of implementing the strategies/meanings negotiated within the workshops but rather it required believing and arguing for the importance of both the existence of the TDP itself and the new strategies or shared repertoire it had developed. Wenger (1998, p. 174) states this as alignment which means ‘coordinating our energy and activities in order to fit within broader structures and contribute to broader enterprises’. I have shown in chapters 7 and 8, several examples of this alignment—for example when the teachers shared their success stories with the group which then continued our reflective conversations regarding new strategies that emerged from previous discussions or when they shared the experience of participating in the TDP with other maths teachers who attended the final TDP seminar.
This draws on their mutual accountability to the joint enterprise of the CoP and highlights how their perception of success in changing some of their classroom practice supported this alignment.

In chapters 7 and 8, I have shown how the alignment for the two teachers was different since it was mediated by both their prior experience and other aspects of identity or roles they were negotiating (for example, as supervisor). It is this diversity which highlights the need to hold on to a concept of identity which is both situated in participation in a CoP but also moves beyond it, as the process of constructing an identity is both individual (depending on prior experience) and social (mediated through participation in the CoP). My analysis of Ahmad's trajectory through the TDP has important implications for teachers like him operating in similar situations as I have shown his case as one of conflicted alignment between belonging to this emergent CoP (with its horizontal power relations) and his role as a supervisor in the school (in charge of instigating vertical accountability). This conflicted alignment was apparent in Ahmad's emerging professional identity where he appeared to not fully 'buy in' to the joint enterprise of the CoP because of the need to show his accountability and competence as a supervisor (for example, worrying about time and pacing of the curriculum).

Nevertheless, I argue that Ahmad's conflicted alignment (negotiating two aspects of his professional identity) was significant to the way in which the CoP emerged and developed. Ahmad was skeptical during the TDP discussions about the new meanings and practices of dialogic teaching which produced discordance in the mutual engagement of the group facilitating important discussions regarding these strategies (again my role as broker was significant here). For example, Ahmad displayed concern about the amount of time some of the new teaching strategies would take up in lessons and whether there would be sufficient space for covering the textbook exercises. I argue that this increased the other teachers’ and my own awareness of the real situation in Saudi classrooms which prevented overestimation of the kinds of change that can be implemented.

In Chapter 8, I also demonstrated how Sultan's own alignment with the CoP was more invested—he used his participation in the TDP discussions to critically challenge people who have direct authority over his teaching, such as the school administrator or supervisor, and this form of critical challenge became part of the process of developing his professional identity. Therefore, I suggest the CoP supported Sultan in negotiating some resistance to the mechanisms of vertical accountability that Ahmad represented as
supervisor. This then constituted a shift in his professional identity towards that of teacher researcher for example; he began to video his own classrooms outside of the TDP workshops. Consequently, I argue that the broadly horizontal power relations established between the teachers in this CoP (and to some extent with myself as facilitator too—see Chapter 9) not only engendered Sultan's accountability towards the regime of competence of the CoP, but both the CoP and Sultan also produced a new sense of accountability to his profession and towards other teachers in the school.

Moreover, I argue that the key properties of this particular CoP which appeared critical to the ‘practice’ (i.e. professional development regarding classroom dialogue) were also central to the identity development of these two teachers. The TDP workshops created a space for discussion whereby the conflict between professional development and vertical accountability to the supervisor could be discussed. This space enabled specific forms of imagination which envisioned new possible classroom practices in the abstract and subsequently possibilities for professional development (Sultan's identity) whilst at the same time produced discussions which connected these practices to the concrete reality of these teachers' classrooms mediated by Ahmad the supervisor (for example, the use of the pairing strategy as a means to promote collaborative learning in a classroom where the physical arrangement of students seated at individual desks are the norm).

However, the TDP workshops were established as a safe space for such negotiation because of my role and legitimacy in setting it up as such and then brokering the horizontal rules of the TDP. In addition, my introduction of the research basis of reform teaching (intentions of the textbook) and the teachers’ actual practice (captured in the video episodes) brought to light the contradiction between the 'ideal' new reform pedagogy and the traditional, teacher dominated pedagogic approach used by Saudi teachers. Through negotiation this contradiction was both maintained and overcome in these 'imaginations'. For instance, Ahmad reflected on change in his evaluation practice as a supervisor in ways which suggested he felt better able to assess the implementation of the textbook's reform approach adopted by his superiors in the Ministry of Education.
10.4 How does the Landscape of Practice in which this Community of Practice is Situated Influence Professional Learning which Takes Place and Teachers’ Identity Development?

A key analysis made in this research is how the landscape in which this emerging CoP was situated mediated the mutual engagement, joint enterprise and shared repertoire which I have described. As a consequence of this situatedness, both the teachers and myself acted as boundary crossers and I have highlighted in Chapter 9 the different boundaries that we crossed and how this experience informed the TDP discussions. For example, the teachers moved across the classroom—TDP boundary and their use of 'success stories' and also their comments on the challenges encountered in implementing the strategies of the TDP reflect this movement. This helped establish the use of success stories about developed practice as a crucial part of the shared repertoire which means the teachers were brokering their practice as teachers—offering their experiences up as objects for discussion (and so reflection and analysis).

Secondly, as I have stated, my own brokering between the mathematics education community and the TDP was also an important resource for the emergent community. Wenger (1998, p.109) describes how “Brokers are able to make new connections across communities of practice, enable coordination, and—if they are good brokers—open new possibilities of meaning”. In this case, such brokering involved the introduction of new tools and meanings from the mathematics education community, such as using video as a professional development tool (van Es & Sherin, 2002; Star & Strickland, 2008; Lewis et al., 2006), which were not readily available in SA previously. Moreover, I also needed to bring new meanings regarding the characteristics of dialogic teaching (Alexander, 2006, 2008) to the group as I attempted to broker the intentions of the reform focused textbook (Particularly the talk task).

My role as broker was important and critical for this emergent CoP and the teachers’ emerging identities. In Chapter 9, I have highlighted how this role required some degree of legitimacy or power in terms of my experience and interest as mathematics educator and PhD researcher. However, this status also had to be questioned or negotiated in order to provide both myself and the teachers with a lived experience of implementing a dialogic approach during our discussions. Therefore, although I introduced new concepts and meanings to the TDP discussions, the teachers contributed significantly in the
negotiation of meanings in order to make sense of these abstract ideas in terms of their own practical competence.

Thirdly, the negotiation of new meanings in practices external to the school was important for this particular CoP and the development of the teachers’ identities. In Chapter 9, we have seen examples from Ahmad and Zayed which indicate that their 'sense of change' in their teaching practice had also transformed their behaviour towards their families as parents with their children. Here, I argue that the contradictions which were sometimes realised in the TDP discussions because of the teachers and my own boundary crossing produced these deeper changes in their identities. For instance, I noted how the teachers commented on the contradiction they observed between dialogic teaching which emphasises students active involvement and their positioning in the home where they must be passive and ‘listen to those in authority’.

Fourthly, I have also discussed how the landscape of practice was made present in the local TDP discussion through imagined ‘others’ (students, parents, educational supervisors) who the teachers and myself attempted to address in one way or another. For example, students were an important audience for the teachers in directing their imagination of their developed practice and classroom. These findings support the argument by Tusting (2005) who suggests the need to have a theoretical perspective on language when researching communities of practice. My use of dialogism to do this provides a framework to see how teacher identity development (which may place through participation in a CoP) is mediated by a whole host of relationships and voices from across the landscape of practice which they move across. My adoption of dialogism also addresses Cox's (2005) criticism of CoP theory: that by focusing on the internal features of a CoP, little attention is paid to the structural forces within which they operate (p. 533). Here, I argue is that dialogism can help to see how these structural forces are present in the CoP which in this research is apparent in the contradictions observed and negotiated by the teachers and myself. Therefore, I suggest the combination of the three analysis units of community of practice and identity by Wenger (1998), and utterances by Bakhtin (1981, 1986) can provide a powerful analytical framework for analysing professional learning.
10.5 Summary of the Research Questions

In summary, the answers to the research questions detailed above provide an overview of the complexity of doing professional development in a context such as SA. By considering the landscape of practice in which the TDP was situated, I have tried to show how this context mediated specific meanings—the teachers and myself spent much of our time discussing various obstacles or challenges to their use of good quality dialogue and therefore, they/we implement some of the intended meanings underpinning this reform orientated textbook. My analysis shows that this process involved certain key aspects. Firstly, my role as a broker coming from the mathematics education research community and with the mandate of the Ministry of Education gave legitimacy to joint enterprise. I have argued that this brokering was necessary not only because of the contradiction between the reform approach and the traditional, teacher-dominated practices more typically found in Saudi classrooms. But also because the ‘reform’ textbook had been implemented with very little teacher training (unlike the USA) and therefore, there was a need to establish how the meanings underpinning the textbook could be made to work in an SA context. Another key aspect was the way in which the TDP adopted horizontal rules (instigated by myself) regarding the relations between members which meant that different experiences and multiple practices which the teachers participated could be discussed in the TDP workshops. This was difficult since it contradicted the vertical mechanisms of accountability which the teachers were more familiar with. But, through sustained engagement in the CoP and the teachers’ experience of success in developing their classroom practice (mediated via reflections on their video episodes), there was some evidence to suggest such mechanisms could be challenged (by Sultan) and even changed (by Ahmad).

10.6 Knowledge Contribution

In this section I highlight the key contributions of this thesis to the research literature.

10.6.1 Contribution to Professional Development

Firstly, the current research has provided an account of how a TDP might be developed around professional development regarding classroom dialogue in the Saudi context. This case study illustrates how a community of practice emerged in the complex context of a new reform curriculum and pedagogy and lack of teachers’ professional development
around this new reform. Therefore, this research adds to the field and breadth of the literature on professional development in significant ways. For instance, it highlights how the complexity and contradictory nature of the Saudi context can be instrumental in producing development when certain aspects are in place: brokerage by/with the maths education research community, space for dialogue where contradictions can be negotiated and the role of videoed practice which brings contradictions to light.

Secondly, a key contribution of this research to literature on teacher development is the significance placed on the landscape of teachers’ practice which mediated both the development of the CoP and the subsequent shifting identities of the teachers. In the thesis, I have shown how this landscape was negotiated as the teachers crossed various boundaries and how this implicated identity development not only in their professional role as teachers but in relation to other practices they engaged in (for example, as parents/supervisors etc). I have shown that this boundary crossing (across the landscape of practice) resulted in a deeper sense of engagement in the CoP, the emergence of a new kind of practical competence in relation to the use of dialogue in the classroom, and subsequently that the teachers reported more fundamental changes in their identity (i.e. not just as teachers). To the best of my knowledge, this is the first study to incorporate the landscape of practice in an account of teacher development in this way. Although there are several other studies which have employed CoP to theorise professional learning and teacher development, these have not adequately recognised how other practices external to the school may be implicated in this development (for example, Cwikla 2014, Koellner-Clark and Borko 2004). There has been a tendency in the literature to focus on teachers as boundary crossers from classroom to a professional learning CoP but this study suggests that other forms of boundary crossing within the landscape of practice are equally significant. In this study, this was most apparent when I discussed how the teachers negotiated the challenge presented by parenting practices which did not encourage children to adopt active behaviour when interacting with adults. This conflict was negotiated by the teachers and consequently, we saw some evidence from Ahmad and Zayed who reported that they changed as parents in the home. Here, a key contribution is how these contradictions and conflicts became a target or interest for reflection and subsequently can produce change.

Furthermore, the current research also theorises how the landscape of practice is manifest in the teachers (and my own) dialogue through the presence of 'others'. A position which
stems from my plug and play of Bakhtinian theory with CoP which is also new in terms of understanding teacher development. In developing this framework, therefore, I have demonstrated how these ‘others’ provide internally persuasive discourses that became a key part of the repertoire in the CoP and hence mediated the teachers’ professional identities. Here, the argument is that complementing the CoP theory with Bakhtinian theory provides greater understanding of the complex landscape of teachers practice.

10.6.2 Professional Development around New Reform Pedagogy

This study also makes a contribution to the research literature on how professional development focused on classroom dialogue can be implemented in an authoritative, hierarchically structured social context such as SA—a particularly interesting context given the Saudi Ministry of Education’s recent adoption of a reform approach to teaching mathematics. To the best of my knowledge, this is the first study to explain professional development using the emerging CoP framework, in such a context, i.e. where new reform pedagogy has been implemented without adequate in-service training (Awaji, 2014). In my analysis I have shown how the contradictory nature of this context was manifest throughout the workshop discussions and on occasions, resolving this contradiction produced change in the teachers' practice. For instance, I noted in Chapter 6 how the teachers felt unable to conduct group work because the children worked at individual desks, and therefore could not be re-arranged to facilitate group discussions (as advocated in the dialogic teaching approach I was trying to implement). An outcome of this contradiction was the use of paired learning as a pedagogic strategy (secondary repertoire) which emerged through our observation of the video and subsequent discussions (see Chapter 6). For the Saudi context therefore, this research addresses recent calls to use professional communities for teachers' professional development in schools (Mansour et al., 2014; Heba et al., 2014). However, I take this argument further by outlining how such communities can enable teachers to negotiate the contradictions they face in implementing the reform curriculum in a hierarchically structured landscape of practice.

10.6.3 The Use of Dialogue in Saudi Classrooms

Another contribution to knowledge made by this thesis is related to the implementation of more interactive forms of teaching in Saudi classrooms. There has been much research on interactive or discussion based pedagogies (and teachers professional development using
it) in Western countries such as in United Kingdom (Alexander 2001, 2006) and the USA
(Michaels, Ocountri & Resnick, 2008; Cazden, 2001), but there is far less research in
non-Western contexts. This is particularly important when we consider the hierarchical
power structures embedded in Saudi teaching cultures and their juxtaposition with the
principles of dialogic teaching. There has been some discussion in the literature regarding
the emphasis on performance in standardized tests and how this conflict with the time
taken to engage in dialogue with students and this tension was certainly experienced by
the teachers in this study (Walls, 2008). As I have shown, the CoP enacted through this
TDP provided a space to negotiate this conflict and the teachers’ vertical accountability to
the supervisor who expected them to cover the textbook.

Furthermore, this research adds to a growing literature on how best to encourage more
dialogue in Saudi classrooms and in Saudi society more generally. There is very little
research on how wider, macro hierarchical structures in society conflict with the
principles of dialogic teaching—this was evident most in this research where the teachers
discussed how parents/fathers position their children/sons in the home where they are
expected to be quiet and non-interactive. This further supports Al-Seddiqi (2011)’s study
which considered the role of dialogue and its obstacles in the upbringing of children in
the Saudi family. The greatest obstacle from the students’ point of view was their feeling
that their parents would not accept their point of view and the fear of their parents’
reaction when they expressed their opinion. Al-Seddiqi recommended families assigning
appropriate time for regular dialogue with their children, and talking with them at any
time when they need to without limiting the dialogue to topics related to study or only
engaging in dialogue when a problem occurs.

So whilst the focus of this research is on teacher development regarding the use of
dialogue in the classroom, I argue that the findings do offer some insight into the
difficulties and challenges of implementing such an approach in a context such as SA
particularly family culture and relationships. This shows how the Saudi context is more
complex and why the government invests a lot of its budget on improving education
through different developmental projects, as discussed in Chapter 2. However, a key
limitation of this research is my lack of investigation into gender which seems to be
important in the teachers comments above. There was no discussion of daughters for
instance or how dialogue might bring about change in gendered relations in the home or
wider society and I would suggest that a different form of brokering would be required to
raise such contradictions with teachers such as these. Here, it is vital to consider the value
of Alexander’s (2001) five-country study, culture and pedagogy, as a rich and important resource for further contextualising and developing understandings of dialogic practice in relation to Saudi culture and policy. The following section presents some implications and recommendations for educators in general, and SA in particular.

10.7 Implications and Recommendations

The findings of this study have implications for mathematics teachers professional development in general, and SA in particular and I have tried to indicate these throughout this thesis. Firstly, it adds to other studies by providing empirical findings to support the use of a community of practice model in creating professional development communities which are effective in producing teacher learning and developing their teaching practices (Graven 2004, Lotter et al., 2014; Koellner-Clark & Borko, 2004). It shows how establishing a common interest, engagement and mutual relationships can enable teachers as co-owners of their professional development to establish a shared repertoire for use in future practice. But more than this, the study suggests that by instigating a CoP type model for professional development, teachers can then negotiate some of the conflicts and contradictions they encounter—contradictions which are both structural and locally realised.

Moreover, the findings also demonstrate the important role video recordings of the teachers’ practice have in a professional development community. There are many studies which have also used video for mathematics teachers professional development (van Es & Sherin, 2002, 2008; Star & Strickland, 2008; Lewis, 2009). However, in the current study, my brokering of the video episodes was critical in enabling teachers to reflect on their own classroom practice in such a way that the teachers could imagine the concrete realisation of various teaching strategies (secondary resources). Therefore, one of the implications of this study is to recommend the use of video for teachers’ professional development in Saudi schools.

Moreover, the study has significance for Saudi education policymakers in terms of supporting teachers’ professional development as they negotiate the reform based mathematics curriculum and textbooks. Instead of adopting a top-down approach to CPD, the present study suggests a more collaborative approach involving teachers as active participants may be more beneficial. This approach takes into account schools as sites of
professional development as well as children's education and this implicates a widening our understanding of what it means to be a teacher. Here, I argue that offering teachers a participatory role in their CPD helps them to immediately concentrate on classroom change and how this influences students' learning (Lotter, Yow, & Peters, 2014). It is a significant departure for Saudi education to establish teachers’ professional communities in this way and this is beginning to be central to many developmental projects already under way. The current study provides important and helpful insights into how to cultivate these professional communities and how to support them for in-service Saudi teachers’ professional development.

This research also has implications in terms of the relationship between Saudi universities and schools. Although the literature shows Saudi teachers are offered very little professional development opportunities from the Ministry of Education and other providers, resulting in challenges and problems in Saudi education (Mansour et al., 2014; Almazroa & Alorini, 2012; Heba et al., 2014). To date, there is no evidence regarding how Saudi universities could work with schools to offer professional development opportunities and thus address this deficit. For example, Minawi (2011) recommends collaboration between universities and schools for in-service teachers’ professional development programmes but without providing a way or framework for this kind of collaboration. Although, the collaboration in this study was between myself as a PhD student of a UK university and schools, the findings suggest similar brokering arrangements could be effective between Saudi universities and schools, particularly where there are expertise in the relevant field (in this case mathematics educational research). Thus, this current study offers a model for this collaboration. As discussed in Chapter 2, most Saudi educational researchers are not involved in teachers' professional development programmes which go inside the schools and focus on developing teachers’ reflective practice. The study shows how the brokering process and the role of a broker between the academic communities and teachers communities provide opportunity to develop this relationship.

Another implication is that attention should be paid to how educators play the role of broker between different communities in the educational landscape of practice, especially for in-service teachers’ professional development. There is a critical question regarding whether teachers or practitioners can accept a particular broker which relates to the legitimacy they have in the CoP. I am not assuming that I was necessarily an effective
broker in this CoP but I paid attention to my dual roles as researcher and active participant in this community. Here, I argue, as a novice researcher engaging in my first experience of brokering between academic and a teaching community, that it is incredibly difficult to bridge the gap between mathematics education research and the reality of teachers' classrooms and to challenge or change teachers' beliefs. This difficulty reflects how the real classroom practice is complex in terms of introducing new elements or theoretical research by academic communities.

Another important implication relates to how more interactive forms of pedagogy are applied in the Saudi context. The findings show how the three teachers implemented different meanings and teaching strategies to improve classroom dialogue. For example, I have discussed evidence which suggests the teachers tried to increase the number of open questions in their interaction with students. Here, the implications of these findings is one of cultural transferability—embedding something so contrary to the traditional pedagogic model used in Saudi classrooms requires much effort and reflection and cannot simply be taken off the shelf and made to work. This reflects the urgent need in Saudi schools to implement change to the traditional ways of teaching which would not give students active role or voice. Al-Seddiqing (2011) study recommended that curriculum planners should consider dialogue as curriculum content and offer suggestions how this might be taught or conducted with student. My study adds to this by emphasising the importance of teacher training on dialogue or how it should be used in teaching and education.

In light of such implications, the current study recommends using CoP as a social learning theory to understand teachers' professional development and the process by which they develop their professional identities as teachers within their landscape of practice. This adoption of CoP theory needs to include a focus on reflective practice instigated through the video recording of participants’ classroom practice. I argue that most professional development frameworks design programmes with fixed resources (themes, topics and ideas) without paying attention to the emerging resources (new video, teachers statements or stories, and new research). This is significant as, in the current study, we have seen how success stories are important for the emergent community of practice and the developed professional identities of teachers.

Moreover, I argue that further research is needed to investigate the impact of teachers' emerging identities on teachers’ actual practice in classrooms. This study has shown some sense of a transformative process for the teachers but I have not discussed in detail the evidence which shows how this transformation was realised in the teachers' behaviour.
towards students. Furthermore, additional research is required which looks further into how professional identity development can influence other aspects of teachers’ identity as they cross various boundaries. Ahmad and Zayed provide two examples of how development changed their family life as parents; however, I am aware that the data regarding these transformative effects is rather thin and recommend further research to look into this further.

Finally, another recommendation is to encourage further research which integrates the two perspectives of community of practice (Wenger 1998) and dialogism (Bakhtin, 1981, 1986) when researching teachers’ professional development and reflective practice. Wenger (2013) argued that 'social theory does not progress in a linear fashion, with one theory replacing another, but by assembling a puzzle of interacting pieces. I propose that theories contribute to this progress by clarifying their location in this puzzle and thus enabling a ‘plug-and-play’ approach to the combination of related theories' (p. 1). Therefore, as discussed previously, the two perspectives can provide us with tools to understand the development of teachers’ identities as reflective practitioners and the process of construction of new meanings for improving the classroom practice.

10.8 Chapter Summary

To summarise, I suggest this research offers insight into how professional development might be productive in implementing a ‘reform-orientated’ curriculum in the Saudi context. It demonstrates how professional development can take place following a CoP model that helped to develop the three teachers’ identities into reflective practitioners around improving the quality of classroom dialogue. I argue that the landscape of practice in which this CoP was situated was crucial in shaping the emergence of the community and the developing identities of the teachers. However, there is still much work to be done in mind of exploring the real impact of teacher development work, both for these teachers and in other schools, institutions, and classrooms across Saudi.
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Witterholt, M; Goedhart, M; Suhre, C; and Streun, A ( 2012). The Interconnected Model of Professional Growth as a means to assess the development of a mathematics teacher. *Teaching and Teacher Education, 28* (5), pp 661- 674


Appendixes

Appendix A: The tutor and video stimulated recall pilot study’s report

The pilot involved assessing the use of video stimulated recall as part of a teacher development process with one tutor from an undergraduate course. The purpose was to use the video recall method to encourage reflection focusing specifically on the nature of dialogue between the tutor and undergraduate students. The video observation was a one-hour lecture. Upon viewing the video, I selected key episodes relating to the tutor’s interaction with students which included dialogue and question – response sequences. This follows the proposed plan for the main study where video episodes will be identified for discussion in Professional Development Workshops. As this pilot could not include more than one tutor and was conducted within a very different context to that of the main study, it was decided that a semi-structured interview with the tutor would be more appropriate as opposed to a shared PDW involving 3 teachers which will be the case in the main study. As such, the subsequent interview with the tutor involved asking key questions about tutor’s beliefs regarding dialogic teaching and the nature of questions.

The schedule of the interview is shown in the following table:

<table>
<thead>
<tr>
<th>The interview questions:</th>
<th>The selected video</th>
<th>The purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1</td>
<td>Q1: What type of question do you usually ask your students? (e.g. open vs closed) <strong>(Presenting video)</strong> Q2: When you ask your students a question, what do you expect of them?</td>
<td>Video no1</td>
</tr>
<tr>
<td>Part 2</td>
<td>Q3: Do you like to engage in dialogue with your students? Q4: What do you think about the purpose of this dialogue? <strong>(Presenting video)</strong> Q5: How do you see the role of your students during the dialogue?</td>
<td>Video no3</td>
</tr>
</tbody>
</table>

The pilot has indicated that there are challenges and affordances created by the video stimulated recall method when investigating teachers’ reflective practice. For example, the importance of familiarising the participants with the video camera and the experience of being videoed. I noticed that the tutor was a little nervous and frequently, attended to
the camera. This is will be similar with the primary teachers I am working with and I am considering extending the length of phase 1 in order to increase their familiarity with the video before the Professional Development Programme begins. Additionally, I have also learnt the following key lessons from doing this pilot study:

- Although the context of the pilot study (undergraduate classroom) and the main study (primary classroom) are different, the influence of being videoed and the intrusion of the researcher as an unfamiliar person in the classroom was noticeable. Therefore, more attention should be paid to how to make this influence less invisible by being a co-teacher or teaching assistant in the classroom. Specifically in phase 1 – this will also be useful for modelling the reflective process for your teachers – showing videos with you in and noticing things about your own practice.

- This pilot study helped me to see the challenge presenting the selected video episodes to the teachers in such a way that makes them notice possible contradictions between their espoused beliefs and enacted practice but without judging and critiquing them directly.

- The pilot study is hoped by increasing my familiarity to develop a close relationship and modelling my own reflective practice

**Pilot study analysis:**
Analysis of the tutor’s interview responses to the video episodes highlights the significance of espoused beliefs in relation to dialogic teaching and whether this is or is not implemented in practice. For instance, in relation to questioning techniques, the tutor argued that the quality of dialogue is important. Regarding closed questions, the interviewee argued that students need to give more rather than yes or no response:

“even if I ask close question I still expect some qualifications not just say yes or no say yes because or no because”

This suggests that he felt students need to use their participation to justify responses and explain their thinking. There were also other comments regarding the tutor’s espoused beliefs which suggested he recognised the importance of dialogue and student participation. For instance:

“to help them be confident..voice their views and give mind” and “developing your own mind and your idea”
However, he also stated that he believed the content of the discipline or subject was significant in shaping the quality of dialogue with students. For instance, the interviewee believed that:

“I think dialogue in teaching is more relevant in certain disciplines in other …. I also think the discipline itself also lead more to dialogue styles”

“That is the nature of media the nature of social science ….this is not hard science … usually you know 2 and 2 is always 4 …..here you know I like channel 4 because I like channel 5 because”

Additionally, the tutor commented on the social context of the learning environment and specifically, students’ relationships as essential for encouraging students to engage in the dialogue with teachers or between each other. For example, regarding the role of students in the dialogue, the interviewee argued that the relationship between students enabled them to talk more and build on each other opinions in order to have great discussion.

“Another fact that is small group they know each other more for almost two years at least in classroom situation”

However, the analysis of the lecture observation showed there to be contradictions between tutor’s espoused beliefs as described above and the enacted practice in the classroom. For example, the tutor believed that students are expected to explain and justify their answer but the video recording showed that on some occasions, follow on questions such as why do think? and how? could help to improve the quality of classroom dialogue such as:

T: what do you think they do with pictures?
S1: I think tabloid like pictures are important whereas in broadsheet is bit...text is important... pictures are little.
S2: I say in tabloid that the death more...like incriminated pictures whereas in broadsheet they trying get one picture that tells lot parts of story.
T: ok

Although this analysis is limited – it has allowed me to assess the feasibility of looking at espoused beliefs and enacted practice and contradictions between them. The challenge is how to feed such findings back in the TDP and eventually, how to encourage teachers to notice such contradictions in their own practice.
Appendix B: The transcript of Saudi teachers’ pilot interviews

The interview 1:

Q1: what is your view about new mathematics curriculum?
N1: Excellent and curriculum in itself, but the implementation is failed.

Why do you think that the implementation is failed?
Because there is no preparation ways for teachers to teach it and there is no supportive tools that help teachers. The problem is not the main curriculum but the problem is how to teach curriculum through methods and strategies.

Q2: what is the main difference between the new curriculum and the previous one?
The new curriculum has Diversity of knowledge and information … the old one just gave knowledge and you apply it without the skills of discovery and correction of errors, and the student himself solve the examples and compares the solution with the rest of the examples, and also there is a problem that the higher skills of Bloom's Taxonomy that were not present in previous curriculum such as analysis and evaluation. In previous one the student takes the law and apply the solution without understanding the law. Now, the new curriculum gives different areas of mathematics that you benefit of them in your life. There are a lot of differences but what I said are the main.

Q3: there is a teaching part in the new curriculum about the higher thinking skills.

What do you think about it?
It is excellent ..excellent because some students have a high abilities so you can make it a type of challenges for a student with himself but something more important to understand how the teacher is able to know this exercise suitable for whom .

Do think these kinds of exercises are suitable for all students?
No..no..sure no. only a small percentage of students in the classroom average only might 3 students from 30 students

Do you find time to teach these exercises?
A definite no, because the exercises that before this part cannot be taught fully because the time of the plan of teaching this curriculum is not compatible with the time in the teaching in Saudi Arabia,. This new curriculum has time for 150 lessons and we have 120 lessons and thus there are 30 lessons as waste which makes teachers make two lessons together and concentrate on some exercises to give a more time to the next lesson.

Q4: There is a book as a guidebook for the teacher, what do think about it?
Yes, it helps the teacher in teaching but the teacher know that there is a problem , so no matter how the number of books to help the teacher, these books do not address the problem… the problem is the time… there is no time.

