CHAPTER 3
METHODOLOGICAL ISSUES AND SEARCH FOR SPACE

Having outlined the ‘theoretical field’ (Brown & Dowling, 1998:18), research and debates related to this study, this chapter pays attention to the empirical. The primary aim of this chapter is to reflect on the techniques I used to gather data for this study and to reflect on the “epistemological and ontological assumptions” (Scott, 1996:75) undergirding these techniques. To give effect to this aim, I will discuss these techniques (in 3.2) and focus on steps taken to enhance validity of the study (in 3.2 and 3.3). I will then (in 3.5) argue that this study is an opportunistic case study with an interpretative framework.

Data for this study, though, constitutes part of data gathered for a national study, the Learners’ Perspective Study (LPS), whose interest and scope was much wider than my study. In gathering data for my study, I collaborated and worked with relatively more experienced researchers. So, the second aim of this chapter is to outline how I attempted to search for space for my own research interest by
1. Appropriating data generated for the LPS for my own study and
2. Outlining the constraints and benefits of participating in a collaborative research effort. I will pay particular attention to this aspect in 3.6.

I begin this chapter with a discussion on the learners’ perspective study and my involvement in it.

3.1 LEARNERS’ PERSPECTIVE STUDY AND MY INVOLVEMENT

The Learner’s Perspective Study, was borne out of the need to “supplement the TIMSS Video Study” (Clarke, 1999:03). In particular, the study attempts to mitigate two shortcomings cited with respect to the Videotape Classroom Study. Firstly, it provides a platform for and foregrounds the learner’s voice by “the in-depth documentation of the student perspectives.” (Clarke, 1999:03). In this way, in addition to the teacher’s actions
and the teacher’s own perspectives on his/her own actions; the learners’ responses during the lesson, and their own perspectives about the lesson, are also probed and analysed. Secondly, the LPS videotapes the same teacher over several lessons. This lessens the possibility of a teacher ‘putting up an act’ for the lesson to be observed. It also makes it possible to explain one lesson in relation to other lessons. This minimizes the possibility that events in one lesson may be regarded as isolated, one-day incidents.

One consequence and perhaps limitation of emphasizing the learners’ perspective and focusing on a sequence of lessons is that the possibility of a large scale sampling of lessons such as that undertaken in the TIMSS Video Study is precluded (Clarke, 2000:04). Thus, whilst the Learner’s Perspective Study makes up for what has been overlooked in the TIMSS Video Study, it also loses some of what the TIMSS Video Study captures. Hence, the LPS is viewed as a study that “…intends to supplement the TIMSS Video Study data…” (1999:3) and not replace the TIMSS Video Study. (My emphasis).

This Learner Perspective Study generated interest and drew participation from nine other countries, namely: Australia, Germany, The United States, Israel, Singapore, Japan, Sweden, Hong Kong and mainland China. All countries, including South Africa, that have participated in the LPS are governed by the framework of this study. However, South Africa has its unique educational environment which has to be considered if the study is to be appropriate for the country. The next section focuses on the way in which the Learners’ Perspective framework was shaped by the South African education environment and my participation in the South African version of the study.

3.1.1 Learners’ Perspectives Study in South Africa and my participation

The inclusion of South Africa was proposed by Prof. Christine Keitel, an expert consultant in TIMSS Video Study and TIMSS curriculum study. Participation in this international study, it was argued in the proposal, would explicitly build research capacity in the Learner’s Perspective methodology among South African researchers. It was also anticipated that such participation would generate a research community which would be
empowered to work with new technology and research tools made possible by the LPS. This was the 'ticket' upon which I became a member of the Learners' Perspective Study in South Africa. In other words, my participation, as a PhD student in this project, was partly intended to meet this agenda of generating this research community. Three South African scholars from three universities, Prof. Jill Adler (University of the Witwatersrand), Dr. Hebert Khuzwayo (University of Zululand) and Prof. Renuka Vithal* (University of Durban Westville) conducted the study as collaborating partners, with Prof. Renuka Vithal as the research leader or chief researcher.