- Is the teacher's guide book useful?
Yes, the book is positive...because it explains how to teach and I think that this guide should be the main one that teachers use in the classroom instead of the current compulsory preparatory notebook.

- Are there any parts in this guide useful?
Yes, it illustrates the strategies that teachers can use to teach and the tools might be used , sometimes show one or two strategies and ways and teacher can get the idea of that and become able to create by himself other ways.

- There is a part related to the common mistakes? Is it useful?
Yes, it helps the teacher to know the common mistakes that students are expected to do.

Q5: Is there a difference in the role of the teacher and the student with the new curriculum?
The role of the teacher, if there is all supportive things such as the smart board, the classrooms are prepared well and the number of students is suitable, the role of the teacher will be as facilitator of learning process. But now you are lying to yourself if you said that you apply the new curriculum, we now apply the new one by the old teaching way.

- What about the role of student?
The role of the student and the teacher has not changed only the curriculum has changed

- Does this changed curriculum request from the student a different role?
Yes, yes …requesting a different role from the student...it requests student to discover and deduct the concepts …the presenting through discovering and deduction now become existing , but this in the case of application of the new curriculum.

Q6: What are the main challenges facing the teacher in the application of this new curriculum?
Classrooms, we need smart board to teach because you benefit of it a lot, and less number of students in the classroom…for example between 15 to 20 …, and the number of lessons is necessary to be correspond with the new curriculum and It is not good that you translate curriculum and apply it without the right time for it. Also, there are not manipulatives and tools to use, even the dienes blocks are not available.

Q7: the teacher, what does he need?
The teacher needs training, there is no training… training must be by people who have at least doctorate degree Because those who train us , they are educational supervisors who were teachers of mathematics and have only experience … at least when you apply a U.S. curriculum, you suppose either send the trainers to get training in America or bring American trainers here to train in Saudi Arabia to show us how to teach , and the problem is that the current training’s sessions are short and mostly educational and the general training and not specifically in mathematics.

The interview 2:

Q1: what is your view about new mathematics curriculum?
It is good but it needs a lot of time and you need very many lessons, not the same current situation.

Q2: what is the main difference between the new curriculum and the previous one?
the main difference is it gives the student a greater opportunity to participate and more exercises, and the student need to be depend on himself to use his mind to think more , and the information is not ready

Q3: there is a teaching part in the new curriculum about the higher thinking skills. What do you think about it?
It is little difficult and require more effort from both the student and teacher….effort from both of them.

Q4: There is a book as a guidebook for the teacher, what do think about it?
I have not seen it, there are the students’ book and the activities’ book. No one told me about it and to use it.

Q5: Is there a difference in the role of the teacher and the student with the new curriculum?
I have to focus on the teaching of the whole class because I cannot find the time and if the teacher gives time for each student; the all time of lesson will finish …due to this you try to work with whole class.

-What about the role of student, does this changed curriculum request from the student a different role?
Yes, sure, now the student is a participator and more interactive, if he does not interact with the teacher, he will not understand. The almost of the old curriculum was just filler
where the teacher says some questions and examples and the student only writes that, but new one is not, it requires the student to participate more.

*what do you think that make students to not participate more?*

Time does not enough, the time is too narrow, a very large number of students in the classroom, the new curriculum need a learning environment which is not as the Saudi learning environment, and it needs less number of students in the class.

**Q6: What are the main challenges facing the teacher in the application of this new curriculum?**

The difficulties, I think that one teacher is not enough because the curriculum is rich, deep and strong; it needs the student studies more than not just be taught a bit at home but must be taught more and does more effort.

**More?**

The school environment is not suitable, the lack of technology such smart board, developed curriculum needs more technology, there is developed curriculum without the development of educational technologies, look … the home environment has become attractive whereas the school environment is unattractive, the home containing the iPAd and Galaxy tap and students will find everything, learning games and in the classroom environment where the teacher teach and the student is silent...this is a problem.

**Does the new curriculum encourage teachers to teach and the student is silent?**

no, it requires the student to participate, but the reality, there is a shortage in the school environment, for example the classrooms and technology in the classroom.

**Q7: the teacher, do you think that teacher needs training?**

sure, I say there is a great effort on the teacher, teachers who works well, they will have many tasks and effort.
**Appendix C: Teachers’ initial interview questions**

<table>
<thead>
<tr>
<th>The initial interview questions:</th>
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</thead>
<tbody>
<tr>
<td>- Could you please, tell me about your teaching experience?</td>
</tr>
<tr>
<td>- What do you think about the subject of mathematics? What is mathematics?</td>
</tr>
<tr>
<td>- What do you think about teaching mathematics? What does the teaching mean to you?</td>
</tr>
<tr>
<td>- What are the difficulties of teaching math?</td>
</tr>
<tr>
<td>- Could you please, tell me about the new math curriculum? What is the different between the old and the new?</td>
</tr>
<tr>
<td>- What do you think of the difficulties and challenges to teach the new math curriculum?</td>
</tr>
<tr>
<td>- Are there any parts of the curriculum that don’t make sense?</td>
</tr>
<tr>
<td>- What training do you think teachers need to put the new curriculum into practice?</td>
</tr>
<tr>
<td>- What do you think about the new classroom tasks such as talk’s questions?</td>
</tr>
<tr>
<td>- What is the role of student with old curricula and the new one?</td>
</tr>
<tr>
<td>- What is the role of math teacher with new math curricula? In your opinion, how does the context you teach influence your teaching style?</td>
</tr>
<tr>
<td>- What type of question you usually ask your students? When you ask your students a question, what do you expect of them?</td>
</tr>
<tr>
<td>- What do you think about group work? Pupil discussion?</td>
</tr>
</tbody>
</table>
Appendix D: The first, second and eighth workshops’ transcripts:

<table>
<thead>
<tr>
<th>Workshop’s introduction</th>
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</thead>
<tbody>
<tr>
<td>Before the commencement of the workshop, when teachers were sitting around the table, they were talking to each other and laughing until I turned on the recorder. Then, Ahmad asked me: Did the recording start?</td>
</tr>
</tbody>
</table>

**Researcher:** Yes  
**Ahmad:** Does it mean that I can not start singing and chanting?  
**Researcher:** Feel free  
**Ahmad:** God gives you health.  

**Teachers’ perceptions of phase one:**  
Then I asked them to talk about the first phase, specifically, about how they found it and how they feel with being videoing:  

<table>
<thead>
<tr>
<th>Zayed</th>
<th>Start with Ahmad.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sultan</td>
<td>Honestly, the first two videoed lessons, I felt that the atmosphere was hot as I sweated (smiling) sweated but during the third one, I feel it is ok, as if nothing happened.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>What about you Ahmad?</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>I find enjoyment, enjoyment …innovation…there is something new</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>You feel there is innovation, you feel something is not familiar but we look forward to something that will be good and nice change, it is something not natural for us, really, I am not the same when being videotaped….i feel am different than my natural reality.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>I want to say something, we have much monitoring, and this is a new kind of monitoring (teachers laughing), as being said, in the Middle –East, we have got monitoring and using the camera increases the monitoring. In the beginning, we can say the camera is observer, but we understand from you that it used for development.</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>It has influenced students.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>It positively influenced students, as all of them want to see themselves answering.</td>
</tr>
</tbody>
</table>

**Theme one**  
Using video about Japanese lesson study:  
Then, I talked about different approach to teachers’ professional development, such as Japanese lesson study, and I showed video about that Lesson Study on Multiplication Algorithm in APEC Human Resources Development Working Group website:  

http://hrd.apec.org/index.php/Lesson_Study_Video_for_Multiplication_Algorithm:_Amano_%E2%80%98Not_Finished%E2%80%99_%283_of_7%29

The video aimed to show example of professional development of teachers who play the key role in the continuous professional development.  

**Researcher** The lesson study is based on a chosen lesson. Then,
teachers prepare it together with a lesson plan and one of them teaches it. The others observe and take notes in order to improve the teaching.

**Zayed**
Is it the same lesson for each teacher?

**Researcher**
Yes, it is the same.

**Sultan**
It is a great idea.

**Zayed**
What kind of lesson is it?

**Researcher**
Any lesson. Every period might have a different lesson.

**researcher**
I feel that they have classroom as the same own classrooms in terms of facilities.

**Sultan**
There is no big difference.

**Ahmad**
They are quiet. We see the similarity in the classrooms; there is no difference.

**Zayed**
See how the students surrounded the teacher during the discussion.

This model is in Japan but now it has been used everywhere.

**Ahmad**
This is great please brought it to us.

**Researcher**
Look at the numbers of students.

**Sultan**
What do you think about the video?

**Zayed**
From my point of view, this idea—whereby there are many classrooms for each grade to enable the teacher to teach a lesson and then observe the same lesson with different teacher in different classrooms—is good for the school. Therefore, the same lesson is the main focus to be videoed and discussed. For example, if the lesson were taught by Zayed today it would be taught by Ahmad tomorrow. Then I would teach it on video and we would have a discussion about the lesson. This rotation between the teachers creates a cumulative experience through the years as we rotate. We have in our school just two classrooms for each grade, which means we can’t have a rotation through all the teachers. So, I might suggest that the ministry makes stage one (first, second, and third grades) into a separate school so as to have many classrooms.

**Sultan**
The idea of separating grades is another issue. I think that the real situation in the school is that everything is isolated, such as the grades, whether the early grades or high grades, even the teachers.

**Zayed**
I mean that we have many classrooms.

**Sultan**
I got your idea. You mean that it is necessary that each grade is taught not by one teacher but by more than one so that they gain more experience.

**Researcher**
If Ahmad teaches a class of 1st grade, a class of 2nd grade, and a class of 3rd grade and if Zayed and I do the same, the rotation process will be easy between us and we will be able to adapt the school timetable for the rotation. In the long run, why not the school become a research-based school?

This is the idea of the lesson study—that the school should
become research-based.

<table>
<thead>
<tr>
<th>Theme two</th>
</tr>
</thead>
</table>

2 using worksheets:  
The stimulated video:  
The video showed Ahmad writing on the board and taking long time about writing exercises while students sat individually without doing anything. Additionally, the video included another teacher (Sultan) with his students also working alone and some of them finishing the exercises and not doing anything. Then, the video showed Sultan asked his students to get blanked paper to do exercises.

The discussion:

The following is the example of teachers’ discussion about using worksheets:

<table>
<thead>
<tr>
<th>Researcher</th>
<th>What to you notice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>The time.</td>
</tr>
<tr>
<td>Sultan</td>
<td>The time spent on writing ….oh Ahmad years you write.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Do you notice how your students use their time ….what do you think about the worksheets?</td>
</tr>
<tr>
<td>Sultan</td>
<td>This is one of the disadvantages. If I had special drawers, it would be possible to prepare the worksheets in advance and distribute them to students before starting a lesson and saving time.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>This is one of disadvantages of the textbook</td>
</tr>
<tr>
<td>Sultan</td>
<td>One of disadvantages of the textbook</td>
</tr>
<tr>
<td>Ahmad</td>
<td>It is supposed the textbook has a blank space for exercises where students solve the exercises in it</td>
</tr>
<tr>
<td>Sultan</td>
<td>If I had my computer and I sat in my office, I would prepare lessons for the next day, prepare the tasks, and put them in special drawers. I would then distribute them to students so I say that the teacher is not able to walk inside the school with caravan, if the classroom was equipped, the teacher would start teaching and everything would be ready</td>
</tr>
<tr>
<td>Researcher</td>
<td>When the worksheets are prepared and printed, do they make teaching better?</td>
</tr>
<tr>
<td>Zayed</td>
<td>It is better, yes much better</td>
</tr>
<tr>
<td>Ahmad</td>
<td>If the worksheets printed, sure better…but writing on board is must be.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Ahmad do you think that worksheets would save time for you?</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Writing is a must, but I possibly gain from the time when students solve exercises, I can write on the board and then looking for their solutions and answering.</td>
</tr>
<tr>
<td>Sultan</td>
<td>Let me tell you, there are students who might prepare the lessons in home so if you use the worksheets, this will be new for them. I think that the task or exercise that each teacher creates is the most credible to assess who really understands the lesson. I hope that the teacher is able to have one exercise that he can discuss deeply the exercise as he want but the problem is the crisis of</td>
</tr>
</tbody>
</table>
trustworthiness…there is no trust in the teacher. Teacher is required to follow the assigned lesson plan in the same way as the same as a train which must be in the same way. For example, possibly Ahmad can make an exercise, which would include more lessons’ aims to save time during the lesson and have more time to correct students’ work. I can make just three exercises that would include the lesson's aims and achieve them. Here the difference between making just three exercises and between the current situation when I am required by 13 exercises in one lesson and correct them as well. Thirteen exercises multiplied by 10 students equal 130 ....multiply by 20 students equal 260 exercises, this is a massive count. The students might take advantage of the textbook at home but I want to have my own book of exercises. This book has one example for each lesson and another one exercise for students to practice, then my responsibility is to select the third exercise, which suitable for my students. If my students are at a high cognitive level, I will select what is suitable for them and teach them at a higher cognitive level, whereas if the level of my students is low, I will select what suit them.

Ahmad This way of selecting exercises is succeeded but is each teacher able for this?

Zayed Yes, this is the main point.

Sultan This is the crisis of trustworthiness.

Zayed It is not the crisis of trustworthiness. You do not guarantee the amount of the knowledge here in each lesson. The textbook restricts me in terms of the exercises and requires me to try to deliver them to the student or make him/her understand them.

Zayed Your talk is interesting, it is, indeed, the teacher must be given more space to focus on what is the most important in the lesson or my aim in the lesson

Sultan yes, your aim in the lesson but we must cover the exercises …I want to say to you honestly that mathematics is not an issue of memorization but it is how to be understood not form once or twice. It is through practicing one, two, three, and four tasks. Notice that the student thinks on the first task and when he starts the second one, he will remember what he did on the first task. Therefore, on the third, fourth, and fifth tasks, student's hand will directly solve tasks even that are repeated. You can notice how the student’s solving time will be different during the first task and the seventh one.

Sultan I gave my students a problem and took more time with students to solve this problem. We discussed it and laughed with each other about it. this problem was that there were a group of 16 students who want to go to zoo. The ticket’s price was 5 Riyals per each student and 20 Riyals for a group of six. How the group spend less money? Therefore, students became to think about the solution as I told them about different ideas. Then, one student provided a good answer.

Zayed Possibly, what help this student solve this problem an idea was that his peer mentioned,
<table>
<thead>
<tr>
<th>Ahmad</th>
<th>Yes, yes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>which the student took and thought about to reach the good answer.</td>
</tr>
<tr>
<td>Sultan</td>
<td>For problems solving skill, for me one problem is enough, as this leads students to high level of thinking. I do not want students to write to me the steps involved in solving the problem, but I want this (he pointed to his mind) to be improved.</td>
</tr>
<tr>
<td>Zayed</td>
<td>yes, discussion…discussion</td>
</tr>
</tbody>
</table>

### Third theme

#### 3 sharing the lesson’s aim

Then, I asked them about their thoughts of sharing the lesson’s aim with students on the board next to the topic. They discussed this idea, as outlined below:

<table>
<thead>
<tr>
<th>Ahmad</th>
<th>Writing the lesson’s aims in sentences will take time and will not be useful, but if we wrote them as tips under the lesson’s topic …this would be initially attracting for students and since the student sees the mathematical concept, he will start putting question-marks in his mind about.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>The question is, why don’t we make the students by themselves understand the lesson’s concepts? I mean, why do I write it for them? Basically, writing the title of lesson will attract students. For example, today I wrote the title of lesson “ratio and rate” and said that these are lesson’s concepts; the students will ask me what ratio means …..In other words, in the beginning of lesson through introduction, discussion and questions, I try to make the students by themselves deduct these concepts.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>It depends … on some lessons or some concepts but some concepts are impossible for students to deduct without your dialogue and discussion with him.</td>
</tr>
<tr>
<td>Sultan</td>
<td>When you write the lesson’s concepts on the board for students and teach the first concept or idea and the second one, then reaching the third concept, students know that they get what you want but when you try to make them deduct without knowing the concepts you want them to learn, they progress to something is unknown</td>
</tr>
<tr>
<td>Ahmad</td>
<td>It is interesting to learn about the lesson’s topic through deduction. However, as long as this deduction not being cause to waste time</td>
</tr>
<tr>
<td>Researcher</td>
<td>When we write the statement ‘we want to learn’ in order to share with students, is this has influence?</td>
</tr>
<tr>
<td>Zayed</td>
<td>Sure</td>
</tr>
<tr>
<td>Sultan</td>
<td>It is not a thing without influence</td>
</tr>
<tr>
<td>Zayed</td>
<td>The title itself has influence, especially if it is a new concept, such as ratios …and if you write this statement, this will have much influence. You can say that no one of us did it before.. this sure will attract the student’s attention.</td>
</tr>
</tbody>
</table>

#### Fourth theme

#### 4 Classroom arrangement and students’ collaboration

The last theme of the first workshop was about how to encourage students to learn
together and talk to each other. For this theme, I presented some photos and video of their students as seating individually.

**The stimulated tool:**
Different photos about classroom arrangement and how students set individually.

![Image](image1.png)

**The discussion:**
Then I asked, what do you notice? About the different photos, they said:

- **Zayed**  Alone, each student on his own.
- **Ahmad**  There is real quietness and self-dependence.
- **Sultan**  The thing is that you are on your own in the class. you must work or you don't work (laughing). Well, I see it like typical class that we are looking forward to.
- **Zayed**  There is no interaction. You feel that the students are looking for help this is what I see. My observation is that only one or two students were working on their own.

**Another stimulated tool (Photo):**
Here, I presented them photo and asked them about the story behind this photo? (Photo of a student A of Ahmad's students while doing the tasks in the class, and he was looking to a student B besides him.).

**The discussion:**

- **Zayed**  He was looking for help.
- **Ahmad**  Yes, he was crying for help (laughing).
- **Zayed**  He was looking for his colleagues’ answer and looking for one for himself.
- **Sultan**  He was looking for something free.

**Another stimulated tool (Video):**
Then I said, let us see his story. Here, the video of this student (A) shows that he is looking at the teacher (Ahmad) correcting another student (B)’s work and saying to him, "well done you are the top of the class." Then the teacher left so the student A looked at student B who closed his book in order not to allow Student A to see the correct answers.

**Sultan**
You are in the middle east, you know the traditions society’s culture

**Zayed**
He is looking for help

**Researcher**
So you saw the pictures and you know the story of the student.

**Sultan**
He [student B] closed his book. Let's get real, he worked really hard and he didn't want to give anything to anyone. Ownership rights ….Intellectual rights... This is private ownership of the student (B).

**Researcher**
Did you notice his behaviour?

**Sultan**
Mmm, …. See, the thing is, I am as a teacher I cannot talk on behalf of Ahmad, this is not to praise him or for something because I see him as top of the top. But I think it is an accumulation from several lessons let's say that in the first, second and third lessons by other teachers , then Ahmad comes and gives the students the fourth lesson. Here we see an accumulation……here is a culture that Ahmad cannot resist. For example, I have tried to distribute the grade three into groups last semester but then the main classroom’s teacher comes refuse this arrangement..

**Zayed**
Classroom teacher (is the teacher who teaches all the subjects except mathematics and this is the system for stage one in the primary school each class has teacher).

**Student collaboration:**
Then I asked the case teachers about the importance of student collaboration in the classroom.

**Ahmad**
Well, there are advantages and disadvantages. Some disadvantages are that the students don’t make effort to concentrate or to work because they already know that other students in their group will help them answer the questions.

**Researcher**
Let's talk about the advantages and then we talk about disadvantages.

**Ahmad**
In terms of advantages, there are individual differences between students. So, some students comprehend more quickly than other students, some students understand from the first example, some understand from the second example, and others understand the idea from the third example..... the students’ collaboration is better for those who understand after the second or third example when students who understand from the first example are with them. The time would be economized, and the students would understand better from their peers who could explain topic to a smaller group.

**Sultan**
For me, seating in groups on just individually solving exercises, I don't think that groups are advantageous. I think groups are
advantageous for discussion when you put them together to solve a problem together. I would ask them to solve a problem on one worksheet in the same table so they could discuss how to solve it. This way, everyone would have to participate to solve the required problem, then I would choose one student, not necessary the best student, to summarize the solution.

Zayed  
From my experience, this way is effective in lower grades, in grades one, two, and third, because here the individual differences emerge. You can notice a student who has high cognitive skill and a student who still needs more help from a student like him not from the teacher.

Researcher  
What about the teacher's role?

Zayed  
Here the teacher is a guide and supervisor. I mean he would guide students what to do and not to do. The teacher would tell the student that they have a problem here or there but not tell them answers, just guide them. Regarding higher grades (grade four, five, and six), I agree with Sultan that working in groups just for doing exercises is not advantageous.

Researcher  
Hence, according to the classroom observations, all of you feel comfortable about making the students cooperate in the class.

Zayed  
Certainly.

5  
Example of students’ collaboration:

The stimulated tool:
Let us see the video that shows the cooperation between two students in Zayed’s classes; the cooperation was spontaneous, without teacher telling them to cooperate (this video will be used to motivate teachers to see that they can allow students to cooperate and discuss with each other).

The discussion:

Researcher  
Notice how the student in Zayed's classroom was discussing with his peer sitting behind him.

Zayed  
Yes, I saw him; did you see the student who was looking behind him? This student always asked and discussed with the student behind him.

Researcher  
What I have noticed in your all classrooms is that everyone has the ability to participate and work.

Sultan  
Look, our system is democracy, we do not have repressiveness anyone wants to learn see we defend ourselves (laughing), this is joyful chat but I want to say, there is flexibility, why? Because the subject is hard in itself, then it is not good to make the atmosphere more difficult why? Let the atmosphere be somewhat comfortable.

The end of workshop

6  
(recommendations and suggestions)
The workshop ended by asking case teachers to write their suggestions and recommendations on the provided form. The suggestions and recommendations were
based on the important themes of this workshop.

**Researcher** What are the most important recommendations and suggestions?

**Sultan** I think that the most important thing for us is to organise the collaboration work.

**Researcher** Example of recommendations is writing the phrase "we want to learn..." on board.

**Ahmad** This is the lesson aim.

**Sultan** Changing students' behaviour during discussion, asking them to solve problems, and teaching them that working together means discussing and solving problems rather than carelessness.

**Zayed** Promoting students' collaboration in solving problems.

**Researcher** It is a good idea to ask students to seat next each other.

**Zayed** It means students seat in pairs.

**Ahmad** Using the strategy of learning in pairs.

**Researcher** While learning in pairs, if give students a task, we need to ask them to work together and give them more time.

**Sultan** We can use the worksheets to support learning in pairs.

**Ahmad** When working in pairs, from my point of view, it is wrong if I say that the first five students who finish will be the excellent. This will lead to competition between them. I consider the student who finishes the last as the first one and consider him as excellent, as the most important thing is to collaborate with your peer.

**Researcher** There is another point, which Sultan just mentioned, which is that your aim in the classroom is to change students' behaviour during the discussion.

**Sultan** We learn ...we collaborate (he means using these words to encourage students during discussion).

---

**The second workshop’s transcript**

1: *Teachers' Perceptions About the First Workshop:*

**Researcher** Let’s recall the general points of the first workshop: sharing learning goals. These are photos for writing learning aim on the blackboard by teacher Ahmad and teacher Sultan. We’ll watch an episode and then share comments.

**Episode A:**

<table>
<thead>
<tr>
<th>Episode info:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Sultan</td>
</tr>
<tr>
<td>Part 1 ( lesson 2 - phase one)</td>
<td>Part 2 ( lesson 1 - phase two)</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show teachers the difference between their classroom practice when sharing lesson’s aim with classroom talk

**Episode Description:**

In this episode, Sultan displays two different methods of presenting mathematical concepts. The lesson were based on the “We want to learn” strategy.

**Episode A Part 1:**
Sultan faces the class and gives the following instructions:

**Sultan**: Today we have elements we must to take them which are the dividend, the divisor and the quotient. (He points to the concepts on the blackboard).

**Episode A Part 2:**
The second part of the episode focuses on the “We want to learn” method, which is based on techniques learned in the first workshop that recommend sharing the goal of the lesson with the students. Sultan writes the learning goal on the blackboard and talks with the students.

**Sultan**: Our lesson today is about division by 6 and… (He stops talking and points at the title of the lesson).

**Students**: Seven

**Sultan**: Yes, seven. Today we want to learn how to divide by 6 and 7 (He points at the phrase “We want to learn”).

**Sultan**: What is our aim today?

**Some students**: Division by 6 and 7.

**Sultan**: What we want to learn?

**Students**: We want to learn division by 6 and 7.

**Sultan**: Mohanad, what do we want to learn today?

**Mohanad**: Division by 6 and 7.

**Teachers’ reflections:**

**Researcher**: Have you noticed the difference between the two lessons?

**Sultan**: The second lesson was better.

**Researcher**: In the first lesson, you presented the concepts very quickly. In the second lesson, you gave more time. What have you noticed?

**Ahmad**: In the second part, the students had more time to concentrate on the lesson.

**Zayed**: The students knew the goal.

**Researcher**: How do you see the change?

**Sultan**: It is great

**Collaborative learning (students work on pairs)**
The teachers watch two episodes, one of Ahmad and one of Sultan. Each episode includes two parts, the first part is in phase one of study, whereas the second one is phase two.

**Episode B:**

<table>
<thead>
<tr>
<th>The purpose of episode B and C:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The purpose is to show teachers the difference between their classroom practice when students learn as pairs to support classroom talk and create supportive learning environment.</td>
</tr>
</tbody>
</table>

**Episode B info:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>Part 1 (lesson 3 - phase one)</td>
</tr>
<tr>
<td></td>
<td>Part 2 (lesson 1 - phase two)</td>
</tr>
</tbody>
</table>

**Episode Description:**

In the first episode, Ahmad’s lesson is displayed in two parts. The first part shows students solving math problems individually while the teacher moves between them and corrects each student. In the second part, the students are shown as pairs sharing with each other to solve problems. Ahmad moves between them and urges them to cooperate in solving the exercises.
Episode C:

Episode C info:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
<th>Part 1 (lesson 3 - phase one)</th>
<th>Part 2 (lesson 1 - phase two)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sultan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Episode Description:

This episode features Sultan and shows the students seated separately. During this lesson, he asks the students to put a hand on the table when they have completed the problem. In the second part, the students are shown cooperating in solving exercises as the teacher moves between pairs.

Teachers’ reflections:

Sultan  Collaborative learning changed the classroom and encouraged students’ cooperation. This is based on simple observations (he means the researcher’s observations about their classroom practice).

Ahmad   Yes, yes

Zayed   There is a difference.

Sultan  Yes, there is a difference. In the first videos, students were isolated.

Ahmad   I felt that the students were like a beehive at work.

Sultan  There is an atmosphere of learning. That’s what I was told by the educational supervisor. He said, if the needle falls, we need to hear the voice of the fall of the needle. I put the students into groups and I discussed that with the educational supervisor, but he said grouping is not a proper method.

Researcher We have noticed from the episodes that there is a change in the learning environment. What do you think, Zayed?

Zayed   I saw a big difference in the way of solving problems, in the way of thinking, in the classroom situation, and also in the teaching method. This makes teaching easier, because instead of moving between the students individually, you can move between groups.

Ahmad   Grouping also solves the problem of having a large number of students in a class.

Sultan  Today in my class, the exercise was about the method of calculating the perimeter of a pool. As the students found the answer, I ask the students themselves to be sure the answer was correct.

Researcher Were the students solving together?

Sultan  Yes! For example, one of the students, Tamim, and his friend ran to me and said that they had solved the problem, and showed me that they had solved it themselves using their hands.

Zayed   Teamwork is a great.

Ahmad   But it consumes time and effort

2: The Second Workshop’s Discussed Themes:
Let's move on to the theme of the workshop today. We'll focus on five ways to encourage the students to talk more in the classroom. 1) The skill of talking in the classroom, 2) Talk Task, 3) Rules of talking, 4) Obstacles to the skill of talking, 5) Opportunities to promote the skill of talking.

2:1 Theme One: The skill of talking in the classroom

We’ll start with the first theme, “the skill of talking in the classroom.” Let's watch the episode.

Episode D:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Sultan</th>
<th>Lesson</th>
</tr>
</thead>
</table>

The purpose of episode:
To show case teachers that they need to encourage students to talk in classroom

Episode Description:
The episode shows Sultan’s students while they are individually solving a math problem. Sultan is saying to his students: *Try! There is no problem if you make mistakes. Try again and again. People do not learn unless they make mistakes.*

Teachers’ reflections:

**Researcher** What do you notice on this episode?

**Ahmad** Urging the students to develop self-reliance and self-confidence. The majority of people, not only students, fear the wrong answer.

**Sultan** They fear failure.

**Ahmad** They keep silent and neutral, but with the encouragement of the teacher they can learn that even if an answer is wrong, this is not a fault but an incentive to learn and progress more towards what is correct.

**Zayed** Learning from mistakes leads to being more correct.

**Ahmad** Yes, attempting is the first step.

**Researcher** Sultan, what do you think about your talk in this episode?

**Sultan** I feel that I want the students to at least try. For example, you may get lost when you go to an unfamiliar place for the first time, but the next time you will know your way around.

**Ahmad** Or you might take a more difficult path the first time, but the second time will be easier. And so students learn from their mistakes.