In order to appropriate the study for a South African context, a whole range of issues had to be taken into account. I will limit myself to a discussion of two points which I feel are central in making sense of why the LPS (SA) is structured the way it is. These are (1) the structuring of schools along racial lines and (2) recent education policy shifts in South Africa.

**Structuring of schools along racial lines:** It is common knowledge that, during the apartheid era, South African schools were structured along racial lines. Not only did this policy prevent the integration of different racial groups within the same school, but it also legitimised unequal resourcing (both human and materially) of different racial groups. The disparities between the different racial groups in South Africa is articulated, in rather simplistic terms, by Mamdani (1999:126) who writes: “If white South Africa were a country on its own, its per capita income would be the 24th in the world, next to Spain; but if black South Africa were a separate country, its per capita income would rank 123rd globally, just above DRC”. These disparities inevitably influenced the schooling set ups in ‘white South Africa’ and ‘black South Africa’, a legacy that remains in the current post-apartheid schools.

Hence a decision in the LPS to focus on three teachers and therefore three schools belonging to different racially defined populations was taken deliberately by the South

* Because all three wished to create a less formal and non-threatening interaction, they encouraged the use of first names. So I will often, in this thesis, refer to them by their first names Jill, Hebert and Renuka.
African research team. It was informed by the knowledge that a focus on schools historically identified with only one racial group would have the potential to provide a skewed impression about the South African setting. In contrast, observing and analysing the teaching of mathematics across these different schools would afford an opportunity to reflect on the way C2005 mathematics teaching is taken up in these different contexts. I elaborate on these differences in the section below.

**Recent education policy shifts in South Africa:** The present ANC-led government has taken on the task of overturning the legacy of apartheid education by generating a new education policy. For different reasons, the process of implementing this policy has provoked resistance from some schools. For example, a number of schools in the previously disadvantaged areas find it difficult to implement the new curriculum (often called the OBE) because of lack of resources (Jansen, 1999). On the other hand, some schools in the previously advantaged areas (mainly white schools) are not very enthusiastic about the new curriculum because they view themselves as already empowered and therefore any new education system is probably meant for the previously disadvantaged (Brodie, 1997).

First set of data for the LPS (SA) started in 2001, the same year that C2005 was phased in at Grade 8. LPS (SA) thus became a platform by which the implementation of C2005 was taking effect in Grade 8 level mathematics classes. As outlined in chapter 1, the new mathematics curriculum favoured the incorporation of the everyday into the mathematics. The LPS (SA) provided me a platform to explore the learners’ perspective regarding this incorporation.

Given the different racial backgrounds of South African communities and the different systems of education in the country at the time, it is not possible, at least at this stage, to make reference to a South African education system as if it were one. In order to make sense of the South African education system, these differences need to be accommodated. The South African Learners' Perspective study attempted to 'accommodate' these differences by focusing on schools located in three different racially defined localities.
This, in turn, enabled me access to the perspectives of learners from different racial backgrounds. These were considerations taken into account when schools were accessed.

3.1.2 Finding a voice within the LPS (SA)

The proposal for all the LPS in all the participating countries was that three classes be investigated in each country for a period of three weeks. Videotape data was to be collected over this period, which would be inclusive of one week of student familiarization and acclimatization to the presence of researchers and video equipments. Local members of the research team in each country were to identify teachers who were engaging in “quality teaching practices” consistent with local curricular emphasis. This attribute of teachers was central to the classes and hence the schools to be visited.

The South African team identified three teachers who were reputable and considered efficient by the school community (the principal, colleagues and students) as well as other mathematics teachers in the area. The three dominant racial groups in Kwazulu Natal (the South African province in which the study takes place) are African, Indian and White. These three teachers were drawn from these three different racial groups, and by implication, from three former different education systems.