**Researcher** It is such a wonderful guidance, but have you noticed that the guidance of trying and making mistakes was in what?

**Zayed** In the writing in textbook

**Researcher** What I've noticed is in Phase One. What did you guide students to do? To solve, and to not be afraid of mistakes. Your instructions are valuable, but until now the students have been focused on written tasks.

**Zayed** Mmm

**Researcher** You ask students not to fear making mistakes during written tasks. How can you use this same advice to encourage them to talk?

**Ahmad** This means using advice for talk.

**Researcher** What is meant by talking?
It means to tell me what is in your head
Dialogue and discussion.
Yes.
Aha! Encourage discussion. For example, if we multiplied 6 by 7, the student would explain the problem verbally.
You see the student's answer and steps to the solution when it is written, but you can use the problem solving method to encourage students to talk more.

2:2 Theme Two: Talk Task
What phrases can we write to encourage students to talk in the classroom? I think the phrases that Sultan will use may differ from those Ahmad will use. We need to encourage students to talk, so what will you say to them?
Explain to me.
Good. But we also need phrases that encourage students to participate in classroom talk prior to phrases that are used for explanation and clarification.
Let me understand. I am not understanding.
Teach me. I want to learn from you. How do you understand?
We might ask a student to explain to his friend.
Yes. For example, if we say to a student that we need to listen to your voice, will that encourage him to talk?
We usually say, “let us hear your nice voice.”
I want to listen to your voice.
Great
We might say to a student, “Give me the answer, and tell me even if
Tell me the answer, and don’t be afraid of making a mistake.
Talk and teach me, oh champion.
There are Talk Tasks in the new curriculum.
Talk Task exists in the new curriculum. How do you solve this task?
You can take advantage of the supportive phrases of talking that you've written shortly.
Mmm
What is the purpose of Talk Task?
By making time for the students to talk about how they can solve the problems.
Why should the student talk? What’s the point?
So the students can explain their thoughts.
To be sure that students get the knowledge
How can you benefit from this as a teacher?
By knowing whether or not the student understood the lesson.
Even if the student expresses himself differently than the teacher. It is not necessary that the student talks as the teacher.
Talking is an important skill, but as teachers, we sometimes rush. When I urge a student to talk and participate on his level, we can have a nice conversation. But when I am focused on the lesson, the weakness in a student’s language skills might cause me to not respond, and possibly offend him. There are parents teach their children the ability to have language skill.
An important part in talking with the students is letting them talk, no matter how they struggle to express themselves. As Ahmad said: "Let the student talk"

Then we can learn if the student understands the content.

Yes, the ability to express ourselves differs from person to person. There are some people who are good at expressing themselves and some that are not. Still, they need to feel understood and to express their ideas to you. What I understand from our discussion is that we want to encourage them to talk. But Does it consume time?

The teacher can decide the time he allows for talking.

This is due to the students’ conversation skills. Between you and me 70% or 80% of Saudi students in terms of talking are not like foreign students such as the Egyptian students who talk even if a student who is in a grade one.

As a math teacher, are you more interested in the student’s language skills? Or is it more important that they understand the concepts, as we said a while ago?

As they understand. The most important that they talk even by few words that make me know about their ideas.

The most important thing is that students get the knowledge.

I want to know the student follows the correct steps. If he follows the steps incorrectly, I will recognize it through the way he expresses himself, and I will try to explain the correct way to him.

Let's move to the next theme: how to ask the students to talk, listen and respect. We have two rules (Talk-Listen-Talk) and (Talk-Respect-Talk).

This is supposed by the classroom’ teacher (At Saudi primary schools for grades one, two, and three, there is a teacher who teaches all subjects except mathematics and science. He is considered the classroom’s teacher), He is responsible for teaching students about respect. He should educate them on respect because he is with his students four or five lessons per day.

Listening is important.

Listening, but The problem with mathematics is that the class is only 45 minutes per day. That is why the classroom’s teacher who educate students about how to talk and listen.

Okay, what about higher grades, 4, 5 and 6? Are they the same in terms of the classroom teacher?

No, it is not the same idea higher grades, 4, 5 and 6. They have different teachers.

But it is due to the culture of respect. Can you interrupt your father while he talking? No. Can you interrupt your older brother while he is talking? No. So, when we start the lesson do not interrupt your friend.

Etiquette means to not interrupt others.

Yes. You should not interrupt someone until he finishes what he has to say.
**Episode E:**

**Episode E info:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>lesson 4 ( phase one )</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers the importance of rules to encourage students to talk in classroom

**Episode Description:**

The episode shows Zayed talking with a student and explaining the lesson on the blackboard. Another student is talking loudly, explaining the lesson himself and not listening to Zayed.

**Teachers’ reflections:**

**Researcher** What do you have noticed?

**Zayed** This is a student who his name is Faisal. He usually want to participate.

**Ahmad** I have an observation. I noticed that Zayed stood in a position that allowed all the students to see the board.

**Sultan** Yes, it is important to stand in the right position.

**Researcher** This is good observation. You need to make sure all the students can see your face during the lesson.

**Researcher** Notice the behaviour of the student who is talking loudly. He does not give you a chance to speak and does not listen to your words.

**Zayed** Because Faisal sees himself as more advanced than his peers. His talking does helps other students to understand, though.

**Researcher** The most important thing is to help Faisal understand how to show respect while you are speaking with other students, but still allow him to comment on the discussion.

**Episode F:**

**Episode F info:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 1 ( phase two )</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers the importance of rules to encourage students to talk in classroom

**Episode Description:**

The episode shows Ahmad conducting a lesson on prime numbers. Ahmad asks the students to tell him the prime numbers, starting from number 1, as he writes them on the blackboard.

**Ahmad** What is the number that follows 17, Mashari?

**Mashari** 19

**Ahmad** Excellent (He writes 19 on the blackboard). What is the next one?

**Student A** 21

**Ahmad** Ok, what is 3 multiplied by 7?

**Student A** 21
Ahmad: Is it a prime number, then? No. Were you absent yesterday? (Ahmad looks at the rest of the students).

Student B: 19

Ahmad: We said 19, come on Ali.

Ali: 21

**Teachers’ reflections:**

**Researcher:** What have you noticed?

**Zayed:** They do not listen.

**Sultan:** They do not listen when someone else says the answer, and they do not repeat the teacher.

**Ahmad:** The student repeated the wrong answer.

**Researcher:** Good. So who do the students listen to more?

**Zayed:** To the teacher.

**Researcher:** But did he listen to his friends’ answers.

**Ahmad:** It seems that the student was not attentive, therefore he repeated the answer.

**Researcher:** You may notice that some students listen to the teacher, but they do not care if their colleagues speak.

**Sultan:** This is the culture of the Middle East. If the president speaks, we pay attention to him.

**Researcher:** In the classroom, it is important that the students also listen to the other students, and show them respect. How can we encourage students that when someone else speaks, even another student, they should listen? How can we teach the rules “Talk-Listen-Respect”?

**Sultan:** We can tell them that we all learn from each other.

**Ahmad:** We can provide constant guidance for the students.

**Sultan:** Yes, we all want to learn and we all learn together. The plan is to encourage the concept of respect throughout the year. And a student should not laugh about how other students talk.

**Zayed:** Yes, do not mock your friend while he is talking (statement for students).

**Sultan:** Do not mock a student if he makes a mistake.

**Researcher:** What is the benefit of the skills of listening to others in both learning and teaching?

**Sultan:** They help us to understand the ideas of others and how they want to solve a problem. Someone may answer in a new way.

**Researcher:** Yes! You may hear a new idea about a method that leads to the answer or a new way of solving. Or it may lead to the wrong solution, so you will not make that mistake again. These are the reasons to respect and listen in terms of the educational perspective.

**Zayed:** And we should not make fun or mockery of others when they speak, because that may cause someone to not participate again.

**Ahmad:** Yes
2:4 Theme Four: Obstacles to the skill of talking

(Here papers were distributed to the teachers to record the obstacles)

**Researcher** What are the obstacles that may hinder the teacher and students from talking in the classroom?
**Ahmad** It can be a physical obstacle, like a stuttering problem or a problem with the pronunciation of some letters.
**Zayed** Health-related reasons.
**Researcher** What about the obstacles in the classroom?
**Sultan** The fear of being laughed at.
**Researcher** Good, let we try to keep our thinking slightly wider relating the student, the teacher and the classroom.
**Sultan** The culture of the society
**Zayed** Shyness.
**Researcher** We will also add shyness to the fear of mockery.
**Sultan** Systematic oppression.
**Researcher** Write what you want. (I left the teachers to write what they want for discussion later).
**Researcher** What did you write, Sultan?
**Sultan** The politeness culture. Among teachers, the belief is that politeness is silence.
**Researcher** This is an important point, to interpret politeness as silence. Does politeness mean silence?
**Sultan** In school, no one talks and you must clasp your hands. There is a master of the classroom and we will punish those who speak. (Here I put three stars next to this statement).
**Researcher** That is a good point. What else?
**Ahmad** Low self-esteem and not understanding the lesson.
**Zayed** The fear of the wrong answer and talk because the student is afraid to give an answer he is not sure about. When students are unsure, some of them do not participate at all.
**Researcher** Why?
**Ahmad** Because the teacher could make fun of them.
**Researcher** Yes, the teacher may laugh at the students. This is another important point. Your statement is worth stars. (Ahmad laughs)
**Sultan** There are some students in the classroom, who would like to participate, but their language skills are weak, and so they become ashamed.

- **Some Episodes of case teachers’ classroom practices:**

**Researcher** Does the teacher affect students’ opportunities to talk in the classroom? Let us see the following episodes?

The next episodes are examples of Zayed, Sultan and Ahmad’s classroom practices. The episodes showed the teachers’ insistence on algorithms and getting the answer without giving opportunity for the students to talk about the answer.
### Episode G:

#### Episode G info:

| Teacher | Zayed   | Lesson | lesson 2 ( phase one ) |

#### The purpose of episode:

To show case teachers how a teacher might prevent students’ opportunities to talk in classroom

#### Episode Description:

The episode shows Zayed conducting a lesson on mixed fractions. The following interaction is between Zayed and a student. Zayed writes $\frac{1}{4} + \frac{5}{6}$ on the blackboard and asks students to solve it in their textbooks:

- **Zayed**: Solve the exercise
- **Student**: Teacher, can I write the answer?
- **Zayed**: What?
- **Student**: Can I write the answer only?
- **Zayed**: How do you write it? Do you know how to get the answer? Do you know how to make the answer? (with high voice) Before you do this (Zayed writes the steps to the solution on the blackboard).
- **Student**: No, (low voice) teacher
- **Zayed**: Do you know how to find the answer before you follow the procedure? (with loud and fast voice, He points to the exercise on the blackboard).
- **Zayed**: (looks at the student silently)
- **Zayed**: Are you able?
- **Student**: No
- **Zayed**: You must use the procedure to solve the problem.

#### Teachers’ reflections:

<table>
<thead>
<tr>
<th>Researcher</th>
<th>What did you notice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>My voice.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Passion!</td>
</tr>
<tr>
<td>Zayed</td>
<td>I'm not angry, but I'm trying to get him to use the correct method to reach the answer.</td>
</tr>
<tr>
<td>Researcher</td>
<td>One important obstacle to learning is the insistence of the teacher on one method.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Mmm</td>
</tr>
<tr>
<td>Zayed</td>
<td>Mmm</td>
</tr>
<tr>
<td>Researcher</td>
<td>You look like you only focus on the algorithm.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Yes, I want to focus on the algorithm.</td>
</tr>
<tr>
<td>Researcher</td>
<td>If a student said quickly, &quot;I know that 20 multiplied by 4 is 80&quot;, do I need to ask the student to say the steps of the algorithm?</td>
</tr>
<tr>
<td>Sultan</td>
<td>No, if he got this result directly, this is enough</td>
</tr>
</tbody>
</table>

### Episode H:

#### Episode H info:
The purpose of episode:
To show case teachers how a teacher might prevent students’ opportunities to talk in classroom

Episode Description:
The episode shows Sultan conducting a lesson on Division. The following interaction is:

<table>
<thead>
<tr>
<th>Sultan</th>
<th>What is 15 divided by 3? Who can tell me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>Five</td>
</tr>
<tr>
<td>Sultan</td>
<td>15 divided by 3. How many groups does that make</td>
</tr>
<tr>
<td>Student B</td>
<td>Five</td>
</tr>
<tr>
<td>Sultan</td>
<td>How many groups does that make (He speaks more loudly)</td>
</tr>
<tr>
<td>Some students</td>
<td>3… 4…(collectively)</td>
</tr>
<tr>
<td>Sultan</td>
<td>Three. I make three groups (he draws three circles on the board below 15 ÷ 3)</td>
</tr>
</tbody>
</table>

Teachers’ reflections:

Researcher: What can we notice?
Zayed: Insistence.
Ahmad: It is possible that discussing the student’s wrong answer might be an obstacle for future participation.
Sultan: If the student makes a mistake, you give him a smart look or you ignore his answer until he says to himself, "Thank God, he did not hear me”.
Sultan: We only listen to the correct answer, and we try to ignore the wrong answer as much as possible so as not to embarrass the student. Am I right or not?
Ahmad: Your point is right.
Researcher: My point is, teachers sometimes insist on an idea that can hinder a student's participation. Let's watch the episode of Ahmad.
Zayed: (says to Sultan with a low voice) all episodes and cons about us (he laughs).
Researcher: Let's watch the episode of Ahmad.
Zayed: Do not miss it (He says to Sultan "Because it is an episode of Ahmad")

Episode I:
This episode included three short parts of Ahmad’s classroom practice and was presented part by part.
### Episode I info:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 3 (phase one)</td>
</tr>
</tbody>
</table>

### The purpose of episode:
To show case teachers how a teacher might prevent students’ opportunities to talk in classroom

### Episode Description:

The episode shows Ahmad conducting a lesson on probability. The following interaction is:

Ahmad: The probability of getting a blue ring from this vessel—if you know the answer, raise your hand

(Some students raised their hands and the teacher chose one of them by pointing to them)

Student 1: Certain

Ahmad: no (immediately), you can answer "certain" when they are all blue

Ahmad: (points to another student to answer)

Student 2: Equal possibility

### Teachers’ reflections:

**Researcher**
What have we noticed in the episodes of Ahmad?

**Sultan**
A threat to the student.

**Zayed**
Ahmad said “No”. (with a loud voice)

**Researcher**
Note that he said "no" quickly.

**Zayed**
Yes.

**Researcher**
One of the obstacles to learning is that the teacher may sometimes have an idea he wants to deliver quickly. When the student said the answer, Ahmad said "no" directly for the purpose of delivery of information.

### Episode J:

**Researcher**
Let's watch the next episode, it is also for teacher Ahmad.

**Ahmad**
(laughs)

**Zayed**
Finally an episode for you (Hahaha) I kept telling Sultan that the cons are all yours and mine, not Ahmad! (All the teachers laugh)

**Researcher**
It is not about disadvantages.

**Zayed**
Let's laugh a little.

**Sultan**
This is for learning, we want learning.

**Ahmad**
Yes.

**Sultan**
Honestly.

### Episode J info:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 3 (phase one)</td>
</tr>
</tbody>
</table>

### The purpose of episode:
To show case teachers how a teacher might prevent students’ opportunities to
The episode shows Ahmad conducting a lesson on probability. The following interaction is:

**Ahmad:** What is the probability of getting a red ring? What is the probability? Is it certain or impossible, strong or weak, or equal? Come on, guys (the teacher puts a big circle around the lesson’s vocabulary, which includes descriptions of probability types).

**Student 1:** Certain.

**Ahmad:** Teach me. Wait a moment (he asked the other students to wait), certain means what? It means sure, right? If someone inserted his hand in the vessel with closed eyes he will pull a red ring out... imagine yourself in front of this vessel and you inserted your hand. Is it certain you will get a red one? When can it be certain? (a little loudly) When they are all what?

**Student 2:** Red.

**Ahmad:** Well done, so this is not certain (**the teacher means the answer**). What kind is it, Walid?

**Walid:** Equal possibility.

**Teachers’ reflections:**

**Ahmad:** This lesson is boring.

**Zayed:** When Ahmad said, “teach me” the boy kept silent here but when he said “well done” the boy recovered.

**Researcher:** The student is also given a chance, but you hurried in the explanation.

**Episode:**

**Researcher:** This is also an episode for Ahmad, sorry.

**Ahmad:** Never mind, just proceed.

**Episode K:**

**Episode K info:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 3 ( phase one )</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers how a teacher might prevent students’ opportunities to talk in classroom.

**Episode Description:**

The episode shows Ahmad conducting a lesson on probability. The following interaction is:

**Ahmad:** What does the possible outcomes mean?

**Student 1:** It means the the blue. ( here Ahmad shakes his head and looks to other students)
Ahmad what does the possible outcomes mean? (points to another student to answer)

Student 2 it is the probability
Ahmad What are the possible outcomes?
students the probability
Ahmad What are the possible outcomes?
students the probability
Ahmad Congratulate him, excellent (the students applaud their friend)

Teachers’ reflection:
Zayed He ignored the first boy. He did not appreciate him and evaluate him.
Researcher He continued with whom?
Zayed The second student.
Researcher Who got the praise?
Zayed The second student.
Ahmad The second student.
Researcher What about the first student?
Ahmad The first student gave a wrong answer!
Researcher Here is a question: What could be negatively affected by the praise given to the second student?
Ahmad The first student’s feelings?
Researcher So he does not talk.
Sultan He will never talk again.
Ahmad The praise had two different effects.
Sultan We supposed praise both of them for participating in the discussion
Researcher The point is, when do we use praise as reinforcement to applaud a student? It is for the speaking up, whether they are right or wrong.
Zayed That’s it
Ahmad Mmm
Researcher What have we learned?
Sultan Praising is not related just to the answers.
Zayed It is for reinforcement.
Ahmad And participation.

2.5 Theme Five: Opportunities to promote the skill of talking
(A paper was distributed to teachers to write down the appropriate opportunities that can be used to encourage talking in the classroom)
Researcher For example, when using the "We want to learn" strategy, and what we can gain from the last episode of Ahmad?
Ahmad Praising the student for just participating in the classroom talk.
Sultan Not to praise for only the correct answer.
Researcher Wonderful, write this within the opportunities in the paper.
Sultan Greeting is given for participation.
Ahmad This is a psychological factor.
Zayed: We Greet the student for his participation, whether his answer is correct or wrong answer.

Ahmad: Well, I can praise any participant by saying "Well done participating" and still honor the student who gave me the correct answer. We can distinguish between different types of praise.

Sultan: Praise is given for participation, not only for an answer, and we can give higher praise for reaching the correct answer. Praise could also be individual, between you and your student, similar as if he were your child. Imagine if you praise one of your children and the other hears you do that. This could affect him and cause jealousy between them. We know that jealousy can exist in everyone.

Researcher: What are the other opportunities that can be used to provide an opportunity to talk other than using the "We want to learn" strategy and "Talk Task"?

Ahmad: I could say “there is a group of students whose level has increased” while at the same time looking at those who do not talk much. Saying praise while looking at them will give them the confidence to talk.

Researcher: And thank students who participate in order to encourage permanent participation. Let's watch another episode.

| Episode L info: |
| Teacher | Lesson |
| Ahmad | lesson 1 (phase two) |

**The purpose of episode:**
To show case teachers how a teacher might create opportunities to talk in classroom

**Episode Description:**
The episode shows Ahmad conducting a lesson on prime numbers and decomposing non-prime numbers. The episode features Ahmad talking to the students and reminding them not to forget the multiplication sign.

Episode L:
Ahmad: Some of the students have forgotten to put the multiplication sign between numbers.

Abdullah: Teacher, you forgot to put the sign (The student points to the blackboard).

Ahmad: Oaky, remind me and tell me that you (teacher) make mistakes and forget the sign. Say to me “teacher your solution here is incomplete”. Excellent Abdullah.

**Teachers’ reflections:**

**Ahmad:** Are you happy, Zayed? (he laughs)

**Zayed** (laugh)

**Researcher:** What have we learned from the episode?

**Sultan:** He allowed the student to talk about teacher’s mistakes and thanked the student. The teacher is a human being who also makes mistakes.

**Researcher:** Good point from Ahmad, to thank the student for reminding him.

**Sultan:** For a person to be effective in society, if he notices something wrong he should say it is wrong.

**Zayed:** Sometimes we can make mistakes deliberately in order to provide a chance for students to talk.

**Researcher:** Let’s watch this episode in which there is an opportunity to talk.

**Episode M:**

<table>
<thead>
<tr>
<th>Episode M info:</th>
<th>Zayed</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>The purpose of episode:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To show case teachers how a teacher might create opportunities to talk in classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Episode Description:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The episode shows Ahmad conducting a lesson on subtraction of mixed numbers. Zayed is demonstrating an exercise about subtraction of mixed numbers (3 ⅔ - 2 ⅝). The students find it difficult. A student goes to the blackboard to figure out the answer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>(Writes on the board $\frac{2}{3} - \frac{4}{5} = \frac{10}{15} - \frac{12}{15}$ = he could not complete)</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>10 minus 12 how? (the teacher struggle seconds)</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>We borrow, teacher.</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>Yeh</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>We borrow</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>No (looking to board) you borrow from what?</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>From 5 which under the 12</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>Which is the larger number? (he makes circle with his hand around the number 3⅔)</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Three</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>Three and two thirds, and the other one?</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Two and four over five</td>
<td></td>
</tr>
</tbody>
</table>
Zayed: The fraction (points to $\frac{3}{4}$) is smaller than the fraction (points to $\frac{3}{5}$) but the number (point to 3½) is larger than the number (point to 2%). I say to you that 5 Riyals and quarter, and two Riyals and half, which is larger than other?

Student: Five

Zayed: The five riyals and quarter is the larger, but the five has quarter with it and the two has half with it. Can I say a quarter is larger than a half?

Students: No

Zayed: It is not larger, so it is not correct to subtract quarter from half; I need to subtract it as the mixed numbers.

**Teachers’ reflections:**

**Researcher:** The observation here is that there are exercises that can be used as an opportunity to what?

**Zayed:** Talk

**Researcher:** Yes, to talk with students. Here is another episode.

**Episode N:**

**Episode N info:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Zayed</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>lesson 4 ( phase one )</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers how a teacher might create opportunities to talk in classroom.

**Episode Description:**

The episode shows Zayed asks a student to go to the blackboard in order to solve the exercise. The student talks to Zayed only.

**Teachers’ reflections:**

**Researcher:** What is noticeable in this episode?

**Zayed:** Faisal is talking.

**Researcher:** Is he talking to the teacher or the students?

**Zayed:** He is talking to me.

**Researcher:** The teacher can create opportunity when student is at the board to talk to whom?

**Ahmad:** To his friends.

**Zayed:** To the students.

**Researcher:** From the previous episodes, we can say that the opportunities to talk to students could be at the beginning of the lesson.

**Zayed:** And during the exercises.

**Researcher:** Yes, during the exercises, and also when a student goes to solve on the blackboard in front of other students.
Episode O:

### Episode O info:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 3 (phase one)</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers how a teacher might create opportunities to talk in the classroom.

**Episode Description:**

This episode shows Ahmad during the end of the lesson. He is correcting the exercises that the students solved individually as he was talking to each student.

**Teachers’ reflections:**

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>What has Ahmad noticed? What does he do? He does revision with each student and talks to him. What do we call that?</td>
</tr>
<tr>
<td>Sultan</td>
<td>Continuous guidance.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Observing students.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Discussing the solution with the student.</td>
</tr>
<tr>
<td>Researcher</td>
<td>In what way? As individuals.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Yes, individual discussion.</td>
</tr>
<tr>
<td>Researcher</td>
<td>How can we take advantage of this discussion?</td>
</tr>
<tr>
<td>Zayed</td>
<td>By raising our voice so the discussion can be heard in the classroom.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Also, what do you note during the individual discussions?</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Negative and positive points which I can discuss with the students if the time allowed me.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Great. What is the opportunity that you can take advantage of it?</td>
</tr>
<tr>
<td>Sultan</td>
<td>Finding common mistakes and correcting them. Sometimes, there is mistake that could be a common mistake. Sometimes you find that students solve the exercises in the same wrong way. Even if you find mistakes in the homework’s exercises, they should be discussed.</td>
</tr>
</tbody>
</table>

Episode P:

### Episode P info:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>lesson 1 (phase two)</td>
</tr>
</tbody>
</table>

**The purpose of episode:**

To show case teachers how a teacher might create opportunities to talk in the classroom.

**Episode Description:**

This episode shows Ahmad is discussing with the whole class a mistake made by two pairs of students.

**Teachers’ reflections:**

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher</td>
<td>Now we will conclude with Ahmad’s last episode</td>
</tr>
<tr>
<td>Ahmad</td>
<td>I discussed the mistake with them.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Note that there are two groups who have the same mistakes.</td>
</tr>
<tr>
<td>Sultan</td>
<td>A teacher’s moving between pairs is for the common mistakes or misconceptions by students.</td>
</tr>
</tbody>
</table>
### 3: The Workshop’s Recommendations and Suggestions:

<table>
<thead>
<tr>
<th>Researcher</th>
<th>We conclude with the recommendations. The first theme was the skill of talking in the classroom. What can we recommend?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>Unleash the students.</td>
</tr>
<tr>
<td>Sultan</td>
<td>For learning.</td>
</tr>
<tr>
<td>Zayed</td>
<td>The skill of talking. For example, we can ask “Tell me about the last lesson”.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Using words that encourage talk in the classroom.</td>
</tr>
<tr>
<td>Researcher</td>
<td>There were rules such as “Talk-Listen-Respect”.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Talking etiquette.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Organizing and respecting participation and talk.</td>
</tr>
<tr>
<td>Researcher</td>
<td>We said that there was a Talk Task. How can we take advantage of it? How do we handle obstacles and difficulties such as fear and mockery from students?</td>
</tr>
<tr>
<td>Sultan</td>
<td>The mockery by a teacher, a student and the community, let us prevent it in the classroom through continued guidance.</td>
</tr>
<tr>
<td>Zayed</td>
<td>By engaging students who fear participation and encouraging non-active students to participate.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Or shy students.</td>
</tr>
<tr>
<td>Sultan</td>
<td>I have a student in the third grade who was always sleeping and lazy. But once I praised him, he changed.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Not to make fun of students’ participation by the teacher and the student.. Remember the proverb: <em>Tell me, I'll forget. Show me, I may remember. But involve me, and I'll understand.</em> It means that if a student listens to my words he will forget what I said, and if I write to him on the board he might remember, but when he participates creatively with me, the student never forgets.</td>
</tr>
<tr>
<td>Researcher</td>
<td>These are wonderful words that we should write down and share with students in the classroom. They will change the environment of the classroom.</td>
</tr>
<tr>
<td>Sultan</td>
<td>You know what my father used to say: &quot;Men are like closed boxes and their tongues are the keys&quot;</td>
</tr>
<tr>
<td>Ahmad</td>
<td>do not talk (he explain what Sultan’s father means by the closed boxes)</td>
</tr>
<tr>
<td>Sultan</td>
<td>Do not talk and close your mouth.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Ok! In conclusion opportunities are like taking advantage of teacher’s moving between pairs to encourage participation in the classroom.</td>
</tr>
</tbody>
</table>
The Eighth Workshop’s Discussed Themes
1:1 Teachers’ Perceptions of Purposeful Teaching

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Welcome everybody to the eighth and final workshop!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>Wait a minute. My children are at school and they leave at 1:00pm. It is 12 pm now.</td>
</tr>
<tr>
<td>Researcher</td>
<td>We will finish in time for the children. By God, we have enjoyed a lot these eight weeks. Last week, we talked about purposeful teaching, what do we mean by that?</td>
</tr>
<tr>
<td>Sultan</td>
<td>It is when you introduce a group of specific points and exercises for a specific purpose you want to reach.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Through introductory questions and by following a progressive sequence of questions in the classroom.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Meaning that you have an understanding of what you are going to do during the lesson</td>
</tr>
<tr>
<td>Zayed</td>
<td>In other words, I introduce an exercise and build on to get to the information and mathematical concept.</td>
</tr>
<tr>
<td>Researcher</td>
<td>And what do you expect from the discussion about the exercises? Do you expect posing questions or getting answers?</td>
</tr>
<tr>
<td>Sultan</td>
<td>The questions would be planned ahead of time, and the answers too... meaning that you know the answers because you have studied your questions and chosen them very well before you start. The questions, then, are not too easy nor are they too difficult or vague. So you will be steering towards a certain goal.</td>
</tr>
<tr>
<td>Researcher</td>
<td>What do you expect from the students?</td>
</tr>
<tr>
<td>Zayed</td>
<td>I expect that they would give a reasonable answer that I can build on. The answer is not supposed to be 100% true, but it can be 80% true, so I can take that correct part to use and build on.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>And find new solutions.</td>
</tr>
<tr>
<td>Researcher</td>
<td>What do you expect from them when you pose questions?</td>
</tr>
<tr>
<td>Sultan</td>
<td>Interaction.</td>
</tr>
<tr>
<td>Researcher</td>
<td>What else? What do you expect regarding answers?</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Wrong answers, partially correct answers, and correct answers. But one should start with the weak student or the student who is not expected to give the right answer.</td>
</tr>
<tr>
<td>Researcher</td>
<td>When you put questions your experience will help you expect the students’ answers, and the common mistakes. How can you build on these answers? For example: today I will talk about percentage, its definition, and relation to fractions, what the students know about it, and how it relates to them?</td>
</tr>
<tr>
<td>Researcher</td>
<td>Zayed, you must have noticed students’ answers in your teaching experience last week when the lesson was about the percentage.</td>
</tr>
<tr>
<td>Zayed</td>
<td>The interaction was totally different. I swear to God it was so different with this [dialogic] approach because there was interaction. As Ahmad has said, there were wrong answers. You take them. You don’t ignore them. And they [the students] have given partially correct answers [to the percentage problems] that lead to correct answers. Here you can modify the mathematical</td>
</tr>
</tbody>
</table>
concept. You can use their answers to simplify the concept for them. I take their answers and start to link them to the concept in question.

**Researcher** This is what I noticed last week in Sultan’s questions about the number that can be divisible by 5.

**Sultan** Yes. Let’s say that the teacher wants to talk about several things. You may forget the concept in a moment, but you will be better organized when you start by posing a question. The best thing. The best thing is to look at the math problem from A to Z, and imagine how the class would be. You can also take one of your old lessons and watch how it went. Then you can create a database about the information the students have and about which you are going to pose questions. This way, you would be aware of what the student has and what you have, the purpose of the question, what you would add, and what the student may say to you. If I just prepare questions and enter the class I may find that my preparation is not enough because I do not know what they already have and know, and what their background is. You can use a simple exercise to discover their background so that you know how to start your questions. You should not prepare questions without knowing the level, background and the potential of the students.

**Researcher** What about your experience in teaching grade four away from grade six?

**Zayed** Fractions . equivalent fractions such as: $\frac{1}{2}$. What is the relationship between 1 and 2? The students have said: Here is 1 and is there is 2 underneath it ... A fraction. “What is the relation between 1 and 2?” They said: “1 is half the 2”. so the fraction means (half). I said, OK, give me examples. only examples. They provided examples. They got the concept and the idea. I asked them: “What if we make it 1 over 3?” The 1 becomes 2, and the 3 becomes 6 and so on. The idea was to make the students think with you instead of being merely instructed. This has helped the student think and give answers instead of limiting the activity to the teacher to give answers.

**Zayed** In the beginning, I did not apply what you used to say in the workshop except in the classroom under study. I used to leave grade six to another grade taking with me very little things ... but when I started to expand my method (dialogic teaching) in classes, by God, the classes have changed.

**Researcher** What did you notice about the students’ answers?

**Zayed** Students’ answers have increased. they became plentiful. Many answers have surprised me . And new distinguished students appeared. Take Sami for example. There was also a student who was totally hopeless. He did not want to give any answer. He did not want to talk nor play. He just came to class and sat. Now, he is a participant in classroom.

**Researcher** The student’s chances increased

**Sultan** When his chance to participate in discussion increased

**Zayed** He took part in the discussions and his answers may become a base for the lesson, and may be used by his classmates to think and solve
problems. this student now is one of the first students to participate. The other students now can notice his participation.

Zayed
Now we use the first answer as a base for the lesson, while before everything was over when someone gave the correct answer.

Researcher
What about the number line, which the students have created ...

Zayed
Thank you for reminding me about that. Comparing fractions. Usually I used give two fractions using representations. For example, I use oranges to represent fractions and compare them such as asking: “Which is bigger; one out of four or three out of four?” It is clear, and I’d say: “Let’s represent it, how do we do that?” A student came to me and said: “the number line!” . I did not think of it at all. If I spent two weeks thinking about it I would never think of the number line. So I thought of letting him do it . He did, and he represented the fractions starting by the bigger one, which is the closest to number one. Thus the idea became clear. So I myself took that idea from the student.

Researcher
What happened in your class, Sultan? When the students were dividing by five. The story of Rayan.

Sultan
Rayan got the idea. The rule of when we can divide by 5. He took the 0 and the 5. Of course he is still in grade three., meaning that he is so little. It is like talking about the mass and the kilogram in grade three. how can I explain the difference between weight and mass? The problem was how to describe the mass. We started taking solid things and say that these are all masses and this is an object and so on. they started to question and differentiate, but the mass till now remains .

Researcher
Some concepts require exercises.

Sultan
Because there are some issues he does not understand yet. This is the first thing we say to him. we say: “this is weight .”

Researcher
Khaled is a student in Sultan's class. Before Sultan utters the question he gets an answer. He gets the answer before he even finishes his question! We noticed in previous classes how we allowed the student to talk under the condition of placing his hand on the table

Sultan
We made them forget random answers in order to give a chance for the rest but some students still have the energy. Khaled would burst if he didn’t say the answer. This way he would negatively affect the others.

Researcher
We’ve concluded before that distinguished students should be left to the end.

Sultan
Look, Zayed. There are four very distinguished students will be in your grade four next year. They are top students.

1:2 Teachers’ Discussions about Examples of Students’ Participation

- Ahmad’s example:
The example involved a student who answered Ahmad’s question in a revised exercise about the median. The student’s answer was late in the discussion. The purpose of this example was to show the case study teachers the importance of allowing enough time for mathematical discussion

Teachers’ reflection:
This is what I have noticed while teaching the median in Ahmad's classroom last week. What was the difference between this teaching experience and the past one?

The students were eager to understand the concept. You feel that the students insist on understanding the mathematical concept.

What did you notice about the students?

Interaction

When the questions are plentiful they should be precise, otherwise they may be boring for the teacher and the student. If your questions are not based on a prior estimation you will not be able to continue the lesson, and you will not even get 40% of what you are seeking from the lesson. On the contrary, if you prepare your questions purposefully and chose thought-provoking questions.

I have noticed in Ahmad’s class that the students could not find the median of four numbers. However, they could find the median of five numbers. I felt that you, Ahmad, have given up. One of the students wanted to answer from the beginning. Of course you and your students consumed time, and more than five minutes have passed. What was his answer and his opinion?

He said that the number was between the two middle numbers. In the beginning we put the heights, so he said that the number is between the two middle heights. And this was the correct answer.

What do you notice about the answer? How did it come?

Late.

After long dialogues and discussions

And thinking

After a long discussion

This may entrench the idea in the minds of the students and they wouldn’t forget it.

Do you know why? Because the available information. For instance, if you go to the bank and get a certain amount of money without any reason you may not value that as much as receiving the money as a result of your hard work. This also applies to the student. When you drive the students to put an effort in the question they will not forget it. But that differs with the grade level. The waiting time differs because the second grader can’t wait for more than two minutes, otherwise the student would forget me and forget the question. the first grader would forget me and forget my question so we’d go back to ask him again.

As if you are talking to yourself

It differs with the grade level.

Indeed. With grade five you are able to pose several questions and go back to the main question. With the third grade you may ask a question, and another question but with the third question the student would be totally lost.

The structure of the student’s mentality differs

- Zayed’s example:
The example focused on a student who answered Zayed’s question to find 85% of
40. The student’s answer came late in the discussion. The purpose of this example was to show the teachers the importance of allowing a proper amount of time for mathematical discussion and to show how students build their answers on each other’s responses.

**Teachers’ reflection:**

**Researcher**
What about discussion inside the classroom and its effect on the students. The students remember Zayed’s discussion about the ratios as well as the percentage lesson. How was your student's participation?

**Zayed**
Mohammed is a student who had certain circumstances and lots of absence. However, the discussion and the participation of the students helped him understand and participate. I asked the students to find 50% of 40. They gave correct answers. Then I asked them to find 25% (one forth) of 40 which was 10. We [Zayed and Researcher] suggested that every one of them should choose a percentage of 40 and give us the answer. One of the students said: 75% of 40 is 30, another one suggested 85%, so I asked him to come up to the board. He said: 75% is 30, and then I asked how much more do we need to get 85%? What is 10%? The students remained silence and could not answer. Finally a student his name is Fahd.

**Researcher**
Look how he solved it. He said 25% is 10 and the 25% is five times 5%. We asked the students: How much is 10%? They were all quiet. Now imagine the whole classroom silently looking for 10% of 40.

Mohammad answered saying: that is 4. We asked him “how did you get that?” He said: 5% is 2 and 10% has two 5% so the answer is 4 and he went to write the answer on the board. The students were surprised to see him participate and go to the board to write an answer.

**Zayed**
I myself did not think of it this way. It totally ran out of my mind that 25% is known. 50 is known, and 10% is known through Fahd’s participation who said that 25% is 10.. Mohammed then said that if 25% is five times 5%, so 5% is 2 then 10% is 2+2=4

**Researcher**
We asked him to come up to the board and he did. the other students were surprised with that because he has never participated and have almost never attended. Today he went to the board and he solved the problem with the others.

**Zayed**
We benefit from every workshop with you. By God, I will reconsider this student . I feel that I was unfair to him.

**Researcher**
Balance is important in participation because it makes the teaching to be inclusive.

**Researcher**
What do you think about this discussion? Do you think it is useful to take place?

**Ahmad**
I think it is useful and helps the students to think logically, and to depend on himself. It also encourages all the students to participate, and entrenches the information because it is better for the student to get the information by himself

**Sultan**
Every student in the classroom would feel that he is important and not a mere student who attends classes. All the students accept the all ideas. When the student comes class prepared to talk and his talk
won’t go down the drain. In the past he used to give wrong answers, and we used to say “thank you and sit down.” This is actually an insult, but when we take his answer, and start to build on it, we get to the concept. The student’s self-esteem and presence improves. Everyone is part of the lesson and everyone understands what is going on, let’s say that all students’ participations in the classroom have the same value.

Zayed The space for talking has become bigger. rather than having hesitant students who fear participation because their answer could be wrong. Now the students have a margin of freedom and the opportunity to practice. Now we have no problem. The best thing we achieved is discovering new ways for solutions; the ways that you as a teacher have not thought of, and with that you can also discover common mistakes.

Sultan The way of thinking differs. yes now you are considering the mental activity of every student. In the past you used to give them one way but. let’s say that everyone has his own method. one calculates reversely, one calculates starting from the beginning, and another calculates from the middle. Everyone has his way now. Some start from the end and move to the beginning. Everyone has his way of thinking. None is like the other.

Zayed This discussion has also distanced us from algorithms that the students should learn. I do not restrict myself to them. I started to accept any solution that takes me to my goal. The idea that there is an only one way to follow does no longer work nor does it exist.

Researcher Did you notice in the discussion that the focus turned to be on mathematics?

Zayed There is more space for solutions. I go to school from one way. Is it the only way? No If this way gets blocked I will be able to go to school using a second or third way.

<table>
<thead>
<tr>
<th>1:3 The Principles of Dialogic Teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Researcher</strong></td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
</tr>
</tbody>
</table>
students, students participate and talk and they feel that the class is different. Reciprocal teaching is not just between the teacher and the students. Instead, there is an interaction between the students themselves, and students share the teaching goals, the learning, and the pairs.

**Researcher**  Cumulative teaching in which the teachers and children build on their own and each other’s ideas and chain them into coherent lines of thinking and enquiry. In purposeful teaching teachers plan and steer classroom talk with specific educational goals in mind.

**Zayed**  What happened is that the whole class turned to a discussion. I have planned 20 minutes for discussion but that actually has expanded to 35 or 40 minutes. We asked them to give us an example of a percentage. They gave us 10 examples about number 40. There was also your challenging question: What is 160% of 40 and what is 170% of 40? But they answered that. We applied the same way in the next class, and Salem provided me with answers. I tried to explain to them but he did.

**Sultan**  He used to be shy

**Zayed**  Indeed. I noticed that from the beginning of the year, but he started to be committed with the beginning of the second semester since I used a new [dialogic] approach and it helped this student become distinguished. after this dialogic approach he predominated the others because he does not write his thoughts on paper anymore. He directly says them.

**Ahmad**  Dialogic teaching discovers the students’ buried talents

**Researcher**  It affected all the students. Discussion and dialogue bring out the talents of the students

**Zayed**  Indeed, like Yasser for example. We used to ask him to come up to the board and write, but he refused saying “no”

**Researcher**  But over time Yasser now comes up to the board.

**Sultan**  Yasser is excellent

**Researcher**  What is 1012 – 815? How to solve this?

**Zayed**  203

**Sultan**  Everyone has his way of thinking

**Zayed**  For me, I take 12 out of 15, and then 1000-800=200

**Researcher**  This is your way.. How about you, Ahmad?

**Ahmad**  I need 85 for the 815 to become 900, and then a 100 to become 1000, so that is 185. By adding 12 it becomes 197 excuse me 185 and 10 equals 195 plus 2 equals 197. Oh yes 197

**Researcher**  197

**Sultan**  15 and 12 together, and 10 and 8 together. got that?

**Sultan**  15 and 12 together

**Ahmad**  yes

**Sultan**  and then subtraction: 10 and 8

**Zayed**  12 is the tens

**Ahmad**  We have to borrow

**Sultan**  What is 12 minus 15? 3
Ahmad  Do you mean minus or difference?
Sultan  And the 10 is above and the 8 is below, right? We subtract
Researcher  What is the answer?
Sultan  It is 200.
Ahmad  No, not 200, it is 197.
Zayed  197
Sultan  Ah! (He recognized his mistake)
Researcher  How did you get that answer?
Zayed  In the beginning I did as Sultan did. I subtracted 12 from 15 and then 800 from 1000 and said that the answer is 203, but it is 197. If you check the reasonableness of the answer you’ll know that 203 is wrong
Ahmad  Here is a quicker way. I imagine that the 1012 is 1015 and later I subtract the (3) that I have added. The difference between 1015 and 815 is 200 minus 3 =197. This is better and quicker
Researcher  Any other ways?
Ahmad  we can use conventional subtraction
Researcher  Sultan and Zayed have done conventional subtraction mentally. The subtraction algorithm includes “borrowing” and performing that mentally made it difficult, Ahmad’s method: adding 85 to 900, and 185, 195 and 197 is the first method.
Researcher  And the second method is to consider the 1012 as 1015, then find the difference, then subtract 3 you get 197
Ahmad  800 subtract 1000 get 200, and 200 plus 12 equal 212, then 212 subtract 15 equal 197
Sultan  Number line and the reverse counting
Zayed  I like your idea. what is it from 1012 to 812? 200 and then we subtract 3 and the answer is 197
Researcher  Any other ways?
Researcher  What would you get if you apply all these ways to the number line? And what do you notice about the discussion that just took place? We asked a question and the answer was 197 but did we care about the answer or the something else?
Ahmad  The way of thinking.
Researcher  The way of answering. The question here is: can we ask open-ended questions in which there are no specific answers? What you care about is not the answer but the way by which you get the answer. I don’t care about the 197. I care about the idea of how getting it. What do we target when we do this with the students?
Zayed  Brain storming
Researcher  And so that you enter the classroom telling the students: “I don’t want the result”
Ahmad  I want thinking
Researcher  Great! We want innovators

1:4 The Development of Teachers’ Recommendations and Suggestions through the Professional Development Workshops
<table>
<thead>
<tr>
<th>The first/Second workshops:</th>
<th>Seventh Workshop:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Unleash the students.</td>
<td>- Listening to the student gives the teacher a better opportunity for proper corrections and clear evaluation</td>
</tr>
<tr>
<td>- Using talk and expression vocabularies inside the classroom (such as talk about the previous lesson and the previous topic).</td>
<td>- Employing the students’ answers in improving the dialogue or discussion in order to get to the goal</td>
</tr>
<tr>
<td>- Encourage the shy students, use exercises.</td>
<td>- Employing the students’ answers in a dialogue with the student to clarify a certain idea, advance it, and use it as a gateway to other ideas.</td>
</tr>
<tr>
<td>- Encourage the students to respect talking’s manners.</td>
<td>- The teacher’s ability to change his classroom practice by good listening to the students’ discussion and by examining their answers.</td>
</tr>
<tr>
<td>- Take advantage of Talk Task.</td>
<td>- Examining the students’ answers helps the teacher define what is needed to get to the lesson's goal</td>
</tr>
<tr>
<td>- Taking advantage of available opportunities for talking such as the teacher’s round between students’ groups inside the classroom</td>
<td>- Purposeful teaching by preparing suitable questions for dialogue</td>
</tr>
<tr>
<td></td>
<td>- The dialogue should be of a high quality</td>
</tr>
<tr>
<td></td>
<td>- The dialogue should be purposeful, not boring. We can elaborate or be brief depending on how important the information is to the lesson’s goal</td>
</tr>
</tbody>
</table>

| Teachers’ reflections:                                                                   |
|---------------------------------------------|---------------------------------------------------------------------------------------------------|
| **Researcher**                              | A comparison between recommendations. Look at the first and second workshops, and then look at the seventh |
| **Zayed**                                  | Man! There is a big difference. (Laughing)                                                       |
| **Teachers**                               | Laughing                                                                                         |
| **Ahmad**                                  | The expression even differs                                                                      |
| **Zayed**                                  | Here (in the first and second workshops): encourage the shy students, use exercises, encourage the students to respect, and man! here: The nature of dialogue should meet high quality conditions |
| **Sultan**                                 | “You educated academic folks!” (Referring to the fact that the talk and recommendations of the seventh workshop are of a higher level than the first workshops) |
| **Zayed**                                  | (reading: Examining the students’ answers helps the teacher defines what is needed to get to the lesson's goal) (Laughing) |
| **Ahmad**                                  | Very big words                                                                                   |
| **Zayed**                                  | Employing the students’ answers in a dialogue with the student to clarify a certain idea, advance it, and use it as a gateway to other ideas |
| **Researcher**                             | Notice the difference between the recommendations of the first and seventh workshop. Notice the progression. these are seven weeks. No, they are nine because during holidays you also worked on analysing the videos. We are in the ninth week now. Look at your |
recommendations and the points you were aiming for in the first workshop. Look at the points of the seventh workshop. What were you seeking?

Sultan

Look here at the first workshop: free the students. In the Seventh workshop you find: good listening. Notice the vocabulary, you find (talking) in the first workshop and (employing students’ answers in dialogue) in the seventh workshop.

Researcher

Yes not only (talking)

Sultan

Now you say: “the dialogue meets high quality conditions”. What does this mean? It means that the encouraging shy students, and encouraging students to be polite in the classroom and the use of certain expression such as (talk, and unleash the students) was the base to reach high quality for the dialogue.

Researcher

Underline the points you like in the seventh workshop. Try to connect the issues and come up with new ideas.

Zayed

“Encouraging students to respect talking’s manners” has lead to the employment of students’ answers. This means that we don’t only let the student talk but we want also to organize the answers because they all talk. We want something organized. We start to say “this student is close to the answer” and “that student has a better answer” and so on.

Researcher

This means that you have passed the phase of talking.

Zayed

Yes, the goal is no longer to talk. The goal is now to make students arrange the answers.

Sultan

Notice the power here: We have now four strong point available in the seventh workshop: Employing students’ answers, examining students’ answers, nature of high quality dialogue. While the first recommendations were moving towards something we didn’t know. We used to be attentive when you said: “dialogue.” At that time I did not completely understand what you meant by “dialogue.” And then we talked about giving the students the space, and I started to implement that, I discovered the “good” and the “better” and started to improve our dialogue to meet quality requirements.

Researcher

So you’ve noticed the progression in the workshops. How was our understanding in the first workshop?

Sultan

It was an understanding of simple things.

Researcher

It is not simple.

Zayed

We had an understanding about just the student, but now we have a new understanding about mathematics as a subject and how we deal with it differently in terms of how we change it from the way that it was taught by to the current way.

Researcher

What do you think, Ahmad?

Ahmad

We have passed the phase in which the goal was to put the student to the right path, set the lesson goals in accordance with the right path. However, now the student himself analyses, organizes and discovers the goals. Notice here that the dialogue is of a high quality. The stage of encouraging the shy student is now behind us. The student now has started to talk without any embarrassment. Conversation manners are now known for them as well. The teaching practice
improved, the goals became higher.

**Researcher**  This was the role of the student. What changes did you notice regarding the role of the student?

**Ahmad**  The student’s as well as the teacher’s

**Zayed**  The roles of the student have increased

**Researcher**  What are the goals of the teacher now?

**Ahmad**  The goals of the teacher now stem from the student himself. The student now helps the teacher teach the lesson

**Sultan**  The student has now abandoned the rhythm, how? In the past we used to explain on the board, and pay attention to algorithms, and that was it. Here (in the seventh workshop) the student has started to participate with ideas. ideas about a concept the student is trying to elicit

**Ahmad**  Here, there is less time. there is more time for discussion (in the seventh workshop)

**Researcher**  Why? What is the reason behind that?

**Teachers**  Dialogue

**Researcher**  Zayed, what did you get from the first and second workshops?

**Zayed**  During first and second workshops, I wanted the students to understand what we were talking about. As soon as the students start to exchange a talk with me this means that they have started to participate, but now during last weeks, the stage of understanding the mathematical concept is behind us. Now the student has learned how to apply the mathematical concept.

**Researcher**  Notice the recommendations you had and wanted to follow with the students, notice what you were looking for here from the students in the first and second workshops, and what your role was.

**Ahmad**  Talking, and my role was to order them to talk

**Researcher**  And what were the students required to do? What did you want from them during that period? Only to talk?

**Ahmad**  And to overcome the difficulties of talking, to be respectful and polite

**Researcher**  What happened in the seventh workshop? What were you asking them? What were you careful about regarding the students? And now what are your recommendations in the seventh workshop exactly aiming for?

**Zayed**  Reflection on the answers

**Ahmad**  Good listening. And to get to the lesson goals through logical thinking. we did not only apply talking manners, that stage is now behind us

**Sultan**  Even the teacher is now a better listener. The teacher now understands the students’ thinking. In other words, we do not only ask for an answer and say goodbye! We started to examine the quality of thought.

**Researcher**  quality of answers

**Sultan**  And that is the source of questions. As I said before, students may have the same answers but different ways.

**Ahmad**  The plan and the progress of the lesson change (he is referring to the
lessons of the last workshops) but here they did not (he is referring to the lessons of the first and second workshops). Here I may build on the answer of one student to start another solution and tell them: “this is another solution,” and then I go back to the book’s method to enrich their knowledge.

Researcher: Why could the student provide another solution?
Ahmad: Because of high quality dialogue and purposeful dialogue.

Researcher: Here, the role of the student was to analyse during the discussion with the teacher or classmate in order to get to a right answer or information in innovating new solutions.

Zayed: And in the last weeks here (he is referring to the lessons of the last workshops), the student started to benefit from the ideas of the other students. Students started to focus on any useful information they may get and not only on what I give them. Students started to focus on what their classmates say as key words to the solution and take information from several suggestions, link them together to get to the comprehensive answer.

Researcher: You notice here in the seventh workshop the following: I want a purposeful dialogue, high quality dialogue, preparation of dialogue questions, clear dialogue in which the students’ answers are examined.

Sultan: Even the student has changed. In the first phase, the same student did not talk because he did not know why. now the student has started to talk because he knew that someone is listening to him and to his ideas.

Researcher: And benefiting from his ideas, and the others are encouraged.
Sultan: And he feels encouraged. He benefits when he listens to a certain idea suggested by classmates.

Researcher: This is only a comparison between our situation in the first workshops and that in the last one. I, Mansour, did not expect that by God I did not expect to write down these recommendations, honestly. Whose effort is this? It is the effort of the four of us during these 8 weeks along with our discussions and examples of your classroom’s practices. When I read these recommendations I do not believe that we have this level of quality after 7 workshops. This proves that training and professional development are essential and that the human being achieves more when working in groups. Group work has a greater effect.

Sultan: FYI, the advantage I got may be very strange. the person’s thinking changes, the student’s thinking changes. In other words, I may deal with a student in the first grade based on my thinking when i was like him but I actually found out that his thinking is advanced.. What can I tell you? The new student in grade one has an increase of 15% or 10% in his thinking compared to four or five years ago.

Ahmad: I want to admit that the workshops have affected me at home and with my children. My son now talks with comfort, and I listen to him more. This method builds the personality. Anyone could commit mistakes but treating the mistakes is something and destroying the personality is something else. Dialogic method builds the student’s
personality. Even if the student’s level is somehow low he gains confidence.

Researcher  
I remember that Sultan has said that we have a problem of trust. A student who does not know the answer or commits certain errors would trust the teacher and feel that the class environment includes him. You, as a teacher, prevent the others from mocking him, listen to him, thank him and reward him. The same thing happens at home. Ahmed, you notice that your discussion was about to finish last class, but at the end a student changed the whole discussion. You have waited till the student participated. You can distinguish students by the movement of their hands such as Khaled. He seems to be saying “I want to participate.” Why? Because you have controlled his participation: “hold on, we want to listen to the others.” He raised his hand, and I was watching him. Then he started to move, and then he said: Teacher, I have an answer, I know the answer.” As if he was trying to convince you about his answer. He could give an answer but he knew that no one talks in class without permission. The students encouraged him too. They were all excited to know the answer and they were looking forward to hearing it.

Sultan  
And what was good about the answer is that it came from a student

Researcher  
The question here is: Why is the excitement? Because the discussion's time was long and everyone was attentive.

Ahmad  
I was bored and I felt that they were too.

Researcher  
They want the answer

Ahmad  
There were many answers and I saw him raising his finger although he has already answered.

Researcher  
But he insisted and when they were all bored, the answer came and that felt so good for Ahmad and the students so they applauded loudly for him.

Ahmad  
I was supposed to ask him to stand in the middle of the students, but as you see, ideas come very late.

Researcher  
The way you introduced the median was different. Do you remember? Your way was nice because you asked a clear question: “what is the median of the students’ heights?” In the past time you were in a hurry and you did not even mention “height.” They could search for the median of height, weight, volume etc but your question was clear: what is the median of the students’ heights? And it was good that you chose different heights and lengths.

2: The Workshop’s Recommendations and Suggestions:

Researcher  
Now these are the final recommendations for the whole project, for you and for the future. Your idea was interesting. If you want to suggest 8 different recommendations for yourself what would that be after these workshops? Write them down. Things related to purposeful teaching, dialogic teaching, you, your preparation, and home. 8 recommendations. Anything! That could be long or it could be just a word. Take your time and write about all the topics we have discussed. Write anything that is in your mind. The recommendations could be for you or for any teacher inside or outside this project. Any suggestions that you may have for the
minister or the head teacher. anyone you think may need these recommendations after these weeks and these workshops. Write and widen the scope of your recommendations.
## Appendix E: Teachers’ self-reflections and observations (Mid-break)

The transcript of Zayed’s episode during phase one

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Classroom talk</th>
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<tbody>
<tr>
<td>Zayed</td>
<td>What is the difference between a number and a fractional number? What is the difference between a number and a fractional number?</td>
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<tr>
<td>Student A</td>
<td>positive (inaudible)</td>
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<tr>
<td>Zayed</td>
<td>all of them positive</td>
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<tr>
<td>Student B</td>
<td>Teacher (raises hand)</td>
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<tr>
<td>Zayed</td>
<td>Yes ((looks the student))</td>
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<tr>
<td>Student B</td>
<td>The fractional number has a whole number beside it.</td>
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<tr>
<td>Zayed</td>
<td>It means a number has what?</td>
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<tr>
<td>Student B</td>
<td>A fraction.</td>
</tr>
<tr>
<td>Zayed</td>
<td>The fraction is only a fraction which hasn’t any number… it hasn’t a number.</td>
</tr>
<tr>
<td>Zayed</td>
<td>If I said… for example, if I said to you (looking to students to choose a student) … Fahd… Two and a half riyals plus two and a quarter riyals—what is the total?</td>
</tr>
<tr>
<td>Fahad</td>
<td>Four and three quarters riyals (immediately)</td>
</tr>
<tr>
<td>Zayed</td>
<td>Huh?</td>
</tr>
<tr>
<td>Fahad</td>
<td>Four and three quarters riyals.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Four and three quarters riyals. How did you calculate that?</td>
</tr>
<tr>
<td>Fahad</td>
<td>Two plus two is four.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Ok, wait a minute. (writing on the board) What is the sum?</td>
</tr>
<tr>
<td>Fahad</td>
<td>Two and a half riyals.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Two and a half riyals (writing on the board)</td>
</tr>
<tr>
<td>Fahad</td>
<td>Plus two and a quarter riyals.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Plus two and a quarter riyals (writing on the board). This is the sum (turns to the students)… If you look at the sum, it is a fractional number. It has a whole number and a fraction. What will we do? What is the method to follow to answer this sum?</td>
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<td>(One student raises his hand to participate)</td>
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<tr>
<td>Zayed</td>
<td>First, I want Fahd to answer me. What did you do?</td>
</tr>
<tr>
<td>Fahad</td>
<td>We added two and two, which is four.</td>
</tr>
<tr>
<td>Zayed</td>
<td>The whole number with the whole number (circles the whole numbers and connects them). Nice, we add the whole numbers to each other (writes on the board &quot;we add the whole numbers to each other&quot; above the line connecting the numbers, then turns to students).</td>
</tr>
<tr>
<td>Some students</td>
<td>Right.</td>
</tr>
<tr>
<td>Zayed</td>
<td>What was our lesson yesterday? What did we note with the denominators?</td>
</tr>
<tr>
<td>Some students</td>
<td>They are different. We must make them similar.</td>
</tr>
<tr>
<td>Zayed</td>
<td>They are different. We must make them similar (writes this on the board).</td>
</tr>
</tbody>
</table>
What is the common denominator for them? (points to the numbers 2 and 4)
39 Student C Eight.
40 Zayed Guys.
41 Student D Four.
42 Student E Four.
43 Zayed Four is the double of two. It means that we can use it as the common denominator (writes on the board)
44 Student Yes
45 Zayed The number four (points to the common number) and number 4 which is found here (points to the denominator of the quarter in the sum) then write one here. And here it was two (points to the denominator of the half in the sum), and it becomes four (points to the common number). How?
46 Some students We multiply them (collectively)
47 Zayed Multiply them by what?
48 Some students Two (collectively)
49 Zayed Then multiply 2 by 1 (referring to the numerator of half in the sum) and the result is?
50 Some students Two.
51 Zayed Then the result is (points to )
52 some students Three quarters (collectively)
53 Zayed Then the fraction of the result is what? 3/4. And the whole numbers are 2 plus 2 (writes on the board 2+2=5) which is 5.
54 Student Four, teacher.
55 Zayed Four (erases the number 5). If we add them, what do we get? Then the result is 4 ¾. (writes the result on the board) Understood?

First: Ahmad’s notices and reflections

| Observation 1 | In the first question, when the student A gave a random answer, the teacher should to ask him this question (explain to us how you came to this answer?). |
| Reflection     | This will make the student get used to thinking logically instead of providing random answers. It will also help him be more confident when he talks. |

| Observation 2 | In the second question, the student was given the opportunity to explain the result, and we thank the teacher for that 2.50 + 2.25 = four and three quarters |
| Reflection     | This manner gives the student a strong motive to talk and encourages his colleagues to participate in the discussion freely |

| Observation 3 | One of the students wanted to ask a question, but the teacher didn't give him the opportunity to complete his question and instead interrupted him to explain an idea. This is wrong. |
| Reflection     | Such behaviour might negatively affect the psyche of the student (in front of his colleagues and teacher); thus, he might not try or might hesitate to ask questions and remain ignorant, meaning the knowledge will be vague to him. |

| Observation 4 | All the answers were collective. This method has pros and cons according to the educational situation. |
| Reflection     | One of the positives is that there might be a question in the mind of one of the students and hear the answer from his colleagues, but the |
| Observation 5 | A student corrected something the teacher said, and the teacher graciously accepted the correction, but he should to thank the student for his correction. |
| Reflection | We are all human beings and we all make mistakes (a message must be delivered to the student in one form or another); this behaviour urges the student and his colleagues to concentrate more seriously. |
| Observation 6 | In all of students’ participation and answers, no one was thanked for their answers with encouraging words. This is wrong. |
| Reflection | Incentivizing phrases add an element of enthusiasm and fair competition among students and are considered positive reinforcement for the participating student while encouraging the non-participating student. |
| Observation 7 | During the discussion, there were only two participants; this is wrong. |
| Reflection | It should involve as many students as possible in the discussion in order to make students feel important. |
| Observation 8 | No phrases were used to urge the students to speak, such as *tell us*, *explain to us*, *show us*, and *teach us*. This is wrong. |
| Reflection | The teacher’s use of such phrases with the students will help them speak freely and make them feel the value of what they say. |

**Second: Zayed’s observations and reflections**

| Observation 1 | The lesson’s aim, ‘We want to learn’, was not properly enforced. The statement was not written on the board, nor was it pointed out by the teacher during the lesson. |
| Reflection | Show the goals and the purpose of the lesson to the students. |
| Observation 2 | There was lack of encouragement by praising and thanking students for participation and being active during the lesson. |
| Reflection | The lack of engagement negatively reflected on the rest of the students, which discouraged participation, interaction, and sharing their opinions without fear. |
| Observation 3 | The episode showed that the teacher did not give chances for students to talk while the teacher was discussing the solution of a mathematical problem with another student. |
| Reflection | The teacher was supposed to go back to the student and allow him to talk or participate in discussing the solution. The neglected student may have been referring to a better way that could have led to a reasonable answer or may help others understand something better than the teacher since the student’s process of thinking may be closer to that of his classmates. |
| Observation 4 | Again, the teacher did not thank the student who was sitting in the back. |
of the class for his correct answer.

Observation 5  While discussing the example with the students, the teacher was doing most of the talking, writing, and finding solutions. The teacher did not leave enough time for the students to think, analyze, or solve. Also, he did not ask any of the students to write on the board, to talk, or to explain the answer’s method using his method based on what he understood from the teacher, and the classmates participated with him and helped to correct him.

Observation 6  The teacher rarely used ‘right/wrong’ questions.

Reflection  It would be better if the teacher used these types of questions more often because they would increase interaction and include more students. Even the shy or hesitant students would interact more using these types of questions.

Observation 7  For one of the teacher’s questions, he received several different answers at the same time. This led to not distinguishing the students’ answers, and it was not clear which answers were correct, which were not, and whether new students were participating.

Reflection  But the teacher supposed to organise participation and tried to get more participants, and not have given negative comments for wrong responds. The teacher need to prize each student for his participation and answer, even if it was wrong, and then the teacher could have shown the correct answer in a positive manner.

Observation 8  The episode showed that while writing the solution on the board, the teacher made a mistake in one number. One student highlighted the mistake, and the teacher corrected it without thanking the student for being attentive.

Observation 9  At the end of the episode, the teacher did not check the degree by which the lesson was understood. For example, he did not ask ‘What did we understand today?’ or ‘What did we learn today?’ He did not ask the students to do exercises individually or in pairs in order to evaluate their comprehension.
<table>
<thead>
<tr>
<th><strong>Researcher</strong></th>
<th>No, it is constructive criticism and a useful proposition. Ahmad, look at Zayed’s reflections. Zayed, look at Ahmad’s reflections. Sultan and I have both analyses.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zayed</strong></td>
<td>Almost identical ideas</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>You can write down similar points</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>There were right/wrong questions … I’ve noticed that I have asked this type of questions once or twice in the episode, and I did not use them a lot. This is the only different note. I would like to add a point: The teacher did not test the students’ understanding of the lesson through discussion questions at the end.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Zayed has noted that the teacher performs all roles- “getting ready, solving the problems, finding the result” as if the student were a “vase”. [Teachers laugh]</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Sultan, what else did you like about Ahmad’s notes?</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>The eighth point… only two students have participated. “Tell us” or “talk to us” statements were missing in Zayed’s class. There is also point 7: Getting the student’s participation in an organized manner, and avoiding negative comments on wrong answers. Instead, the student should be encouraged to participate even if his answers are wrong.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>True. Encouraging the students even when they make mistakes… what matters is to make them participate.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Here Zayed wants to say a point: Don’t hurt the student’s feelings.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>You let him make mistakes. We don’t have a problem if the student makes mistakes.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>The problem is not in making mistakes. The problem is in justification.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>Here is point 2…. When the student gave the answer of a quarter to 5, he gave the student the time to clarify and explain. This was one of the positive things.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>To give the student the chance</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>I will justify the third note. I expect that what I am going to say is already known for the guys and may be right on the tip of their tongues. When the student asked to talk and was not allowed to. I was supposed to go back to him. Here is the point of: allowing the student to participate and talk. I think this has also happened in your classes and is still happening. The student may have something to say. This is what we want, but he should say it in his own way so that he helps his classmates understand what they couldn’t understand from me.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>He understands from his classmate better than from me.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Tell us in one minute…what was your reaction?</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>When the student tried to talk with me…I was not the one who gave him a chance, got back to him, or understood from him. What he was going to say would have probably benefited me or provided a piece of information.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Meaning that when you say ten words and he says one his one word may summarize the whole lesson…</td>
</tr>
<tr>
<td>Name</td>
<td>Contribution</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Zayed</td>
<td>And another student may understand the information from him better than the one coming from me.</td>
</tr>
<tr>
<td>Researcher</td>
<td>This discussion will lead us to talk about cumulative characteristic of dialogic teaching which supposed to be next week but thank you as your comments and reflections help me to introduce this concept with this video episode as you relied on algorithms without attention to students answers… so the cumulative characteristic is to build on students’ responds</td>
</tr>
<tr>
<td>Zayed</td>
<td>I supposed to stop my teaching and ask the student who answered to come next to me and explain his answer</td>
</tr>
<tr>
<td>Sultan</td>
<td>This is what I say that the quality is important for me that the quantity as which concern me is that the student start to play with numbers and through his thinking produces different answers.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>And it is not a problem if the student answers correctly without being perfect with algorithm as he will learn it later because his first answer could be the core answer.</td>
</tr>
</tbody>
</table>
## Appendix F: questions of the professional development programme seminar

### Theme one: introduction

- General introduction of the TDP
- The concept of dialogic teaching and its features

### Theme two: teachers’ experiences about TDP

- What do you think about dialogic teaching prior the workshops? how do you describe any changes in your teaching practice?
- What is your opinion about Talk Task in the new textbook?
- What ideas did we discuss in workshops? and how were these ideas implemented in teaching?
- What are the dialogic teaching opportunities and obstacles? (After five minutes of group discussion) what do you as a group think the greatest challenge is?
- What are the main obstacles from the students’ side?
- What is your opinion on the recommendations and the comparison between first and second workshops, and recommendations in the seventh one?

### Theme three: school, society and government

- What do you think about the challenges face teachers, students and school leaders to change the classroom toward dialogic teaching?
- From your point of view, for dialogic teaching what are the effects or challenges of the society or local communities that students live in?
- What about the government? How could schools be helped by the government and educational policies?

### Theme four: open discussion

- Can you provide example of situation where teachers ask questions have more than one answer?
- Is teacher able to ask questions with an unknown answer or respond?
Appendix G: Example 1 of teachers’ reflections on the challenges of classroom talk

هل يوجد هناك معوقات وصعوبات تعقيط الطلاب من التحدث داخل الحجرة الدراسية؟

- اللغة العربية غير مناسبة
- الطلاب لا يفهمون
- الطلاب 말ين
- الطلاب مشغولون
- الركابة صعبة
- تقدم

هناك مشاكل في التحدث وفهم الطلاب.
Appendix H: Example 2 of teachers recommendations and suggestions (Zayed, fourth workshop, Arabic copy)
Appendix I: the guidance form for teachers recommendations and suggestions (example 3rd workshop)

<table>
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<tr>
<th>الatra</th>
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Appendix J: The teachers’ final interview questions

The Final interview:

- Could you tell me, How do feel of any change through the workshops? if so what is this change? And where? Why do you think this change happens? Is there challenges face this change?
- Do you think after this change you are able to deal with these challenges? Explain?
- How do you see teaching mathematics? Do think teaching mathematics difficult?
- What do think about the influence of school’s administration?
- Do you think that there are still difficulties on completing lessons and tasks?
- Is the classroom talk in your classroom has been changed? What is the difference now after the workshops?
- What do you prefer more tasks and exercises or deep teaching of specific exercises?
- What is the part of new curriculum needs training for teachers?
- What is the importance of teacher’s guidebook? Do you use it during the workshops?
- Do you think that dialogic teaching helps you to know about students’ ways of thinking? If so Why?
- Through the workshops….how is the space of students’ talk especially with the developed curriculum? Is there space of students’ talk before the project?
- Could you tell me about asking questions in classroom? Do your strategies and aims of asking questions change? Please explain
- How do you describe the relationship between the teachers before and after the project? How this influence teaching the new mathematics curriculum?
- Do you think this relationship between case teachers will able to influence the policies of school toward enabling dialogic teaching?
- Tell me about the role of the family on your teaching? Do you think that the student’s family still affects your teaching approach and you need to complete the whole lesson?
- What do you think about using video recording and workshops for preparing teachers to teach?
- What do you think about this project prior and after your participation? did you want to participate or hastate? feel free to say what do think?

Further individual questions for each teacher:

Ahmad

- You think that Mathematics is a solution for problems… did this achieved during the past few weeks?
- You believe that Mathematics is a brainstorming subject… is the dialogue with the student achieve that and how?
- You believe that teaching Mathematics is a joy… did your believe developed during the past weeks and the workshops and how?
- Are these workshops and cooperation among mathematics teachers contribute to
prepare and train the teacher on modern curricula?
- You say that in old curriculum, the biggest tool for the teacher was explanation; tell me more about that before and after the workshops regarding the modern curriculum.
- The teacher is able to solve the vast amount of exercises by matching the exercises similar in idea and choosing one or two exercise to discuss with the students, thus it is a good time to the developed curriculum (is this belief was active in the first stage before the conversational teaching, and did it become active after these workshops?)
- Did your belief changed about this exercise? Did these exercises support talking in the classroom? Can you make use of it in the dialogic teaching? explain to me.
- You believe that the modern curriculum is a dialogue from the teacher to student’s mind… how do you describe this before and after the workshops?
- You believe that the modern curriculum has a dialogue, which mimic the student's mind... How do you see it now? Explain to me.

<table>
<thead>
<tr>
<th>Sultan</th>
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<tbody>
<tr>
<td>- What is your opinion in the technique we used from the workshops and video? You believe that training courses are important because it give the way to hear a solution of a problem or a method from teachers rather than the supervisor?</td>
</tr>
<tr>
<td>- Do you remember the effect of the camera and shooting? Why were you sweating? Is there any change and why?</td>
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</table>

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<tr>
<th>Zayed</th>
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<tbody>
<tr>
<td>- You think that Mathematics is renewable in teaching methods and facing problems, how these workshops helped you in that?</td>
</tr>
<tr>
<td>- You think that Mathematics is a subject to understand, not to sum-up, how these workshops contributed to this?</td>
</tr>
<tr>
<td>- You think that the teacher and the student must participate in the solution, how it was before and after the workshops?</td>
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<tr>
<td>- You think that the student cannot solve higher-order thinking skills, but in partnership with other students. Now, after applying participation among student, do you think that you can provide them a higher-order thinking skills question?</td>
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</table>
### Appendix K: The translation’s glossary

<table>
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<th>Source text</th>
<th>Target text</th>
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<tr>
<td>سلطان</td>
<td>Sultan</td>
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<tr>
<td>تمرين اتحدث</td>
<td>talk task</td>
</tr>
<tr>
<td>العناصر الرئيسية</td>
<td>themes</td>
</tr>
<tr>
<td>المرحلة الأولى</td>
<td>phase one</td>
</tr>
<tr>
<td>التدريس التصاعدي</td>
<td>cumulative</td>
</tr>
<tr>
<td>التدريس الثاني</td>
<td>pair students</td>
</tr>
<tr>
<td>المرحلة الثانية</td>
<td>phase two</td>
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<tr>
<td>التدريس التبالي</td>
<td>reciprocal</td>
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<td>عناصر التدريس الحواري</td>
<td>the principles of dialogic teaching</td>
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<tr>
<td>مقطع فيديو</td>
<td>episode</td>
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<tr>
<td>التدريس الحواري</td>
<td>dialogic teaching</td>
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<td>أحمد</td>
<td>Ahmad</td>
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<td>Zayed</td>
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<tr>
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<td>Teacher</td>
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<tr>
<td>مدير</td>
<td>head teacher</td>
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<tr>
<td>طالب</td>
<td>student</td>
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<tr>
<td>جماعي</td>
<td>collective</td>
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<td>خوارزميات</td>
<td>algorithms</td>
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<td>التغذية الراجعة</td>
<td>feedback</td>
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<td>High grades (stage 2)</td>
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<tr>
<td>صفوف أولية</td>
<td>Low grades (stage one)</td>
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<tr>
<td>الفصل</td>
<td>Classroom/</td>
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<tr>
<td>الحوار</td>
<td>dialogue</td>
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<td>المناقشة</td>
<td>discussion</td>
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<td>المحادثة</td>
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<td>مناهج قديمة</td>
<td>Old curriculum</td>
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<td>مناهج محدثة أو مطورة</td>
<td>Developed curriculum</td>
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<td>مهارات التفكير العليا</td>
<td>High thinking skills</td>
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<td>ورشة عمل</td>
<td>workshop</td>
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<td>تمارين</td>
<td>exercises</td>
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<td>مسائل</td>
<td>Problem</td>
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<td>Workshop</td>
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<td>مشرف</td>
<td>Supervisor</td>
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Appendix L: School of Education Ethical Approval (pilot study)

A- School of Education Ethical Approval Application and consent form (Pilot with Tutor)

School of Education
Ethical Approval Application Form

The ethical approval application form must contain answers to all the questions indicated in the boxes below, if they do not apply please state why.

SECTION 1 Student Details /Identification of the person responsible for the research

<table>
<thead>
<tr>
<th>Name of Student:</th>
<th>Mansour Alanazi</th>
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<tbody>
<tr>
<td>Student ID (quoted on library/ swipe card):</td>
<td>8023912</td>
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<tr>
<td>Email Address:</td>
<td><a href="mailto:mansour.alanazi@postgrad.manchester.ac.uk">mansour.alanazi@postgrad.manchester.ac.uk</a></td>
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<tr>
<td>Name of Supervisor:</td>
<td>Dr. Laura Black</td>
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<tr>
<td>Programme (PhD, Prof Doc, MEd, PGCE, MSc, BA etc):</td>
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<td>Year of Study</td>
<td>First year</td>
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<td>Full/Part-time</td>
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<td>Title of Project:</td>
<td>An investigation of developing teachers’ understanding of using dialogic approach (Pilot Study)</td>
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<td>Project Start and End Dates:</td>
<td>Upon approval – Jan 2015</td>
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<td>Location(s) where the project will be carried out:</td>
<td>In Manchester, School of education</td>
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<td>No risk, or acceptable levels of risk (measures documented)</td>
<td>Low risk</td>
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<td>Student Signature:</td>
<td>Mansour Alanazi</td>
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<td>Supervisor Signature:</td>
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<td>Date:</td>
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2. **Aims and Objectives of the Project**

A. Provide a statement of your research aims and objectives including research questions.

Drawing on recent developments in dialogic approaches to learning and teaching of mathematics, the aim of my main PhD project is to investigate how Saudi mathematics teachers develop their understanding of classroom dialogue through a professional development process. This professional development process uses video recordings of the participants’ lessons in the form of video stimulated recall. In order to improve the quality of the research, a pilot study will be used in order to try out this stimulated video recall method to explore the challenges and affordances that this method has. For logistical reasons, the pilot will involve an undergraduate tutor and will look at how this method can tap into reflective practice regarding the quality of dialogue between lecturer and students.

B. What is the justification for the research? (why is it an area of importance/ has any similar research been done)

Many studies have focused on the classroom discourse and the quality of dialogue (Mercer and Sam 2006, Alexander, 2006, 2008; Solomon and Black 2008, Walshaw & Anthony, 2008). Therefore, classroom talk and dialogue has become fundamental to students’ learning mathematics and much research has focused on the ways teachers interact with their students. In addition, research on teachers’ professional development emphasises the value of video-stimulated recall to enable teachers to reflect on their practice (Muir, 2010) and to enhance reflection (Rosaen, et al., 2008, Powell, 2005). Thus, video-stimulated recall will be a useful tool in terms of developing teachers understanding of dialogic teaching and how it can be used ‘on the ground’. This is particularly timely in Saudi Arabia with the introduction of a new ‘reform’ orientated curricula and textbooks which hold dialogic teaching as central but which has not yet been fully adopted by mathematics teachers. The purpose of this pilot project is to assess and evaluated video stimulated recall as a tool for professional development and as a data collection method.

C. What are the main ethical issues and what steps will be taken to address them?

1) The pilot study involves observing a tutor and undergraduate students and interviews the tutor. Great effort will be made to ensure all data is kept confidential and that individuals cannot be identified. No information which can identify participants will be kept and as this is a pilot the data will not be published in a public forum.

2) Another issue is to take steps to ensure that the tutor and the students do not feel coerced in to participating in the study. Informed consent will be obtained with extra care to notify the tutor and the students that they are free to withdraw at any time without consequence.

3) Inconvenience to the tutor and students – care will be taken to ensure that the lecture observation and the following interview will be arranged at times convenient to the tutor and that will not take him away from their routine activities. The lecture observation will be conducted in a lecture which is already part of the timetable.
2. Methodology

A. Please outline the design and methodology of the project, including the methods of data collection and the methods of data analysis and the theoretical framework that informs it.

The pilot study will involve qualitative research methods. This includes a lecture observation and following interview. The participant will be one professional educator interested in teaching and learning. The pilot study will take place during the first semester of the academic year 2012/13 on campus at the University of Manchester. It will involve videoing one lecture (involving the tutor and students), selecting key episodes relating to the dialogue used and then showing such episodes to the tutor in order to stimulate his reflections on his own practice. The interview with the tutor will also involve asking key questions about tutor’s beliefs regarding teaching. The analysis of the observation and the interview data will look at how the tutor’s beliefs and knowledge are made visible in the practice of teaching through discourse analysis.

B. A description of the research procedures/activities as they affect the study participant and any other parties involved.

The tutor (and students) will be observed and videoed for one lecture lasting approx. 2 hours. The student researcher will act as participant observer in lecture observation. The interview using video stimulated recall will last no longer than 2 hours maximum.

C. Please state your experience in conducting the research procedures/activities and provide supporting evidence.

The student researcher has experience of conducting interviews with primary students and administering tests in a professional capacity and through a Master’s degree. I have completed two research training modules, namely Quantitative Methods and Analysis (EDUC60542) and Qualitative Data Analysis (EDUC60562), at the School of Education. In addition, I have attended different workshops and training courses at the University of Manchester. These training courses have improved my research skills and knowledge.

Attach copies of any draft instrument / interview guide / screen prints, and so on.

3. Participants

A. Give the number of participants; sex; age group and location

The participants will be one male tutor and approximately 25 students.

B. Will your project include participants from any of the following groups? (Tick as appropriate)

C. If your project includes vulnerable populations please explain why it is necessary to include them in your study, including measures you will take to avoid coercion.

The study will not include vulnerable populations.

4. Recruitment (please append any advertisement you will use)

A. How will potential participants be:
   i) Identified: By the researcher
   ii) Approached and Recruited: Personal contact

B. How will your recruitment policy avoid putting any overt or covert pressure on the individual to consent?

The researcher will inform participants that their participation is entirely voluntary and refusal to participate will attract no sanction, and that they will not be required to give reasons for refusal. Also, if they agree to participate in the study, they are free to leave the study at any time without being required to give reasons for leaving. If any students do not consent to being videoed as part of the lecture observation, then the camera will be positioned so that they out of view and any input they make in class will not be counted as data (or used as part of the video stimulated recall process). The attached information sheet and consent form will provide full details.
regarding the study including what will be required of them, how the data will be managed, and assurances of confidentiality and anonymity.

C. How long will the participant have to decide whether to take part in the study?
   Two weeks.

D. State any payment or any other incentive that is being made to any study participant. Specify and state the level of payment to be made and/or the source of the funds/gift/free service to be used and the justification for it.
   There is no payment.

5. Risk and Safeguards
   Please outline any adverse effects or risks for participants
   
   A. What is the potential for adverse effects of a physical nature; risks or hazards, pain, discomfort, distress, or inconvenience, to participants?
      No physical effects and risks have been identified.

   B. Will any topics discussed (questionnaire, group discussion or individual interview) be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could take place during the project?
      The interview will not involve discussion of sensitive or embarrassing issues. However, it is acknowledged that there is a minimal chance that such issues may arise spontaneously during the course of the research.

   C. What is the potential for adverse effects, risks or hazards, pain, discomfort, distress, or inconvenience, of a physical or psychological nature to you as the researcher?
      No effects and risks identified.

   D. What precautions have been taken to minimise or mitigate the risks identified above in A, B, C?
      The student researcher will be flexible in conducting the observation and the interview with the tutor and will be aware that the study should not interrupt normal university procedures and activities. In terms of social risk, attention will be paid to a procedure of ongoing consent checking and the participant will also be made aware that he can decline to discuss particular topics or issues.

6. Consent
   
   A. Detail how informed consent/assent will be obtained.
      All informed consent will be supplied in written form (information sheet) and signed off (consent form) by the study participants. Please see attached information sheets and consent forms. I have received training in taking consent via my core training modules.

   B. If the participants are to be recruited from a vulnerable groups (3B) give details of the extra steps taken to assure their protection.
      Attach draft Information Sheets & Consent Forms for each participant group.

7. Data Protection and confidentiality
   
   A. Will the pilot study use any of the following activities at any stage?
      - [ ] Electronic transfer by email or computer networks
      - [ ] Storage of personal data on any of the following:
        - [ ] Home or other personal computers

      The researcher will abide by the provisions of the Data Protection Act and the University Data Protection Policy. Data and results obtained from the research will only be used in the way(s) for which consent has been given.

   B. Please provide details on the measures you will employ to comply with the Data Protection Act and the University Data Protection Policy?
The researcher will be aware that research data must be fairly and lawfully processed for limited purposes. The data will not kept longer than necessary and processed in accordance with the participant’s rights. The data will have adequate protection.

C. What measures have been put in place to ensure confidentiality of personal data?
All participants’ names and identifiers will be removed and pseudonyms will be used thus breaking the link between identifiers and individuals. Data base storage will be encrypted. The classroom videos of participants will be stored in accordance with the School policy on Video Recording and Still Image Capture. Once the work is complete, the original source material and final output resources will be destroyed after a pilot analysis has been completed.

D. Where will the analysis of the data from the study take place and by whom will it be undertaken?
By the student researcher in a private study area.

E. Who will have control of and act as the custodian for the data generated by the study?
The student’s supervisor: Dr. Laura Black

F. Who will have access to the data generated by the study?
The student researcher will have sole access to the data (other than the participants). Additionally, the supervisor may ‘see’ the data for analysis purposes. This relates to the interview data only which will be anonymised. Supervisors will not view the video of the lecture.

G. For how long will data from the study be stored?
As this data is not for publication, the data will be destroyed after analysis which will be no more than one year after the data has been collected.

8) Reporting Arrangements

A. Please confirm that any adverse event will be reported to the Committee
I confirm that any adverse event will be reported to my supervisor and then to the UREC committee.

B. How is it intended the results of the study will be reported and disseminated?
(Tick as appropriate)
□ Thesis/dissertation

C. How will the results of research be made available to research participants and communities from which they are drawn?
By writing report to the tutor about the findings of the pilot study.

D. What arrangements are in place for monitoring and auditing the conduct of the research?
The supervisor will monitor the research.

E. What are the criteria for electively stopping the research prematurely?
Any unforeseen harm that cannot be resolved.

9. Sponsorship

Provide information on whether the study is in receipt of any external funding. Confirm who will act as sponsor of the research.
This is a student degree project and The University of Manchester will sponsor the research.
10. Conflict of Interest
Have any conflicts of interest been identified in relation to this project?

No conflict of interest has been identified at the point of application. Should a conflict of interest become apparent as the study progresses then UREC will be informed.

SECTION 3 - MINOR AMENDMENT TO RESEARCH PROJECT

Application for Approval of Minor Amendment\(^5\) to a Research Study

Details of proposed amendment (please give as much detail as possible)

Supervisor Declaration

I agree that the amendment proposed does not change the character of this research or the participant groups.

I confirm that the research risk assessment for the study as MEDIUM remains.

Supervisor’s signature* | Date.

Please send applications for amendment to ethical approval for MEDIUM risk research to the School Quality Assurance Administrator at ethics.education@manchester.ac.uk who will pass on the request to the RIC member who authorised the original application wherever possible.

\(^5\) Minor amendments are those that do not alter the character of the research or the participant groups.
Tutor's Participant Information Sheet

An investigation of developing teachers' understanding of using dialogic approach in Saudi primary mathematics classrooms

Participant Information Sheet

You are being invited to take part in a pilot study for my PhD research on developing teachers’ understanding of using a dialogic approach in primary mathematics classrooms. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research

An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms.

What is the aim of the research?

The key aim of this pilot study is to evaluate ‘video stimulated recall’ as a data collection method which captures data on teachers’ reflective practice. The focus of this pilot will be on your practice and particularly the nature of dialogue between yourself (the tutor) and your undergraduate students. Please be aware that your ‘teaching’ is not under scrutiny or evaluation but rather the use of video stimulated recall as tool for aiding reflection within an interview setting.

Why have I been chosen?

You have been chosen to participate in this pilot lecture observation and interview as a professional educator interested in teaching and learning.

What would I be asked to do if I took part?

One of your lectures will be video recorded. You are not asked to do anything additional to your ‘normal’ teaching practice. I will then analyse the video and select some key episodes relating to the topic of teacher-student dialogue. You will then be asked to participate in an interview where we view these episodes and I will ask some questions about your teaching practice.

What happens to the data collected?

The data will be used to help enhance my understanding of the problems and challenges of using videos in interviews with teachers. The data will be analysed and interpreted for this purpose only. The data will be kept in a secure location in line with the university’s data protection policy. It will be destroyed within one year after collection.

How is confidentiality maintained?

I will maintain the confidentiality and anonymity at all times. No names or identifiable information will be collected or reported in the write up of this research. Any issues discussed within interviews will be kept confidential and seen only by myself and my supervisor, Laura Black.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason.

Will I be paid for participating in the research?
No, you will not be paid for participating.

What is the duration of the research?
It will be one lecture observation (2 hours) and the duration of the interview will be up to 2 hours.

Where will the research be conducted?
The pilot observation will be conducted on campus at the University of Manchester

Will the outcomes of the research be published?
No.

Criminal Records Check (if applicable)

Contact for further information
Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

What if something goes wrong?

If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL, by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093
CONSENT FORM

An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

If you are happy to participate please complete and sign the consent form below

1. I confirm that I have read the attached information sheet on the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.

3. I understand that the lecture and interviews will be audio/video-recorded

4. I agree to the use of anonymous quotes

I agree to take part in the above project

<table>
<thead>
<tr>
<th>Name of participant</th>
<th>Date</th>
<th>Signature</th>
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</table>

<table>
<thead>
<tr>
<th>Name of person taking consent</th>
<th>Date</th>
<th>Signature</th>
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<tr>
<td></td>
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</tbody>
</table>
Students' participant information sheet and Consent form

Participant Information Sheet

An investigation of developing teachers' understanding of using dialogic approach in Saudi primary mathematics classrooms

Your tutor is being invited to take part in a pilot study for my PhD research. The focus of my PhD is on developing Saudi mathematics teachers’ understanding of dialogic teaching. The aim of this pilot is to evaluate the use of video stimulated recall as a tool for encouraging teachers to reflect on their own teaching practice. Therefore, I would like to video your lecture and this requires your consent. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to be in this pilot study. Thank you for reading this.

Who will conduct the research?
Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms.

What is the aim of the research?
The key aim of this pilot study is to evaluate ‘video stimulated recall’ as a data collection method which captures data on teachers’ reflective practice. The focus of this pilot will be on your tutor’s teaching practice and particularly the nature of dialogue between him (the tutor) and yourselves as undergraduate students. Please be aware that his ‘teaching’ and your participation is not under scrutiny or evaluation but rather the use of video stimulated recall as tool for aiding reflection within an interview setting.

Why have I been chosen?
You have been chosen to participate because your tutor is a participant in this pilot study.

What would I be asked to do if I took part?
You will not be asked to do anything other than your ‘normal’ participation in lectures. One lecture will be videoed, this will then be analysed by myself and selected episodes will be identified for an interview with your tutor about his teaching practice. The focus of these episodes will be on your tutor and his behaviour rather than yourself.

What happens to the data collected?
The data will be used to help enhance my understanding of how video stimulated recall can unpack tutor’s beliefs about teaching practice, and the problems and challenges of using this method. The data will be analysed and interpreted for this purpose only. The data will be kept in a secure location in line with the university’s data protection policy. It will be destroyed within one year after collection.

How is confidentiality maintained?
I will maintain the confidentiality and anonymity at all times. No names or identifiable information will be collected or reported in the write up of this research and the video will only be viewed by myself the researcher and your tutor. The interview (based around
the video) will be transcribed and all participants will remain anonymous. The interview data will be seen only by myself and my supervisor, Laura Black.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason. Any students who do not consent to participate, will be removed from view of the camera and their input will not be included in the analysis of key episodes.

Will I be paid for participating in the research?
No, you will not be paid for participating.

What is the duration of the research?
It will be one lecture observation (2 hours).

Where will the research be conducted?
The pilot observation will be conducted on campus at the University of Manchester

Will the outcomes of the research be published?
No.

Criminal Records Check (if applicable)

Contact for further information
Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

What if something goes wrong?
If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to 'The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL', by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093
CONSENT FORM

An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

If you are happy to participate please complete and sign the consent form below

5. I confirm that I have read the attached information sheet on the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

6. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.

7. I understand that the lecture and interviews will be audio/video-recorded

8. I agree to the use of anonymous quotes

I agree to take part in the above project

Name of participant ___________________________ Date ___________ Signature ___________________________

Name of person taking consent ___________________________ Date ___________ Signature ___________________________

Please Initial Box

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- Still Image and Video Recording Declaration

School of Education
Research Risk and Ethics Assessment
Still Image and Video Recording Declaration

This form should be completed by all research students who seek to utilise still image capture or video recording of prospective research participants. This form should be completed and by the researcher in discussion with their supervisor and submitted with the current School of Education Research Risk and Assessment (RREA) and other relevant documentation. Please read the guidance document available prior to completing this form.

<table>
<thead>
<tr>
<th>Name of researcher:</th>
<th>Mansour Alanazi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of research study:</td>
<td>An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms</td>
</tr>
<tr>
<td>Degree programme and unit:</td>
<td>PhD Education</td>
</tr>
<tr>
<td>This study seeks to utilise:</td>
<td>Video recording</td>
</tr>
</tbody>
</table>

This project intends to make use of still image and/or video recordings for research purposes of the following type(s) (please tick):

1. Still image or video resources available from a library or archive;

2. Still image or video recorded independently by the researcher using their own or local available resources;

3. Still image or video produced by the researcher within an independent production team;

4. Still image or video production initiated by the researcher and recorded independently by research participants.

The researcher should complete the following declaration:

I have read and understood my responsibilities as a video ethnographer as outlined in ‘Video recording and still image capture for research purposes in the School of Education, University of Manchester’.

The use of still image and/or video for this study has been discussed by the researcher and supervisor and the manner in which still image or video recordings are to be used have been agreed as indicated.

All aspects of information provision to participants, consent, and related health and safety issues, as outlined in the current School of Education Research Risk and Ethics Assessment documentation, have been discussed and are made available with this form.

The researcher will provide an unedited copy of all original still image and/or video recorded materials for the above research activity for archive to the School of Education Quality Assurance Administrator for audit or inspection purposes.

Available from .http://www.education.manchester.ac.uk/intranet/ethics/
A- The Research Risk and Ethics Assessment (Pilot interview with two Saudi teachers)

RESEARCH RISK AND ETHICS ASSESSMENT

School of Education, University of Manchester

The School of Education is committed to developing and supporting the highest standards of research in education and its associated fields. The Research Risk and Ethics Assessment (RREA) resource has been created in order to maintain these high academic standards and associated codes of good research practice. The research portfolio within the School of Education covers a wide range of fields and perspectives. Research within each of these areas places responsibilities of a differing nature on supervisors and students subject to course, level, focus and participants. The aim of the Research Risk and Ethics Assessment is to assist supervisors and students in assessing these factors.

The School has determined three levels of Research Risk each of which has a number of associated criteria and have implications for the degree of ethical review required. In general, the research risk level is considered to be:

- **High** IF the research focuses on groups within society in need of special support, or where it may be non-standard, or if there is a possibility the research may be contentious in one or more ways.
- **Medium** IF the research follows standard procedures and established research methodologies and is considered non-contentious.
- **Low** IF the research is of a routine nature and is considered non-contentious.

Agreement to proceed with research at each of these levels is provided by an appropriate University Research Ethics Committee, a School of Education Research Integrity Committee member, or by the supervisor/tutor respectively.

How to complete the Research Risk and Ethics Assessment (RREA) form.

This form should be completed by School of Education students and their supervisors in all cases, except where a pre-approved assignment template currently exists.

Students and supervisors should complete this form in consultation with the School of Education Ethical Practice Policy Guidelines. There are five main sections to this document, with three additional sections for UG/PGT research seeking supervisor/tutor approval for LOW risk studies:

All students
- Section A – Research Summary Information (page 2)
- Section B – Outline of Research (page 3)
- Section C.1 – Criteria for HIGH risk research (page 5)
- Section C.2 – Criteria for MEDIUM risk research (page 7)
- Section C.3 – Criteria for LOW risk research (pages 8)

UG/PGT students and Prof Doc students completing Research Papers only

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7 A reasonable person would agree that the study includes no issues of public or private objection, or of a sensitive nature.

8 For courses with approved templates see: http://www.education.manchester.ac.uk/intranet/ethics

9 [http://www.education.manchester.ac.uk/intranet/ethics](http://www.education.manchester.ac.uk/intranet/ethics)
• Section D.1 – Criteria for LOW risk PGT/UG approval (pages 10-11)
• Section D.2 – LOW risk supervisor approval criteria and signature (page 11)
• Section D.3 – Minor Amendments to LOW risk study and supervisor approval (page 12)

Instructions on procedure are provided at the end of each section.

It may be appropriate for supervisors and students to review and discuss responses to these questions together. A member of the School’s Research Integrity Committee should be contacted if there are questions about the most appropriate response to any question. Instructions on subsequent stages of the process are provided at the end of each section.

\footnote{A list of current RIC members is available at: \url{http://www.education.manchester.ac.uk/intranet/ethics/}}
## RESEARCH RISK AND ETHICS ASSESSMENT
School of Education, University of Manchester

To be completed by QA administrator

<table>
<thead>
<tr>
<th>RIA reference</th>
<th>Date received</th>
<th>Date approved</th>
</tr>
</thead>
</table>

### SECTION A - SUMMARY OF RESEARCH PROPOSAL
This section should be completed by the person undertaking the research.

<table>
<thead>
<tr>
<th>A1. Name of Person/Student:</th>
<th>Mansour Alanazi</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2. Student ID (quoted on library/swipe card):</td>
<td>8023912</td>
</tr>
<tr>
<td>A3. Email Address:</td>
<td><a href="mailto:mansour.alanazi@postgrad.manchester.ac.uk">mansour.alanazi@postgrad.manchester.ac.uk</a></td>
</tr>
<tr>
<td>A4. Name of Supervisor:</td>
<td>Dr. Laura Black</td>
</tr>
<tr>
<td>A5. Supervisor email address &amp; contact phone no.:</td>
<td><a href="mailto:Laura.Black@manchester.ac.uk">Laura.Black@manchester.ac.uk</a> Ellen Wilkinson Building-A1.10 55964</td>
</tr>
<tr>
<td>A6. Programme (PhD, ProfDoc, MEd, PGCE, MSc, BA etc):</td>
<td>PhD</td>
</tr>
<tr>
<td>A7. Year of Study</td>
<td>First year</td>
</tr>
<tr>
<td>A9. Course Code</td>
<td>EDUC</td>
</tr>
<tr>
<td>A10. Title of Project:</td>
<td>An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms</td>
</tr>
<tr>
<td>A11. Participant Recruitment Start Date:</td>
<td>On confirmation of ethical approval</td>
</tr>
<tr>
<td>A13. Location(s) where the project will be carried out:</td>
<td>In Saudi Arabia</td>
</tr>
<tr>
<td>A14. Student Signature:</td>
<td>Mansour Alanazi</td>
</tr>
</tbody>
</table>

The following section to be completed by the SUPERVISOR

<table>
<thead>
<tr>
<th>A15. Assessed Risk Level</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
</table>

| A16. Supervisor Signature | L. Black |
| A17. Date | 23.8.2012 |
SECTION B – DESCRIPTION OF RESEARCH

This section should be completed by the person undertaking the research.

B1. Provide an outline description of the planned research (250 words max).

In 2003, the Ministry of Education in Saudi Arabia has established "The General Project for Curriculum Development". Based on this project, the new curriculum of primary mathematics is delivered using three different books: a teacher’s guidebook, a student textbook and a student activities book for each grade. This requires teachers to play a different role than has been typical in Saudi Arabia. The proposed study involves pilot interviews with two mathematics teachers to get more information and data about their perceptions about the new mathematics textbooks and how they are being implemented. These interviews will help develop the aim of the overall research which will use a teacher development approach to explore how Saudi teachers can improve their practice in terms of initiating and sustaining a dialogic approach to facilitate greater mathematical understanding in students.

B2. The principal research methods and methodologies are (250 words max):

The method will be a pilot interview with two teachers. This interview will be conducted by email for ten minutes. The interview questions concern the new Saudi primary mathematics textbooks.

The interview questions:

Q1: what is your view about new mathematics curriculum?
Q2: what is the main difference between the new curriculum and the previous one?
Q3: there is a teaching part in the new curriculum about the higher thinking skills. What do you think about it?
Q4: There is a book as a guidebook for the teacher, what do think about it?
Q5: Is there a difference in the role of the teacher and the student with the new curriculum?
Q6: What are the main challenges facing the teacher in the application of this new curriculum?
Q7: the teacher, do you think that teacher needs training?
B3. Please indicate which of the following groups are expected to participate in this research:

- Children under 16, other than those in school, youth club, or other accredited organisations.
- Adults with learning difficulties, other than those in familiar, supportive environments.
- Adults who are unable to self-consent
- Adults with mental illness
- Those who could be considered to have a particularly dependent relationship with the researcher
- Prisoners
- Young Offenders
- Other vulnerable groups (please detail)

OR

√ None of the above groups are involved in this study

B4. Number of expected research participants.  2

B5. The research will take place (tick all that apply):

- within the UK
- within the EU
√ within the researcher’s home country if outside the EU
- wholly or partly in non-EU countries which are not the home country of the researcher

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11 The person with learning difficulties has appropriate support within the setting from accredited support workers or family members.
12 The researcher’s ‘home country’ is defined as one in which (1) the researcher holds a current passport through birthright or foreign birth registration, (2) a country where the researcher has resident status, or (3) where the researcher holds a permit or visa to work, has a contract of employment, and is not a UK tax-payer.
SECTION C – RESEARCH RISK ASSESSMENT

The following sections should be completed by the person undertaking the research in discussion with their supervisor/tutor with advice from a member of the School’s Research Integrity Committee where appropriate.

C.0 – Criteria for research classified as **HIGH RISK** – NRES

The study involves primary research with adults who are unable to self consent

The study involves primary research with NHS patients or NHS staff, or on NHS premises

The study involves primary research with prisoners/young offenders

If any of these options are selected then please complete an NRES application. See your supervisor for further guidance.

C.1 – Criteria for research classified as **HIGH RISK** (tick any that apply)

I/we confirm that this research:

- involves vulnerable or potentially vulnerable individuals or groups as indicated in B3
- addresses themes or issues in respect of participant’s personal *experience* which may be of a sensitive nature (i.e. the research has the potential to create a degree of discomfort or anxiety amongst one or more participants)
- cannot be completed without data collection or associated activities which place the researcher and/or participants at personal risk
- requires participant informed consent and/or withdrawal procedures which are not consistent with accepted practice
- addresses an area where access to personal records (e.g. medical), in collaboration with an authorised person, is not possible
- involves primary data collection on an area of public or social objection (e.g. terrorism, paedophilia)
- makes use of video or other images captured by the researcher, and/or research study participants, where the researcher cannot guarantee controlled access to authorised viewing.
- will involve direct contact with participants in countries on the Foreign and Commonwealth Office warning list
- will involve direct contact with participants in countries outside of the European Union or the researcher’s home country (see footnote 6, page 4)
- involves face to face contact with research participants outside normal working hours that may be seen as unsocial or inconvenient
- will take place wholly or partly without training or qualified supervision
- requires appropriate vaccinations which are unavailable
- will take place in locations where first aid and/or other medical support or facilities are not available within 30 minutes

[^14]: For example, in the UK, normal working hours are between 8am-6pm, Mon-Fri inclusive.
may involve the researcher operating machinery, electrical equipment, or workplace vehicles, or handling or working with animals at the research location(s), for which they are not qualified, and where a qualified operative or handler is not available to act as supervisor.

A. PGR research

If ONE OR MORE of the **HIGH risk** criteria have been selected ethical **approval must be sought from a UREC committee.**

The person undertaking the research and their supervisor should agree this risk assessment and submit:

- Completed RREA form
- Completed the UREC form.
- Supporting documents

The documents listed above should be submitted to:

A. Mrs. Debbie Kubiena, Room B3.10 along with your PhD Research Plan for consideration at the PhD/Prof Doctorate Review Panel.

B. The Quality Assurance Administrator via Ethics.Education@manchester.ac.uk by your supervisor. In doing so, supervisors confirm that they have agreed the assessed risk level and that the documents are complete and correct. The QA Administrator will arrange authorisation for your documents to be submitted to UREC.

C. The Quality Assurance Administrator via Ethics.Education@manchester.ac.uk by your supervisor. In doing so, supervisors confirm that they have agreed the assessed risk level and that the documents are complete and correct. The QA Administrator will forward your completed documents to a member of the SoE RIC committee for approval.

If no **HIGH risk** items are ticked supervisors and students should continue to section C.2 on the next page ⇒

C.2 – Criteria for research classified as **MEDIUM RISK** (tick any that apply)

I/we confirm that this research:

- is primary research involving children or other vulnerable groups which involves direct contact with participants\(^{15}\).
- study is on a subject that a reasonable person would agree addresses issues of legitimate interest, where there is a possibility that the topic may result in distress or upset in rare instances.
- is primary research which involves substantial direct contact\(^{16}\) with adults in non-professional roles.
- is primary research which focuses on data collection from professionals responding to questions outside of their professional concerns.

\(^{15}\) This does not include research in locations where children are present if they are not the focus of the research.

\(^{16}\) For example in focus group or one to one interview in private locations, and not ‘market research’ which is characterised by brief interaction with randomly selected individuals in public locations.
is primary research involving data collection from participants outside of the EU or the researcher’s home country via direct telephone, video, or other linked communications.

is practice review/evaluation involving topics of a sensitive nature which are not personal to the participants.

involves visits to site(s) where a specific risk to participants and/or the researcher has been identified, and the researcher may not be closely supervised throughout

requires specific training and this is scheduled to be completed before fieldwork starts, or, training will not be undertaken but the research will be closely supervised by an academic advisor with appropriate qualifications and skills

requires vaccinations which have been received, or are scheduled to be received in a timely fashion

requires face to face contact with research participants partly outside normal working hours\(^\text{17}\) that may be seen as inconvenient

takes place in, or involves transport to and from, locations where the researcher’s lack of familiarity may put them at personal risk

may require the operation of machinery, electrical equipment, or workplace vehicles, or handling or working with animals at the research location(s), for which they are not qualified, but such operation or handling will be undertaken under close supervision from a qualified operative or handler

If ONE OR MORE of the MEDIUM risk criteria have been selected, ethical approval must be sought from the School of Education (SoE) Research Integrity Committee (RIC). The supervisor and student should agree this assessment and submit:

- Completed RREA form
- Completed School of Education Ethical Approval Application form\(^\text{18}\)
- Supporting documents.

Documents should be submitted to either

A. **PGR Thesis** - Mrs. Debbie Kubiena, Room B3.10 along with your PhD Research Plan for consideration at the PhD/Prof Doctorate Review Panel.

B. **All other cases** - to the Quality Assurance Administrator via Ethics.Education@manchester.ac.uk by your supervisor. In doing so, supervisors confirm that they have agreed the assessed risk level and that the documents are complete and correct. The QA Administrator will forward your completed documents to a member of the SoE RIC committee for approval.

*If none of the HIGH or MEDIUM risk criteria have been ticked, supervisors and students should continue to section C3 on the next page* ↪

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\(^{17}\) In the UK normal working hours are between 8am-6pm, Mon-Fri inclusive.

\(^{18}\) This document and guidance for completion can downloaded from [http://www.education.manchester.ac.uk/intranet/ethics](http://www.education.manchester.ac.uk/intranet/ethics)
C3 – Criteria for research classified as LOW RISK

C 3.1  Research not involving human participants
I/we confirm that this research (tick as appropriate):

- √ is not of high nor medium risk to the researcher, in accordance with the criteria provided in sections C.1 and C.2 respectively.
- is Secondary research (i.e. it will use material that has already been published or is in the public domain).
- is Secondary data analysis (i.e. it will involve data from an established data archive)

If you have ticked one of the options in C3.1 above, and C3.2 does not apply, you should now complete section C3.3

C3.2  Research involving human participants
I/we confirm that this research (tick as appropriate):

- √ is not of high nor medium risk to the researcher, or participants, in accordance with the criteria provided in sections C.0, C.1 and C.2 respectively.
- √ A reasonable person would agree that the study addresses issues of legitimate interest without being in any way likely to inflame opinion or cause distress\(^{19}\)
- is Practice review (i.e. the research involves data collection from participants on issues relating to the researcher’s professional role, in a setting where the researcher is employed or on a professional placement)
- is Practice evaluation (i.e. the research involves data collection on a student’s professional role, in a setting where the researcher is employed or on a professional placement. The data collected will be used for comparison against national or other targets or standards).
- √ is Primary research on professional practice with participants in professional roles.
- is Market research (i.e. the research may involve data collection from the general public approached or observed in public locations for the purposes of market investigation).
- √ is Primary research using a questionnaire completed and returned by participants with no direct contact with the researcher.

C 3.3  Research context
I/we confirm (tick as appropriate):

- √ the research will be conducted wholly with the European Union, or outside the EU but in the researcher’s home nation,
- √ the researcher is not in a position to coerce potential participants
- √ the location(s) of the research are not listed on the Foreign and Commonwealth Office warning lists\(^ {20}\)
- √ Primary or practice research involves no vulnerable group (as indicated in question B3).

---

\(^{19}\) A reasonable person would agree that the study includes no issues of public or private objection, or of a sensitive nature.

Primary or practice research will be conducted in a public space or building (e.g. the high street, the University campus, a school building, etc)

⇒ UG and PGT research that involves only low risk criteria go to Section D.1 page 10
⇒ PGR students should follow the directions below.

PGR Panel Students

If ONE OR MORE of the LOW risk criteria above have been selected, ethical approval must be sought from the School of Education Research Integrity Committee. The supervisor and student should agree this research risk assessment and submit:

- Completed RREA form
- Completed the School of Education Ethical Approval Application form 21.
- Supporting documents

Documents should be submitted to:
Mrs. Debbie Kubiena, Room B3.10 along with your PhD Research Plan for consideration at the PhD/Prof Doctorate Review Panel.

For UG, PGT research and Prof Doc students completing Research Papers that involve only LOW risk criteria go to Section D.1 page 10

SECTION D – UG/PGT Ethical Approval Application for LOW risk research

D. 1 Research ethics criteria I/we confirm (tick as appropriate):

Codes of Practice

√ I/we have read the School of Education Ethical Practice and Policy Guidelines

√ the researcher will abide by the School of Education’s Ethical Protocol detailed therein

√ the researcher is aware of and will abide by any organisation’s codes of conduct relevant to this research

Researcher skills/checks

√ all necessary training procedures for this research have been completed

⇒ all appropriate permissions have been obtained to use any database or resource to be analysed in Secondary research

⇒ all relevant enhanced CRB checks have been completed

⇒ written permission to be on the site to conduct primary research has been received

Risks to researcher

√ the researcher will not travel through or work in research locations which may have unlit areas, derelict areas, cliffs, or local endemic diseases

21 This document and guidance for completion can downloaded from http://www.education.manchester.ac.uk/intranet/ethics
no specific vaccinations are required to undertake this research

first aid provision and a trained first aider are available where appropriate

the researcher will only operate machinery, electrical equipment, or workplace vehicles, or handle or work with animals at the research location(s) if they are qualified to do so

the researcher will not give out personal telephone information to participants, or owners of secondary data resources, in relation to the research project

Primary or practice research will be carried out within normal working hours at a time convenient to participants.

Public and private travel to and from the primary or practice research location(s) are familiar to the researcher and offer no discernable risk.

Rights of participants

participant information sheets (PIS), consent forms, questionnaires, and all other documentation relevant to this research have been discussed with supervisor/tutor named in A.5

PIS and consent forms have been confirmed by the supervisor named in A.5, as covering required headings illustrated in the School of Education Participant Information and consent templates

the researcher understands the Data Protection Act and the University Data Protection Policy and all data will be handled confidentially and securely, including storage on encrypted devices.

Research Integrity

no data will be collected before approval of the study by the supervisor/tutor

the student researcher will immediately report any issues arising during the course of the study that conflict with the School of Education protocol, to the supervisor who has signed the ethics approval and suspend data collection pending advice from that supervisor/tutor

the researcher will report any proposed deviation from the research specification outlined in this assessment to the supervisor/tutor to update the current assessment or clarify any need for further approvals BEFORE such changes are made

Research output

the only publication/output from this research will be the assignment or dissertation unless consent has been obtained from participants for further dissemination

D.2 Supervisor confirmation that research constitutes LOW risk as assessed above.
When satisfied that the assessment is correct, the supervisor should complete this section.

For ‘low risk’ research approval relevant items in bold must be ticked and one or more of the specific research criteria as appropriate

The supervisor confirms:

X The submission has been discussed and agreed with the person(s) undertaking the research.

X The student has had appropriate training and has the skills to undertake this study, or has qualified supervision in place.

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22 For example, in the UK normal working hours are between 8am and 6pm Mon-Fri inclusive.
The research activities outlined in the proposal involve low risk to the student researcher or potential participants.

and one or more of the following as appropriate:

- Primary or Practice research will not address issues of public or social objection or of a sensitive nature.
- Information giving and consent taking processes follow School of Education guidance.
- Secondary research assignment/project has appropriate resource or database access permissions.
- They will act as custodian for data used for any study that results in a publication (dissertation or otherwise) and will arrange for archiving of data within the School for a minimum period of 5 years.

**Supervisor’s signature:** L.Black  
**Date:** 23.08.2012

**If all relevant** items in **bold** are confirmed and in addition all specific criteria relating to primary, practice or secondary research are confirmed as appropriate, **the supervisor should submit**:

- Completed RREA form
- Student research proposal, or equivalent, on which the assessment is based
- Supporting documents

Documents should be submitted electronically to the Quality Assurance Administrator via Ethics.Education@manchester.ac.uk by the supervisor. In doing so, supervisors confirm that they have agreed the assessed risk level and that the documents are complete and correct. The QA administrator will acknowledge receipt of the documents and provide formal confirmation of ethical approval via email to both student and supervisor. Copies of all documents should be retained by the supervisor.

**Amendments to proposed research design for LOW risk research**

Any minor amendment to low risk approved research submissions should be recorded and signed-off by the supervisor in section D.3 below as necessary. Substantial changes to research will require a reassessment and revised ethical approvals. A revised copy of the RREA showing the approved amendments, and any amended supporting documents, should be forwarded electronically to The QA administrator via ethics.education@manchester.ac.uk. The QA administrator will provide formal acknowledgement of approval of the change by email. A copy should be retained by the supervisor.

**D.3 To be completed if/when applicable:**

**Minor** amendment to assessed research agreed (1):

**Details of amendment**

This section will record any applications made during the life time of the Project regarding minor changes from what was approved.

**Supervisor’s signature:**  
**Date:**

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23 Supporting documents include recruitment adverts/emails, draft questionnaires/interview topic guides, information sheets and consent forms

24 Minor amendments are those that do not alter the character of the research or the participant groups

25 Minor deviations from previously approved research submissions are defined as those which neither change the nature of the study nor deviate from any participatory research groups previously identified. Supervisors should contact a member of the SoE Research Integrity Committee for advice if in doubt.
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

Participant Information Sheet

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research

An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms.

What is the aim of the research?

The aim of the research is to find mathematics teachers’ beliefs about the new primary mathematics textbook and the implementation of it.

Why have I been chosen?

You have been chosen because it is important to find out teachers beliefs about the new textbook and curriculum and to see how it is being implemented in practice. Personal contacts have been used in order to build a trustworthy relationship where participants can feel free to express their thoughts.

What would I be asked to do if I took part?

A short interview via email regarding the new reform primary mathematics textbooks and your perceptions about it. This will last approximately 10 minutes.

What happens to the data collected?

The data will be used to develop an understanding of the challenges teachers face in implementing the new textbook and to develop the main study’s research design – i.e. to think about how a teacher development programme might usefully meet these challenges.

How is confidentiality maintained?

The data will be kept confidential and all names or personal identifiers will be removed from the transcripts to protect your anonymity. The data will be stored by the researcher only with high security. All data will be kept by the researcher until the end of the research and will then be destroyed.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason.

**Will I be paid for participating in the research?**
No, you will not be paid for participating.

**What is the duration of the research?**
The duration of the interview will be 10 minutes.

**Where will the research be conducted?**
The interview will be conducted by the email.

**Will the outcomes of the research be published?**
No.

**Criminal Records Check (if applicable)**

**Contact for further information**
Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

**What if something goes wrong?**
If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL, by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093.
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

CONSENT FORM

If you are happy to participate please complete and sign the consent form below

9. I confirm that I have read the attached information sheet on the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily. 

Please Initial Box

10. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.

Please Initial Box

11. I agree to the use of anonymous quotes

Please Initial Box

I agree to take part in the above project

Name of participant ___________________________ Date ___________ Signature ___________________________

Name of person taking consent ___________________________ Date ___________ Signature ___________________________
Appendix M: School of Education ethical approval (main study)

School of Education
Ethical Approval Application Form

The ethical approval application form must contain answers to all the questions indicated in the boxes below, if they do not apply please state why.

SECTION 1 Student Details /Identification of the person responsible for the research

<table>
<thead>
<tr>
<th>Name of Student:</th>
<th>Mansour Alanazi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student ID (quoted on library/swipe card):</td>
<td>8023912</td>
</tr>
<tr>
<td>Email Address:</td>
<td><a href="mailto:mansour.alanazi@postgrad.manchester.ac.uk">mansour.alanazi@postgrad.manchester.ac.uk</a></td>
</tr>
<tr>
<td>Name of Supervisor:</td>
<td>Dr. Laura Black</td>
</tr>
<tr>
<td>Programme (PhD, Prof Doc, MEd, PGCE, MSc, BA etc):</td>
<td>PhD Education</td>
</tr>
<tr>
<td>Year of Study</td>
<td>First year</td>
</tr>
<tr>
<td>Full/Part-time</td>
<td>Full-time</td>
</tr>
<tr>
<td>Title of Project:</td>
<td>An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms</td>
</tr>
<tr>
<td>Project Start and End Dates:</td>
<td>Upon approval – Jan 2015</td>
</tr>
<tr>
<td>Location(s) where the project will be carried out:</td>
<td>Tabouk, Saudi Arabia</td>
</tr>
<tr>
<td>No risk, or acceptable levels of risk (measures documented)</td>
<td>Medium risk</td>
</tr>
<tr>
<td>Student Signature:</td>
<td>Mansour Alanazi</td>
</tr>
<tr>
<td>Supervisor Signature;** Date:</td>
<td></td>
</tr>
</tbody>
</table>

** Supervisor signature confirms that the student has the relevant experience, knowledge and skills to carry out the study in an appropriate manner.

SECTION 2 PROJECT DETAILS (Please expand boxes to fit answers)
2. **Aims and Objectives of the Project**

A. **Provide a statement of your research aims and objectives including research questions.**

Drawing on recent developments in dialogic approaches to learning and teaching of mathematics, the aim of the project is to investigate how Saudi mathematics teachers develop their understanding of classroom dialogue through a professional development process in mathematics teaching. Therefore, the research questions addressed in the study are a) how can Saudi teachers develop their understanding of classroom dialogue through a professional development process, b) how does this developed understanding affect teacher-student dialogue in the Saudi primary mathematics classroom?

B. **What is the justification for the research? (why is it an area of importance/ has any similar research been done)**

Classroom talk and dialogue has become fundamental to students’ learning mathematics and much research has been increased on the ways teachers interact with their students. Many studies have focused on the classroom discourse and the quality of dialogue (Mercer and Sam 2006, Alexander, 2006, 2008; Solomon and Black 2008, Walshaw & Anthony, 2008). Teacher-student dialogue is very important type of classroom talk in dialogic teaching. In Saudi Arabia, a new reform curriculum for mathematics has been implemented which encourages more interaction between teachers and students in the classroom and places greater emphasis on dialogue. The implementation of this requires a teacher professional development programme which will be the focus of this study. Therefore, teacher’s professional development is essentially about developing their knowledge and understanding of dialogic teaching. The study will provide a close case study of three teachers’ beliefs and knowledge about dialogic teaching, and their ‘enacted’ understanding of it in terms of how they put it into practice.

C. **What are the main ethical issues and what steps will be taken to address them?**

1) The teacher development process involves working closely with teachers in a way which offers them a safe and confidential space to ‘speak their mind’. Great effort will be made to ensure all data is kept confidential and that individuals cannot be identified.

2) Another issue is to take steps to ensure that the teachers do not feel coerced in to participating in the study. Informed consent will be obtained with extra care to notify the teachers that they are free to withdraw at any time without consequence.

3) Inconvenience to teachers and students – care will be taken to ensure that all PDWs and meetings will be arranged at times convenient to the teachers and that will not take them away from their routine activities. Lesson observations will be conducted in lessons which are already part of the timetable.

4) The study includes video observation of three teachers in primary lessons where children under 16 will be present and participating in the dialogue. To address this, the student researcher will gain informed consent from the parents of the children having fully explained the focus of the study and how their child will be involved, verbal assent from the primary students themselves to ensure they are happy to have their dialogue recorded. If any parent or child is not happy to consent, they will be removed from view of the video camera and any episodes which contain their input will be removed from analysis. In addition, in order to minimise the identification of students, the video camera will be positioned at the back of the classroom so that the children’s faces are not normally visible.
2. Methodology

A. Please outline the design and methodology of the project, including the methods of data collection and the methods of data analysis and the theoretical framework that informs it.

The study will involve an embedded case study collecting qualitative data on i) teachers’ espoused beliefs about their teaching practice and dialogic teaching and ii) teachers’ enacted practices using dialogic teaching principles. The embedded case study is used for focusing on a teacher development programme (TDP) for Saudi primary mathematics teachers in relation to their use of dialogic teaching. The participants will be three male primary mathematics teachers in fifth-grade classrooms. Both of them work in public primary school in Tabouk city which is located in the north-western of Saudi Arabia. The fieldwork will take place during the school year September 2012 – July 2013. There are two phases for the design of the study. The first phase will be for three weeks to observe the classroom teaching practices for the three teachers and to video record episodes of teaching practice which can be used in the second phase. The second phase will involve eight weeks of Professional Development Workshops (PDW) with the teachers where video episodes will be used as ‘stimulated recall’ – i.e. as a tool to stimulate discussion and reflection regarding current teaching practices, the new reform curriculum and new strategies which align with dialogic teaching. Subsequent to each PDW, lessons will be video recorded and analysed and episodes will again be selected and transcribed for future PDWs. Hence the design of this research is cyclical. There will also be weekly summ-up meetings with the teachers to explore their perceptions of the teacher development process. The analysis of the observation data will look at how teachers’ beliefs and knowledge are made visible in the practice of teaching through discourse analysis.

B. A description of the research procedures/activities as they affect the study participant and any other parties involved.

The teachers will participate in 8 professional development workshops and subsequent sum-up meetings during the course of the research. In addition, teachers will apply what they will learn about dialogic teaching through PDWs in one observed lesson every week. The student researcher will act as participant observer in each teacher’s classroom and will video record key episodes or activities which are relevant to the PDWs.

The teachers will spend approximately two hours a week in each professional development workshop and approximately 30 minutes in each sum-up meeting. Each lesson observed lasts no longer than 45 minutes.

In addition, the observed lessons will involve up to 90 children whose behaviour is not the main focus of the study but will nevertheless participate as contributors to the dialogue during lessons. They will be involved in the observed lessons outlined above.

C. Please state your experience in conducting the research procedures/activities and provide supporting evidence.

The student researcher has experience of conducting interviews with primary students and administering tests in a professional capacity and through a Master’s degree. I have completed two research training modules, namely Quantitative Methods and Analysis (EDUC60542) and Qualitative Data Analysis (EDUC60562), at the School of Education. In addition, I have attended different workshops and training courses at the University of Manchester. These training courses have improved my research skills and knowledge.

Attach copies of any draft instrument / interview guide / screen prints, and so on.
3. **Participants**

**A. Give the number of participants; sex; age group and location**

The participants will be three primary mathematics teachers. They are male participants and their age is around 30. They work in public primary school in Tabouk city which located in the north-western of Saudi Arabia. They have bachelor degree in elementary education with specialisation in mathematics and have graduated from Tabouk Teachers’ College. They have 8 years of teaching experience at the primary level. They have been chosen as ‘cases’ for this study because they (a) are interested and enthusiastic to become involved in the research and learn about their own practice, (b) are willing to allow me to interview them and observe their classes with video recordings and (c) I have good personal relationships with them which is important for this kind of research.

Additionally, as mentioned above the study will also observe student behaviour as part of the video recorded lessons in the classrooms of each teacher – approximately 30 male students aged between 11 and 12 years.

**B. Will your project include participants from any of the following groups? (Tick as appropriate)**

- [ ] Children under 16

**C. If your project includes vulnerable populations please explain why it is necessary to include them in your study, including measures you will take to avoid coercion.**

The study will gain permission for the study from the authority at the school. As this study will be conducted with primary teachers reflecting on their teaching in primary schools, it is impossible not to include children under 16 who are a part of the teaching activities to be reflected upon. To avoid coercion the researcher will gain verbal assent from the children and informed consent from their parents and all parties will have the right to withdraw from the study at any time. Additionally, during the study, the researcher will act as a teaching assistant during phase 1 (3 weeks) whereby regular involvement in classroom activities will make him a familiar figure to the children. It is hoped that by building a close relationship with teachers and students, both parties will feel able to ‘speak their mind’ regarding their experience of participating in the study. Finally, as mentioned above, in order to minimise identification of the children on the video, the camera will be positioned at the back of the classroom so that their faces are not readily identifiable.

4. **Recruitment (please append any advertisement you will use)**

**A. How will potential participants be:**

i) **Identified:** By the researcher

ii) **Approached and Recruited:** Personal contact

**B. How will your recruitment policy avoid putting any overt or covert pressure on the individual to consent?**

The researcher will inform participants (both teachers and parents) that their or their child’s participation is entirely voluntary and refusal to participate will attract no sanction, and that they will not be required to give reasons for refusal. Also, if they agree to participate in the study, they are free to leave the study at any time without being required to give reasons for leaving. The attached information sheet and consent form will provide full details regarding the
study including how what will be required of them, how the data will be managed, and assurances of confidentiality and anonymity. Additional consent will be obtained for the use of video data from both the teachers and parents of students in the class.

C. How long will the participant have to decide whether to take part in the study?

Two weeks.

D. State any payment or any other incentive that is being made to any study participant. Specify and state the level of payment to be made and/or the source of the funds/gift/free service to be used and the justification for it.

There is no payment.

5. Risk and Safeguards

Please outline any adverse effects or risks for participants

A. What is the potential for adverse effects of a physical nature; risks or hazards, pain, discomfort, distress, or inconvenience, to participants?

No physical effects and risks have been identified other than the possibility of inconveniencing the teachers through their participation in PDW and meetings.

B. Will any topics discussed (questionnaire, group discussion or individual interview) be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could take place during the project?

The PDWs or sum-up meetings will not involve discussion of sensitive or embarrassing issues. However, it is acknowledged that there is a minimal chance that such issues may arise spontaneously during the course of the research.

C. What is the potential for adverse effects, risks or hazards, pain, discomfort, distress, or inconvenience, of a physical or psychological nature to you as the researcher?

No effects and risks identified.

D. What precautions have been taken to minimise or mitigate the risks identified above in A, B, C?

The student researcher will be flexible in conducting PDW and meetings with the teachers and will be aware that the study should not interrupt normal school procedures and activities. In terms of social risk, attention will be paid to a procedure of ongoing consent checking and participants will also be made aware that they can decline to discuss particular topics or issues. This will be the case for both teachers and children (via verbal assent).

6. Consent

A. Detail how informed consent/assent will be obtained.

All informed consent will be translated to Arabic language for the participants and will be supplied in written form (information sheet) and signed off (consent form) by the study participants. Regarding school children, the informed consent will be sent to their parents by the school’s administration. Please see attached information sheets and consent forms.

B. If the participants are to be recruited from a vulnerable groups (3B) give details of the extra steps taken to assure their protection.

Parental consent will be obtained through the school’s administration who will provide an information sheet (see attached) which fully explains their child’s involvement in the study (i.e. as participants on the videoed lessons to be viewed by teachers for the purpose of developing reflective practice).

Attach draft Information Sheets & Consent Forms for each participant group.
8. **Data Protection and confidentiality**

| A. Will the pilot study use any of the following activities at any stage? |
|------------------|------------------|
| ☐ Electronic transfer by email or computer networks |
| ☐ Storage of personal data on any of the following: |
| ☐ Home or other personal computers |

The researcher will abide by the provisions of the Data Protection Act and the University Data Protection Policy. Data and results obtained from the research will only be used in the way(s) for which consent has been given.

B. **Please provide details on the measures you will employ to comply with the Data Protection Act and the University Data Protection Policy?**

The researcher will be aware that research data must be fairly and lawfully processed for limited purposes. The data will not kept longer than necessary and processed in accordance with the participant’s rights. The data will have adequate protection.

C. **What measures have been put in place to ensure confidentiality of personal data?**

All participants’ names and identifiers will be removed and pseudonyms will be used thus breaking the link between identifiers and individuals. Data base storage will be encrypted. The classroom videos of participants will be stored in accordance with the School policy on Video Recording and Still Image Capture. Once the work is complete, the original source material and final output resources will be compressed and copied to DVD for archive storage.

D. **Where will the analysis of the data from the study take place and by whom will it be undertaken?**

By the student researcher in a private study area.

E. **Who will have control of and act as the custodian for the data generated by the study?**

The student’s supervisor: Dr. Laura Black

F. **Who will have access to the data generated by the study?**

The student researcher will have sole access to the data (other than the participants). Additionally, the supervisor may ‘see’ the data for analysis purposes but only in anonymised form.

G. **For how long will data from the study be stored?**

Only one year after graduation from the programme.

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8) **Reporting Arrangements**

B. **Please confirm that any adverse event will be reported to the Committee**

I confirm that any adverse event will be reported to my supervisor and then to the UREC committee.

B. **How is it intended the results of the study will be reported and disseminated?**

*(Tick as appropriate)*

☐ Conference presentation
☐ Thesis/dissertation
☐ Presentation to participants or relevant community groups
C. How will the results of research be made available to research participants and communities from which they are drawn?
   By writing report or sending to them a translated copy of any conference paper about the findings of the study. However, no individual feedback will be provided as the link between identifier and participant will have been broken.

D. What arrangements are in place for monitoring and auditing the conduct of the research?
   The supervisor will monitor the research.

E. What are the criteria for electively stopping the research prematurely?
   Any unforeseen harm that cannot be resolved.

9. Sponsorship
   Provide information on whether the study is in receipt of any external funding. Confirm who will act as sponsor of the research.
   This is a student degree project and The University of Manchester will sponsor the research.

10. Conflict of Interest
   Have any conflicts of interest been identified in relation to this project?
   No conflict of interest has been identified at the point of application. Should a conflict of interest become apparent as the study progresses then UREC will be informed.

SECTION 3 - MINOR AMENDMENT TO RESEARCH PROJECT

Application for Approval of Minor Amendment\(^{26}\) to a Research Study

Details of proposed amendment (please give as much detail as possible)

Supervisor Declaration

I agree that the amendment proposed does not change the character of this research or the participant groups.

I confirm that the research risk assessment for the study as MEDIUM remains.

| Supervisor’s signature* | Date |

Please send applications for amendment to ethical approval for MEDIUM risk research to the School Quality Assurance Administrator at ethics.education@manchester.ac.uk who will pass on the request to the RIC member who authorised the original application wherever possible.

\(^{26}\) Minor amendments are those that do not alter the character of the research or the participant groups.
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

Participant Information Sheet

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?
Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms.

What is the aim of the research?
The key aim of this research is to use a teacher development approach to explore how Saudi teachers can improve their practice in terms of initiating and sustaining a dialogic approach to facilitate greater mathematical understanding in students.

Why have I been chosen?
You have been chosen to participate in this study because I have good personal relationships with you and these relationships are important for this kind of research. Also, I know that you are interested and enthusiastic to participate in the research and you will be learning from the study. Finally, you are willing to allow me to interview you and observe your classes with video recording.

What would I be asked to do if I took part?
The project will take part in 2 phases. In the first phase, I will video record your lessons for a period of three weeks and have regular meetings with you to explain the nature of the study, what’s involved and to discuss possible topics and issues which will inform the next phase. The second phase will take place over a period of eight weeks. Each week I will ask you to participate in a professional development workshop where we discuss topics relating to dialogic teaching and reflect on video recordings of your teaching practice. This will be a safe space to talk where all data will be kept confidential. The objective will be to develop ideas about new teaching strategies which will be used in subsequent lessons. I will then video record one of your lessons per week (both for data collection purposes and to use once again in future teacher development workshops), and we will also have regular sum-up meetings each week to discuss your experience and thoughts about the research.

What happens to the data collected?
The data will be used for research purposes only and will be analysed and interpreted for those purposes. Your name and any other identification details will be removed so that
all data is anonymous. The data will be stored for a maximum period of one year after the end of the study in January 2015.

How is confidentiality maintained?
I will maintain confidentiality regarding your participation at all times. Your name and details will not appear next to the data at any point. The data will be stored by the researcher only with high security in line with the University policy on data security. All audio and video-taped recordings will be kept by the researcher until the end of the research and will be destroyed.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason.

Will I be paid for participating in the research?
No, you will not be paid for participating.

What is the duration of the research?
The duration of the study will be eight weeks. Each professional development workshop will last approximately two hours. Weekly sum-up meetings will last approximately 30 minutes and lesson observations will be for 45 minutes.

Where will the research be conducted?
The research will be conducted at your school.

Will the outcomes of the research be published?
Yes, I will aim to publish the outcomes in anonymous form in academic journals or conferences.

Criminal Records Check (if applicable)

Contact for further information
Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

What if something goes wrong?
If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL, by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

CONSENT FORM

If you are happy to participate please complete and sign the consent form below

12. I confirm that I have read the attached information sheet on the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

13. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.

14. I understand that the interviews and classroom observations will be audio/video-recorded

4. I agree that any data collected may be published in anonymous form in academic books or journals.

I agree to take part in the above project

Name of participant ___________________________ Date ___________ Signature _______________________

Name of person taking consent ___________________________ Date ___________ Signature _______________________

Please Initial Box
Participant Information Sheet

An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

Your child is being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to your child to take part. Thank you for reading this.

Who will conduct the research?
Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms.

What is the aim of the research?
The key aim of this research is to use a teacher development approach to explore how Saudi teachers can improve their practice in terms of initiating and sustaining a dialogic approach to facilitate greater mathematical understanding in students.

Why have your child been chosen?
Your child has been chosen to participate in this study because their mathematics teachers are participants in this study.

What would your child be asked to do if he took part?
Your child will not be asked to do anything beyond his usual participation in mathematics lessons. Lessons will be video recorded and as part of this, your child’s input and participation into classroom activities will be recorded. After recording, the video will be viewed by the researcher and selected episodes will be identified and used in workshops involving your child’s teacher. Here, I will encourage your child’s teacher to think about and reflect on his own teaching and that of others. The selected episodes may include activities which involved input from your child. However, their behaviour is not the focus of the research or workshop but rather the teacher’s own practice.

Where possible, all videos will be recorded using a camera positioned at the back of the classroom so that the children’s faces are not easily identifiable or visible.

What happens to the data collected?
The data will be used for research purposes only and will be analysed and interpreted for those purposes. Your child’s name and any other identification details will be removed so that all data is anonymous. The data will be stored for a maximum period of one year after the end of the study in January 2015.

How is confidentiality maintained?
I will maintain confidentiality regarding your child participation at all times. Your child name and details will not appear next to the data at any point. The data will be stored by the researcher only with high security in line with the University policy on data security. All audio and video-taped recordings will be kept by the researcher until the end of the research and will be destroyed.

**What happens if I do not want my child take part or if I change my mind?**

It is up to you to decide whether or not your child to take part. If you do decide to allow your child to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to your child to take part, your child is still free to withdraw at any time without giving a reason.

**Will I be paid for participating in the research?**

No, you will not be paid for participating.

**What is the duration of the research?**

The duration of the study will be eight weeks.

**Where will the research be conducted?**

The research will be conducted at your child school.

**Will the outcomes of the research be published?**

Yes, I will aim to publish the outcomes in anonymous form in academic journals or conferences.

**Contact for further information**

Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

**What if something goes wrong?**

If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to 'The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL', by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093
Consent Form

To all parents concerned,

I am a second year PhD student at the School of Education of the University of Manchester. I have a research project on the teaching and learning of mathematics in primary school. The research focus on how Saudi mathematics teachers develop their understanding of classroom dialogue through a professional development process in mathematics teaching.

Classroom activities will involve teachers’ dialogue and discussion with children. The aim of the activities is to help teachers to develop some important teaching skills to improve children’s mathematical learning. All classroom observations will be video recorded in order to stimulate teachers’ thinking about their practices and how develop it.

I would appreciate it if you could allow your children to participate in the study as your child will benefit from the teachers’ professional development. If, at any stage of the research, your child wish to withdraw from the research he has the right to do. At the end of the research, your children’s name will not be disclosed in the final report.

☐ I allow my child to participate in the research project.

☐ I do not allow my child to participate in the research project.

If there are any queries and questions that you would like to ask me, my contact numbers and email address are stated below.

Thank you.

Mansour Alanazi
University of Manchester
United Kingdom.
Contact Number:
00966506583421 (KSA)
00447429605053(UK)
Email Addresses:
mansour.alanazi@postgrad.manchester.ac.uk
malanazi@ut.edu.sa
An investigation of developing teachers’ understanding of using dialogic approach in
Saudi primary mathematics classrooms

Participant Information Sheet

You are being invited to take part in a research study. Before you decide it is important for you to
understand why the research is being done and what it will involve. Please take time to read the
following information carefully and discuss it with others if you wish. Please ask if there is
anything that is not clear or if you would like more information. Take time to decide whether or
not you wish to take part. Thank you for reading this.

Who will conduct the research?

Mansour Muzil Alanazi. School of Education, University of Manchester.

Title of the Research

An investigation of developing teachers’ understanding of using dialogic approach in
Saudi primary mathematics classrooms.

What is the aim of the research?

The key aim of this research is to use a teacher development approach to explore how
Saudi teachers can improve their practice in terms of initiating and sustaining a dialogic
approach to facilitate greater mathematical understanding in students.

Why have I been chosen?

You have been chosen to participate in the research’s seminar because you have been
invited by your friend who participates in this research. Also, I know that you are
interested in the research.

What would I be asked to do if I took part?

The seminar will take part in 2 hours. You will join the seminar with other math teachers.
there will be general discussion about the study and you are welcome to ask questions
and discuss the cases teachers about their experiences of the project. This will be a safe
space to talk where all data will be kept confidential.. I will then audio record the
seminar discussion.

What happens to the data collected?

The data will be used for research purposes only and will be analysed and interpreted for
those purposes. Your name and any other identification details will be removed so that
all data is anonymous. The data will be stored for a maximum period of one year after the
end of the study in January 2015.

How is confidentiality maintained?

I will maintain confidentiality regarding your participation at all times. Your name and
details will not appear next to the data at any point. The data will be stored by the
researcher only with high security in line with the University policy on data security. All
audio and video-taped recordings will be kept by the researcher until the end of the
research and will be destroyed.
What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason.

Will I be paid for participating in the research?

No, you will not be paid for participating.

What is the duration of the research?

The duration of the seminar will be 2 hours.

Where will the research be conducted?

The seminar will be conducted at your school.

Will the outcomes of the research be published?

Yes, I will aim to publish the outcomes in anonymous form in academic journals or conferences.

Criminal Records Check (if applicable)

Contact for further information

Mansour Alanazi, email: mansour.alanazi@postgrad.manchester.ac.uk
Dr. Laura Black, email: Laura.Black@manchester.ac.uk

What if something goes wrong?

If there are any issues regarding this research that you would prefer not to discuss with members of the research team, please contact the Research Practice and Governance Co-ordinator by either writing to The Research Practice and Governance Co-ordinator, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester M13 9PL', by emailing: Research-Governance@manchester.ac.uk, or by telephoning 0161 275 7583 or 275 8093
An investigation of developing teachers’ understanding of using dialogic approach in Saudi primary mathematics classrooms

CONSENT FORM

If you are happy to participate please complete and sign the consent form below

15. I confirm that I have read the attached information sheet on the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

16. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.

17. I understand that the seminar will be audio-recorded

4. I agree that any data collected may be published in anonymous form in academic books or journals.

I agree to take part in the above project

Name of participant ___________________________ Date _______________ Signature ___________________________

Name of person taking consent ___________________________ Date _______________ Signature ___________________________
Appendix N: The development of different teaching strategies through the TDP

**Strategy two: Praise as strategy**

The 'praise' becomes another strategy as part of the community shared repertoire to create space of classroom dialogue through encouraging students’ participation. Teachers’ reflections and conversation during the early workshops shift their awareness and beliefs toward using 'praise' for supporting students’ participation and talk. For example, in the second workshop as teachers reflected on video episodes, Ahmed noted how 'praise is for all participation' and Sultan suggested praise should not only connect to [right] 'answers' but “it is for reinforcement and participation.” This was evidence of how all three teachers agreed on the importance of paying attention to all students’ responds in classroom interaction whether the students’ responds were right or wrong. They agreed that 'praise' was a crucial devise in generating more student participation.

For example, it was clearly evidence in Ahmad classroom as he used a seal to stamp “excellent, with thanks” on a student’s textbook for their participations. The analysis of Ahmad’s lessons prior TDP shows that he just used this rewarding or praise technique to reward students for the right answers. Moreover, the analysis shows that Ahmad used words such as “well done” and “excellent” to reward and encourage correct answers. However, as teachers started to use working in pairs as strategy, this lead Ahmad to use praise as another strategy for both students as pair for their participation. This was evidence in Ahmad’s classroom during the TDP. The following table shows a comparison of the change in Ahmad’s use of praise as strategy to support students’ participation.

<table>
<thead>
<tr>
<th>Phases</th>
<th>Examples</th>
<th>Beliefs’ change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase one (prior to joining the emergent CoP)</td>
<td><strong>Ahmad</strong> Clap the hands for Fares. <em>(Here, Ahmad praised only student Fares but not other student)</em> Those of you, who were praised, stand up please <em>(Students who responded correctly stood up to get the stamp. One of the students who stood up provided wrong answer. While Ahmad was distributing the stamp to students who were standing, he approached this student, making him sit down surprisingly. When Ahmad reached him and was about to stamp him, he stopped and left the student without stamping his book).</em></td>
<td>The stamp is only for correct responds</td>
</tr>
<tr>
<td>Phase two (during the emergent CoP)</td>
<td><strong>Ahmad</strong> Great. Which is larger? This is two over three. Put a sign. <em>(Puts &gt; for the fraction)</em> <strong>Ahmad</strong> Great. Heroes <em>(he stamps them with “excellent with thanks”)</em></td>
<td>The stamp is for both students as pair.</td>
</tr>
</tbody>
</table>
Here, the table shows an example of change in Ahmad’s classroom practice in terms of using praise as a way for supporting students’ participation. This table shows that the use of praise was not only as verbal way but include any tools such as ‘the stamp’ as well. This is as teachers become aware of the meaning of ‘praise’ as important strategy for students’ participation and talk and so the common interest (dialogic teaching) of the community. So, we see how Ahmad was aware of this meaning and used this strategy with pair learning as another strategy that already implemented and developed in his classroom. Moreover, teachers showed their mutual accountability for this meaning during their participation in the emergent community of practice. For example, this was evidence in teachers’ individual reflections of Zayed’s video episode on the mid-way through TDP programme. Zayed noticed in his practice that “there was lack of encouragement by praising and thanking students for participation and being active during the lesson” and justified this as “the teacher needs to praise each student for his participation and answer, even if it was wrong”.

**Strategy three: Collective talk meaning and We strategy**

One of the important meanings that teachers negotiated in the emergent community is that the collective talk as essential part for students’ participation. Teachers constructed the meaning of collective talk in their classrooms through changing teachers’ talk (teach me, tell me, explain to me) toward using (teach us, tell us) and using we instead of I. This demonstrates the shift in teachers’ classroom practice toward a more collaborative construction of knowledge rather than it being one directional. Now, the epistemic power is shared rather than being owned by the teacher only. This meaning has developed through different stages (see the figure) in TDP workshops and become important part for the community’s shared repertoire. These stages included three sub teaching strategies sharing lesson’s aims, talk phrases, and we instead of I as the following figure demonstrates:
The figure illustrates the process of how the collective meaning and strategy developed to be important part of the shared repertoire for the dialogic teaching. For example, the figure shows the use of “we” in the first workshop in terms of sharing the lesson aim with students. Here it was the first implementation of this strategy, however, teachers were not aware of the ultimate shift in their talk. Therefore, this meaning of collective talk continued as shown in the figure through teachers participation in TDP. Then, in the second workshop, there was conversation about specific task of students’ math textbook which was the Talk Task and the purpose of it. This conversation was supported by a activity that community’s members participate to do it. The activity was to write different phrases that encourage students to participate and talk in classroom interaction. Each member had his own paper to write what he suggests as phrases or statements (for a comprehensive conversation, please refer to the W2 Appendix D). Figure 1 shows the phrases that Ahmad and Zayed suggested for encouraging talk in the classroom:

**- Phrases that encourage students to talk in the classroom**

In this figure, it can be noticed that teachers wrote phrases to support students’ participation in classroom talk. These phrases indicate an increasing consensus that encouraging confident student talk is an important aspect of classroom participation, which was a move away from the initial emphasis on paying attention to the teacher. Although, theses phrases used for encouraging students’ participation, they indicated the one directional way of construction of knowledge. Almost all of the supportive phrases encouraged students to talk to teachers. This use of the personal pronoun -I, me, is to keep the teacher firmly in control of who says what and when. Student input is valued but only when explicitly asked for by I the teacher. Yet these phrases indicated a belief in teaching as one directional only (from teachers to students) which meant that the student’s role was relatively absent in the learning process. It signifies an awareness of the need to shift
power relations in classroom discussions and because teachers seem to use it quite emphatically.

Therefore, the fourth workshop explicitly focused on the use of ‘we instead of I’ as strategy to support teachers’ collective talk for the collaborative construction of knowledge and dialogic teaching. Here, I presented this theme ‘we instead of I’ for teachers to have discussion about the meaning of it and as strategy for them to use in the classroom. As facilitator for TPD, I used this theme in the fourth workshop in order to advance what teachers negotiated through early workshops (sharing lesson aim, supportive phrases) and to make the new meaning of collective talk and we strategy clear for teachers. Therefore, among teachers’ conversation about the use of ‘we instead of I’ strategy, Ahmad argued this use because it would ‘get the attention of other students’ and allows ‘a student to know his role within the class’. Another point belongs to Zayed, who argued that the use of we would enable the student to ‘understand that he can answer and solve problems not only the teacher would’. It implies that both the teacher and the students are working together. Ahmad shifted the conversation toward the main idea of this strategy as he said “when I say to the student 'we want you to teach us how we have found the mean', all the students feel that there is concern for everyone and communication between all of us. A student will know his role within the class. Also, students will not feel marginalized”.

Therefore, this new meaning became important for teachers’ mutual accountability for their joint enterprise (the quality of classroom dialogue) at the further community’s meetings. For example, teachers’ awareness of using collective talk was evidence in midway teachers’ individual written reflections about video episode of Zayed teaching in Phase One. Ahmad noticed that “no phrases were used to urge the students to speak, such as tell us, explain to us, show us, and teach us”. Moreover, in the fifth workshop, the community’s discussed the mid-way reflections and I asked Sultan about what the observations or reflections would he like. Sultan started with the eighth point of Ahmad’s observations and he said “‘tell us’ or “talk to us” statements were missing in Zayed’s class”. Furthermore, the collective talk and we strategy was evidenced in teachers’ classroom practice as well.

For example, the analysis of Ahmad’s developed classroom practice in the sixth week of TDP. It was evidence how Ahmad improved his talk with students. This was as result of Ahmad’s awareness of language and collective talk in terms of supporting teacher and students dialogue. For example, the following statements were example of Ahmad’s interactions with pair students:

2  Ahmad  Here you (for both students) divided it, and such parting is excellent, but for the highlighting, how many parts do [We] need to highlight?

12  Ahmad  Heroes.. You complete (all) the solving.

16  Ahmad  Ahmad: Well! You (both students) divided this shape into 4 parts, didn't you?

32  Ahmad  Then the half is smaller and your (for both students) answer is wonderful.
Great…why [We] divided the shape into 6 parts? (he pointed at the shape that represents the two-sixes)

These statements show how Ahmad used *you* (for both students) in line 2,16 instead of *you* (for single) to talk with each student in the pair. As in Arabic language, there is difference between *you* (for single *Anta* (أنتم) and *you*, *your* (for plural *Antum* (أنتم)). Moreover, Ahmad sometimes talked with students as if he was a member of the group in order to minimize his authority in the classroom and to make students feel that their teacher is working with them. This was evidence as shown in statements 2, 40 in which Ahmad used [We] when interacting with students. This is significant because Ahmad crossed the boundary in terms of improving his talk with students. Ahmad’s awareness of this collective talk was evidence different occasions of his participation in the community and in his classroom practice such as the previous statements.

**Strategy four and five: asking open questions and Students responds (following up moves)**

Moreover, as the video become as important tool and meaning for the shared repertoire. It continued for more meanings and strategies such as classroom questions and students responds. The early two workshops also show some of teachers perceptions and beliefs about students responds and classroom questions. For example, in the first workshop Zayed indicated

“I want to say to you honestly that mathematics is not an issue of memorization but it is how to be understood not from once or twice. It is through practicing one, two, three, and four tasks. Notice that the student thinks on the first task and when he starts the second one, he will remember what he did on the first task. Therefore, on the third, fourth, and fifth tasks, student's hand will directly solve tasks even that are repeated”.

Here, Zayed showed his belief that mathematics is about more written answers and solving problems different times. This might demonstrate the absence of mathematical talk through discussion and dialogue by verbal classroom questions and students responds. Another example, the teachers’ reflections on a video episode during the second workshop that showed Sultan conducting a lesson on Division, as in the following interaction:

<table>
<thead>
<tr>
<th>Sultan</th>
<th>What is 15 divided by 3? Who can tell me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>Five</td>
</tr>
<tr>
<td>Sultan</td>
<td>15 divided by 3. How many groups do I will make?</td>
</tr>
<tr>
<td>Student B</td>
<td>Five</td>
</tr>
<tr>
<td>Sultan</td>
<td>How many groups do I will make? (He speaks more loudly)</td>
</tr>
<tr>
<td>Some students</td>
<td>3… 4…(collectively)</td>
</tr>
<tr>
<td>Sultan</td>
<td>Three. I make three groups (he draws three circles on the board below 15 ÷ 3)</td>
</tr>
</tbody>
</table>

These are the teachers’ reflections on Sultan’s video and his students’ answers for his question: How many groups will he make for (15÷3)

**Researcher** What can we notice?
Zayed  Insistence.
Ahmad  It is possible that discussing the student’s wrong answer might be an obstacle for future participation
Sultan  If the student makes a mistake, you give him a smart look or you ignore his answer until he says to himself, “Thank God, he did not hear me”. We only listen to the correct answer, and we try to ignore the wrong answer as much as possible so as not to embarrass the student. Am I right or not?
Ahmad  Your point is right.

It is clear from the teachers’ reflections that students’ incorrect answers were not discussed by teachers who only listen to the correct answers: as Sultan said, “We only listen to the correct answer”. Here, it is clearly that teachers did not pay attention to incorrect answers and asking questions about them so as not to prevent students’ participation or to embarrass them. Moreover, even the correct answers were not followed up by more questions. However, using video as part of the community’s shared repertoire enable participants to recognise the importance of students responds and classroom questions in early two workshops. In terms of students’ responds, for example, teachers reflected on a video episode about how teachers need to be aware of saving time. Sultan told the community’s members “I gave my students a problem and took more time with students to solve this problem; therefore, students became to think about the solution as I told them about different ideas. Then, one student provided a good answer”. Here, Sultan’s example leaded the members to value students responds as Zayed tried to explain the reason behind “the good answer”. Zayed thought that “possibly, what help this student solve this problem an idea was that his peer mentioned, which the student took and thought about to reach the good answer”. Ahmad agreed with Zayed’s explanation. This way of sharing examples and stories become important part of the community’s shared repertoire (more details in following section).

I argue here that as Ahmad’s and Zayed’s engaged with Sultan’s example, therefore, Sultan found that an opportunity to share them his belief that “for me one problem is enough, as this lead students to high level of thinking. I do not want students to write to me the steps involved in solving the problem, but I want this (he pointed to his mind) to be improved”. Here, we see the teachers move from a belief in practice (individually) and how this enables transference of method from one problem, question to another towards a belief in taking time to classroom discussion so that they understand. This is a move away from a cognitive view of learning (inside the head) towards a social view through interaction.

Moreover, the meanings of these strategies (classroom questions and students responds) were more constructed during the middle workshops of TDP. For instance, in terms of classroom questions, the first direct activities of classroom questions were in the third workshop. These activities were used to open the conversation between participants about the levels of classroom questions based on Bloom’s Taxonomy and the different types of questions based on the frequency of use by teachers. The activity was reading a hand-out paper distributed during the third workshop and participants were asked by the researcher
“how can we utilize this paper?”. The first reflection was that Sultan addressed one of teachers’ problems with questions. Sultan contends that ‘questions should be pre-decided and purposeful. In fact, our questions can be improvisational and dictated by the pace of the lesson’. Here, sultan indicated teachers’ traditional approach to using classroom questions and this stimulated participants to reflect more about the classroom questions. This is because that addressing the problems and difficulties of a practice is important aspect of mutual engagement of the practice and developing the shared repertoire. Then, Zayed said that “classroom questions measure to what extend students reach the lesson's target, and to what extend they understand it”.

Furthermore, video episodes were used to show teachers different examples of their classroom practice regarding the classroom discussion with focus on classrooms questions and students responds. The following extracts present some examples of teachers’ reflections on different video episodes. For example, one of the third workshop episodes featured the interaction between Ahmad and a student. This video was selected from phase one of participants’ teaching practice prior to their membership in the community.

<table>
<thead>
<tr>
<th>Ahmad</th>
<th>The mode is the most repeated of data, the mode is what? (the teacher pointed to the student)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>Five.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Five, yes it is the only number repeated twice (he wrote the answer on the board next to the exercise)</td>
</tr>
</tbody>
</table>

Here, the teachers’ reflections about this interaction were as follows in this extract:

<table>
<thead>
<tr>
<th>Researcher</th>
<th>What do you notice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayed</td>
<td>Ahmad asked a question but also answered the question.</td>
</tr>
<tr>
<td>Researcher</td>
<td>Who answered?</td>
</tr>
<tr>
<td>Zayed</td>
<td>Ahmed</td>
</tr>
<tr>
<td>Researcher</td>
<td>The student has answered. What did Ahmed do then?</td>
</tr>
<tr>
<td>Zayed</td>
<td>He did not reinforce.</td>
</tr>
<tr>
<td>Sultan</td>
<td>He repeated the answer</td>
</tr>
<tr>
<td>Ahmad</td>
<td>I didn’t ask the student “why?”</td>
</tr>
<tr>
<td>Researcher</td>
<td>This is an important point</td>
</tr>
<tr>
<td>Sultan</td>
<td>Ahmed did not discuss</td>
</tr>
</tbody>
</table>

Here we see that the viewing this video episode and the subsequent discussion motivated Ahmad to identify a shortcoming - i.e. his failure to ask the question ‘why’. Sultan provided the same evaluation, indicating that Ahmad did not initiate a discussion of his student’s answers ‘Ahmed did not discuss’. Another example of video episodes was selected from teachers’ practice in phase two of research project. This example was from Ahmad’s classroom teaching as he started to practice open-ended questions which, however, used only to discuss the student’s incorrect answers. The following extract shows the transcript of Ahmad’s interaction with a student:

<table>
<thead>
<tr>
<th>Ahmad</th>
<th>Is number '11' a prime or nonprime number?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>Prime number</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Correct</td>
</tr>
</tbody>
</table>
Ahmad continue asked students to identify different numbers as either prime or non-prime, and the students' answers were correct.

Ahmad: Is number '37' a prime or non-prime number?

Student: Non-prime number.

Ahmad: Well. You said that it is non-prime number, why? What two numbers have to be multiplied to equal 37? Come on

Student: (Silent) (Ahmad did not give enough time for this student to respond)

Ahmad: You said that it is non-prime number, didn't you? Justify your answer. Why is it non-prime number?

Ahmad: Fares, what is your view? Prime or non-prime?

Fares: Prime

Ahmad: Prime..why?

Fares: Because…

Ahmad: It has two factors.

Fares: Two factors.

Ahmad: Only one.

Fares: And…

Ahmad: The same number 37. (Here he looks at student who provided the wrong answer). 1 and 37. (He talked to the student who provided the wrong answer). Are there other numbers except 1 and 37 that would result in 37 if multiplied? Of course not, then what is it? A prime number.

Ahmad: Clap the hands for Fares. (Here, Ahmad praised only student Fares but not other student)

Here, the following extract shows teachers reflections on this video episode:

Researcher: What do you notice? [A paper has been distributed for note taking]

Sultan: His discussion is interesting. There is seriousness in discussion. This is a good step. He also asked the student for justification. Helping the student express his ideas enforces talking. When he says “Fares!” and helps him feel self-confident. The boy has an opinion but he is afraid. He starts by saying a word to Fares and Fares continues. This helps the student talk.

Researcher: What points do you have, Zayed?

Zayed: What we are always careful about is to ask the student “how”? when he provides an answer “tell me how do you get to that answer?”

Researcher: Justification.

Zayed: Yes, it is justification

Researcher: What else?

Zayed: And giving the chance for other opinions and other solutions

Ahmad: Giving the same student who made a mistake another chance to solve the problem

Researcher: What about you, Ahmad?

Ahmad: I wrote some points:

- Discussing the student about his wrong answer.
- Asking for justification of the answer.
- Using phrases such as “what do you think?” when we redirect the
question.
- Inviting other students to talk.
- I did not go back to the student who was wrong to thank him for his participation although he gave a wrong answer.

This extract shows how teachers engaged with the new meaning of classroom discussion through their reflection on Ahmad’s developed practice. For example, Sultan demonstrated how Ahmad’s discussion as ‘interesting. There is seriousness in the discussion, which is a good step”. Here, valuing this discussion by Sultan was important for teachers to engage in the conversations and reflective practice. Then, Zayed indicated the important of open questions such as “how”. Therefore, justifications and explanation of how to reach a correct or incorrect answer were deemed as important moves in the dialogue - such beliefs emerged out of the participants’ conversation. This was evidence as shown in the extract on Ahmad’s points and reflections in his interaction with the student.

Furthermore, in the fourth workshop, the following questions were directed at the teachers: How important is it for the student to explain his idea? Why do we ask the student to do so? The following extract shows the teachers responds about them as follows:

- Zayed: So that we can assess student understanding of the mathematical concepts.
- Ahmad: To check the students’ understanding.
- Zayed: You let the student talk in order to know what he has understood.
- Sultan: This to check the students understanding and their mathematical skills.
- Researcher: We are trying to make them better understand and to have more discussion among the students.
- Ahmad: This also teaches the student to think logically in all matters of his life.
- Researcher: So we ask him to explain his idea and where it came from.
- Zayed: And to teach the student the reasonability of answering.

Here it was evident that the teachers’ reflections about students’ answers made a connection between these answers and students’ understanding of mathematical concepts (this is in contrast to their earlier beliefs that learning took place inside the head through repeated practice). In this sense, students’ answers were now seen as useful learning tools to check understanding. However, despite this apparent ‘use’, the teachers' reflections were still somewhat distant from the principles of the common interest “dialogic teaching” since if the teacher 'evaluates' student answers, he is still firmly in control. The example above suggests that the teachers were still unaware that students could use their input in the discussion to develop their understanding. They simply saw student answers as an assessment tool, to check what they know. For instance, Sultan believed that student
answers are important “to check student understanding and their mathematical skills”. However, we will see how teachers constructed further meaning for students’ answers through their continuous negotiation of these meanings.

Therefore, at the end of the third and fourth workshops, teachers’ recommendations and suggestions for classroom practice shows evidence of how the meaning of open questions and students respond become part of the community’s shared repertoire and teachers implemented them in classroom. The following table shows examples of teachers’ statements:

<table>
<thead>
<tr>
<th>participants</th>
<th>The third workshop</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Classroom questions</td>
<td>Students responds and answers</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Focusing on questions that require explanation and description’</td>
<td>Give students enough time to respond after questions.</td>
</tr>
<tr>
<td>Sultan</td>
<td>Develop talk questions that achieve the target of the lesson.</td>
<td>Asking students to justify their responses.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Reducing questions that require short answers, such as yes/no questions’</td>
<td>Providing students with adequate time to answer the questions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>participants</th>
<th>The fourth workshop</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad</td>
<td>Increasing the number of &quot;How&quot; and &quot;Why” questions’</td>
<td></td>
</tr>
<tr>
<td>Sultan</td>
<td>Giving a chance for talk to students after &quot;How&quot; and 'Why” questions</td>
<td></td>
</tr>
<tr>
<td>Zayed</td>
<td>Focusing on &quot;How&quot; and &quot;Why” questions through explaining the answers and justifying the answers</td>
<td></td>
</tr>
</tbody>
</table>

We see in this table that of the explanation and justification of classroom talk between teacher and students are developed by classroom questions and students answers as teaching strategies. This table shows how teachers, moreover, reified the responsibility and accountability through different statements about classroom questions and students’ answers to improve the classroom dialogue as the shared enterprise of the emergent community. This was evidence as well in their written statements in the fifth workshop:

- The teacher needs to listen to students’ answers and involve all students in the discussion. (Zayed w5).
- Involving all students in discussing the questions and answers with recognizing the importance of concepts (Sultan w5).
- Involving students in finding the answers and judgment their correctness (Zayed w5).

Here, the argument is that these statements show how teachers become aware about both meanings of students participation and classroom discussion with attention to the questions and answers. It was evidence that the acknowledgement of students themselves
as teachers in discussing classmates’ answers and judging their correctness. This level of awareness was evidence in the community’s long conversation and discussion in the fifth workshop. This was about Sultan’s critical statement “It is starting to be important for me that the student’s benefit and I don’t care about quantity in that regard, even if the official reprimands me.”. This statement was selected to become important element for negotiation and construction meanings. Therefore, the following example shows part of teachers’ reflections on it.

Sultan I mean it is more important to explain the idea and discuss it, have students understand and enforce that idea from all sides, than to have the students do many exercises.

Ahmad […] The Quality means if the student masters solving an example of the lesson’s main idea, this can substitute many exercises. This is my opinion.

Zayed I want the student to know the right way. I don’t care where that leads him. I care whether the student correctly starts the way of solving a problem, and understand the mathematical concept […] in other words, whether he understands the concept and how to use and apply it. I don’t care about the final result.

Sultan That is why I say that I care about the student’s interest […] I mean when a student explains it to me in different mathematical methods, I feel that he has mastered the concept even if we spent the whole time on one problem. I am not only looking here for a variety of methods; I am looking for a variety of explanation ways that a student has.

Zayed The [mathematical] concept would be deeply understood.

Sultan I want the student to be strong in discussion, to understand what he is talking about.

This shows how giving more time for classroom discussion with focus on few exercises and problems becomes important in teachers’ mutual accountability. This focus relied more on teaching mathematical concepts. Therefore, the argument is that these teaching strategies that teachers developed and negotiated become important for the mathematical concepts and the different mathematical ways of answering one problem in terms of students’ interests and understanding through their dialogic teaching. Moreover, the final answer of a mathematical problem is not more interested for them with more concern with time for concepts and the ways of answering one problem. Here, the argument is that this is a significant shift in the construction of classroom questions and students responds meanings, focusing more on the importance of students’ explanation of their thinking rather than assessing their responses as we see discussed early.

Furthermore, in the final workshops, these teaching strategies’ meanings become important for teachers in terms of planning for dialogic teaching. In these final workshops, the community discussed teachers experiences with developing classroom practices, and purposeful characteristic of dialogic teaching (Alexander 2006). The following extract shows part of community discussion:

Researcher Last week, we talked about purposeful teaching, what do we mean by that?
It is when you introduce a group of specific points and exercises for a specific purpose you want to reach.

Through introductory questions and by following a progressive sequence of questions in the classroom.

Meaning that you have an understanding of what you are going to do during the lesson.

In other words, I introduce an exercise and build on to get to the information and mathematical concept.

And what do you expect from the discussion about the exercises? Do you expect posing questions or getting answers?

The questions would be planned ahead of time, and the answers too... meaning that you know the answers because you have studied your questions and chosen them very well before you start. The questions, then, are not too easy nor are they too difficult or vague. So you will be steering towards a certain goal.

What do you expect from the students?

I expect that they would give a reasonable answer that I can build on. The answer is not supposed to be 100% true, but it can be 80% true, so I can take that correct part to use and build on.

And find new solutions.

Here, teachers’ conversation concerned their recognition that classroom questions and students answer could be used to build discussion and thereby improve the quality of the dialogue. For example, what Ahmad believes about purposeful characteristic of dialogic teaching as involving the provision of “a progressive sequence of questions in the classroom”. This extract also shows how teachers become aware of students answers as important to provide and find different mathematical ways to answer a problem. For example, Sultan provided guidelines on how to prepare the lesson based on different meanings and strategies have been developed in the community’s shared repertoire:

The best thing...the best thing is to look at math problems from A to Z, and imagine how the class discussion would proceed. We can also view one of our previous lessons and observe the interactions. Then, we can create a database of information regarding student responses and use these as bases for formulating questions and you need to be aware of what you have of the knowledge and what does the student has as well. Then, you need to think about your question in terms of what can it offers to students and how they respond to it.

Here, Sultan’s reflections showed the level of teachers awareness of different strategies such as selecting one problem, classroom questions and students responds for dialogic teaching. Furthermore, in the seventh workshop, teachers reflected on one of the characteristics of effective teacher-initiated dialogue—achieving high-quality dialogue (Kyriacou and Issitt, 2007). The following extract shows how case teachers reflected on this characteristic of effective dialogue:
Encouraging high-quality dialogue is one of the characteristics of dialogic teaching. What does high quality mean?

It means high-standard classroom questions and dialogue which does not take for granted questions that frustrate classroom dialogue or make the student forget them because they are insignificant.

What do you think, Ahmad?

High-quality dialogue means preparing for this dialogue in advance; it is supported and developed by students’ responses and answers in the classroom.

I agree with Ahmad completely. I would add to Sultan’s words that the dialogue needs to move from one idea to another through the teacher’s discussion.

Here, in this extract, it is evident that teachers reflections and conversation about students’ responses and classroom questions taken for granted toward achieving high quality of classroom dialogue. Teachers see students’ answers as tool for developing the classroom dialogue as well as classroom questions. They are recognising that questions need to be conceptually useful (memorable) and appropriate (not frustrating the dialogue) in order to generate the kinds of student responses that can develop the dialogue. The argument is that the role of students by their responds became important to support the teachers in his teaching. This is evidence as well with Zayed when he interviewed at the eighth week “Because, I have changed my approach and used a different one that by it I ask students to help me to find the answers. I ask students about their opinions until we find something help us and we use it for the answer. Now, the role of student become great in the lesson in terms of supporting the teacher and my role become to manage the discussion and the dialogue with focusing on ideal mathematical ways” [short interview, W8].

Furthermore, there were evidence of how teachers aligned with these strategies of the community shared repertoire in terms of their perception and learning of the dialogic teaching. For example, in terms of classroom questions strategy, Zayed argued in his final interview that “it is one of the most matters for the teacher that how he poses questions he needs? It is one of the most important skills that the teacher needs to learn in the dialogic teaching”. In similar way, Ahmad argue that “one of the most important benefits we gained now is the [dialogic teaching] accessing the knowledge through discussion with the student over pre-prepared questions to reach the mathematical concepts”. Here, the argument is that how the shared repertoire that community constructed the meaning of dialogic teaching for the teachers.
Appendix O: Ahmad’s interaction with student pairs regarding fraction comparisons using the same sized representation

Exercise A: Compare the two fractions (1/2 and 3/4):

1. Student A: We put a point in the centre of the circle (the student divided the circle they drew above the fraction into two parts) then we divide it into 4.

2. Ahmed: Here you (addressing both students) divided it, and such parting is excellent, but for the highlighting, how many parts do we need to highlight?

3. Student B: One

4. Ahmed: Why?

5. Student B: It is because it wants 1 of 2.

6. Ahmed: What is written in the numerator?

7. Student A: One.

8. Ahmed: And the denominator?

9. Student B: Two.

10. Ahmed: Then how many I should highlight?

11. Student A: One part.

12. Ahmed: Heroes.. you complete (all).

13. Student A: Now we divide it into four.

14. Student B: It is four…..1, 2, 3, 4 (The student counts the parts after dividing the shape into 4 parts)

15. Student B: Now we highlight 3.

Here the two students completed the highlighting and put a comparison sign.

16. Ahmed: Well! You (both students) divided this shape into 4 parts, didn't you?

17. Student A: Right.

18. Ahmed: How many parts did you highlight?


21. Student A: A half is less than three quarters.

22. Ahmed: Why the half is less than three quarters?

23. Student A: Because we take 3 from this (he pointed at the highlighted shape that represents three quarters), and we take 1 from this (he pointed at the highlighted shape that represents the half).
Ok, which is larger, three halalas or the Riyal (Saudi currency comprising 100 Halalas)?

The Riyal.

Then four halalas or the Riyal?

The Riyal.

Then it does not depend on the number of parts, what does it depend on?

Teacher, these are three parts and this is only one part.

Okay! 3 halalas are 3 parts, look at the shape and consider that the fractions are not there (the fractions’ symbols under highlighted shapes). If this is a cake, which highlighted pieces do you want me to cut for you?

This one (he pointed at the highlighted part that represents three quarters).

Then the half is smaller and your (both students) answer is wonderful.

The following figure shows the two students’ responses to exercise A on the worksheet that Ahmad used to support classroom talk between students and his talk with students.

Figure: Comparing fractions exercises worksheets (exercise A) in Ahmad’s sixth lesson of Professional Development Phase:

Here the two students’ responses to the second exercise:
Exercise B: Comparing two fractions (2/3 and 2/6)
33  **Student B**  This is a bit complex.
34  **Student A**  This is complex. Have patience! If we have 6 here and it wants 2, then it is simple.
35  **Student B**  How?
36  **Student A**  We divide it into 6 parts (the student divides the shape into unequal parts).
37  **Student B**  1, 2 …6 (He counts the number of parts).
38  **Student A**  The parts should be equal.

These two students found it difficult to divide the shape into 6 equal parts while the researcher was near them, so he suggested that they divide the shape into 3 equal parts for each fraction and then divide each third into 2 parts so that the total of the parts would be 6.

39  **Student A**  We highlight only 2 parts.

Here, Ahmad came to this pair to see how they handle the second exercise.
40  **Ahmed**  Great. Why did we divide the shape into 6 parts? (he pointed at the shape that represents the two-sixes).
41  **Student A**  Because the denominator here is 6.
42  **Ahmed**  Then why did you highlight only two parts?
43  **Student B**  Because here is 2 (point to the nominator).
44  **Ahmed**  Great. Which is larger?
45  **Student B**  This is two over three.
46  **Ahmed**  Put a sign.
47  **Student B**  (Puts > for the fraction)
48  **Ahmed**  Great. Heroes (he stamps them with “excellent with thanks”)
49  **Student A**  Look, this was harder than that one, but it is now simpler.
50  **Researcher**  Do you know now, which is larger, two-thirds or two-sixes?
51  **Student B**  Two-thirds is larger than two-sixes.

**Figure:** Comparing fractions exercises worksheets (exercise B) in Ahmad’s sixth week of Professional Development Phase:
"excellent with thanks"
### Appendix P: The teachers' answers and the different ways about (1012 - 815)

<table>
<thead>
<tr>
<th></th>
<th>What is 1012 – 815? How to solve this?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Researcher</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>203(immediately)</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Take time for thinking about the answer</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Everyone has his own way of thinking</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>What is the answer?</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>12 out of 15 that is three, and then 1000 minus 800 is 200</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>This is your way.. How about you, Ahmad?</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>I added</td>
</tr>
<tr>
<td><strong>researcher</strong></td>
<td>What did you do?</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>I need 85 for the 815 to become 900, and then a 100 to become 1000, so that is 185. By adding 12 it becomes 197 sorry 185 and 10 equals 195 plus 2 equals 197. Oh yes 197.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>197</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>15 and 12 together, and 10 and 8 together.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Are you lost Zayed?</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>(laughing)</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Do you recognise my method?15 and 12 together</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>Ok</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>10 and 8 then we subtract</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>Now, 12 is the tens, 12 of 15</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>ok</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>three</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>We have to borrow</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>15 minus 12 and do not look to the rest.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>Ok, then.</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Write , what is15 minus 12?</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>What is the answer?</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>three</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>What three ? What do you mean the difference or the whole subtraction?</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>The difference.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>Ok, If it is the difference</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>And the 10 is above and the 8 is below, right? We subtract.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>What is the answer?</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>One moment , No</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>It is 200.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>No,..</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>No, it is not 200 the answer lees that it.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>197</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>197</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>How did you get that answer? What is you method?</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>In the beginning I did as Sultan’s method</td>
</tr>
<tr>
<td><strong>Sultan</strong></td>
<td>Ah! amm (He recognized his mistake)</td>
</tr>
<tr>
<td><strong>Zayed</strong></td>
<td>My answer was as Sultan I subtracted 12 from 15 and then 800 from 1000 and said that the answer is 203, but it is 197. If you check the reasonableness of the answer you’ll know that 203 is wrong.</td>
</tr>
<tr>
<td><strong>Ahmad</strong></td>
<td>Here is a quicker way. I imagine that the 1012 is 1015 and later I</td>
</tr>
<tr>
<td>Researcher</td>
<td>Subtract the (3) that I have added. The difference between 1015 and 815 is 200 minus 3 = 197. This is better and quicker</td>
</tr>
<tr>
<td>Ahmad</td>
<td>Any other ways?</td>
</tr>
<tr>
<td>Researcher</td>
<td>We can use traditional subtraction</td>
</tr>
<tr>
<td>Researcher</td>
<td>Sultan and Zayed have done traditional subtraction mentally. The subtraction algorithm includes “borrowing” and performing that mentally made it difficult, Ahmad’s method: adding 85 to 900, and 185, 195 and 197 is the first method.</td>
</tr>
<tr>
<td>Sultan</td>
<td>There is another method.</td>
</tr>
<tr>
<td>Researcher</td>
<td>And the second method is to consider the 1012 as 1015, then find the difference, then subtract 3 you get 197. What else?</td>
</tr>
<tr>
<td>Ahmad</td>
<td>1000 minus 800 get 200, and 200 plus 12. No it is not suit.</td>
</tr>
<tr>
<td>Zayed</td>
<td>Yes, yes one moment (with voice to encourage Ahmad to continue his method)</td>
</tr>
<tr>
<td>Researcher</td>
<td>One moment Zayed, continue Ahmad.</td>
</tr>
<tr>
<td>Ahmad</td>
<td>1000 minus 800 is 200, and 200 plus 12 equal 212, then 212 subtract 15 equal 197</td>
</tr>
<tr>
<td>Sultan</td>
<td>Number line and the backward counting.</td>
</tr>
<tr>
<td>Zayed</td>
<td>I like your idea. what is it from 1012 to 812? 200 and then we subtract 3 and the answer is 197</td>
</tr>
<tr>
<td>Researcher</td>
<td>Any other ways? What would you get if you apply all these ways to the number line? And what do you notice about the discussion that just took place? We asked a question and the answer was 197 but did we care about the answer or the something else?</td>
</tr>
<tr>
<td>Ahmad</td>
<td>The way of thinking.</td>
</tr>
<tr>
<td>Researcher</td>
<td>The way of answering. The question here is: can we ask open-ended questions in which there are no specific answers? What you care about is not the answer but the way by which you get the answer. I don’t care about the 197. I care about the idea of how getting it. What do we target when we do this with the students?</td>
</tr>
<tr>
<td>Zayed</td>
<td>Brain storming</td>
</tr>
<tr>
<td>Researcher</td>
<td>And so that you enter the classroom telling the students: “I don’t want the result”</td>
</tr>
<tr>
<td>Ahmad</td>
<td>I want thinking</td>
</tr>
<tr>
<td>Researcher</td>
<td>Great! We want innovators</td>
</tr>
</tbody>
</table>