The three teachers identified were Mr. Hassam Chetty, Ms. Bulelwa Guca and Mr. Kevin Smith. Hassam* is a former UDW student and he teaches in a predominantly Indian school, Himalaya High School, which is situated in an area assigned to South Africans categorized as Indians. Bulelwa is also a former UDW student. She teaches in a predominantly Black Umhlanga High School, which is situated in a township previously assigned to South Africans categorized as Blacks. The third teacher, Kevin a former Etude College of Education student teaches in a predominantly White school, situated in an area previously assigned whites, Settlers High school. Their formal qualifications suggest they all have at least a four-year teacher training background. This sets them apart from the majority of teachers whose qualifications are either a two-year or three-year diplomas.
In order to give the PHD project an identity and divorce it from the LPS (SA), I needed to use my research interest as a guideline. The central aim of the PhD study was to investigate the learners’ views on the use of the everyday in mathematics. The interest of the national LPS was, on the other hand, the learners’ perspectives about each and every lesson observed. Therefore the scope and focus of my study was narrower than the scope and focus of the LPS (SA). At an empirical level, I took two major deviations. Firstly, I focused only on two of the three schools, Umhlanga and Settlers. My focus on the two schools was motivated by both practical reasons and the nature of the sample in the two schools. At a practical level, Umhlanga and Settlers are the two schools in which I participated more in the data collection process. In Umhlanga, I participated in six of the nine data collection days and was able to participate in interviewing the teacher and learners. In Settlers, I was present for the entire data collection period and was in fact once ‘in charge’ of the data collection exercise in the absence of Prof. Renuka Vithal and Dr. Khuzwayo. In relation to the nature of the samples, the two schools were much more polarized in terms of their location (Settlers was in a historically white suburb and Umhlanga was in a historically black locality), participants (a white male teacher with mainly white learners in Settlers and a black female teacher with mainly black learners in Umhlanga) and availability of resources. The polarized nature of the resources provided access regarding the take-up of mathematics learning in these two polarized sites. My sampling was thus purposive, as Manion, Cohen and Morrison observed, such a sample does not pretend to represent the wider population, it is deliberately and unashamedly selective and biased” (2001:104). My second deviation from the main study was motivated by my interest in lessons which summoned the everyday as these offered data most relevant for my own study. The total number of lessons observed at Umhlanga and Settlers are twenty-four; nine at Umhlanga and fifteen at Settlers. In each of these schools, five of the lessons observed drew from the everyday.

In the following section, I focus specifically on how I collected data relevant for my study, though working within the constraints of the LPS (SA).

* All the teacher’s names are pseudonyms
3.2 TECHNIQUES AND PROCEDURES FOR DATA COLLECTION

As outlined above, the LPS (SA) generated a very rich data set. In order not to look at whatever swam into my field of vision, I turned to my research questions for guidance and focus. As Martin (1997:25) warns, without any research questions to guide you, “You’d have your choice of any of this infinite list to take note of. Where should you begin? Nothing is more important than anything else”. The first two key questions of the study were concerned with (a) the type of the everyday incorporated and (b) the way learners responded and argued when engaging these activities. In order to address these questions, it became necessary to capture the lessons. The major areas of concern in these lessons would be the type of the everyday incorporated, the type of classroom conversations provoked by these activities and the learners’ written responses. The other two questions focused on (c) learners’ descriptions of the everyday and (d) their views on the significance of the everyday in mathematics. These two questions required the capturing of learners’ views. The last key question is concerned with making sense of data and providing an explanation for the findings. I will therefore guide my discussion in this section in relation to the techniques used to capture the lessons and techniques used to capture the learners’ views.

3.2.1 Capturing the lessons

The video tapes and field notes: All the lessons were captured by videotapes and by recording field notes. During any one lesson; three video cameras were used, the one camera focused on the teacher, the other on the learners and the third one on the focus-group. The cameras that focused on the focus group and the class were normally left to capture the classroom proceedings with very little monitoring from the research group. This offered researchers an opportunity to write down classroom observations. The camera that focused on the teacher was to be constantly monitored to capture every movement made by the teacher. This camera was often monitored by one of the technicians. As the lesson progressed, images from the two video-cameras were mixed on-site to provide a split-screen picture of the teacher and learners. This facility enables
an observer to note, simultaneously, the teacher’s instructions and the learners’ reaction towards the instruction. These tapes, on which the split-screen image was recorded, and field notes for each lesson, served as a source for reviewing the classroom events.

In viewing these tapes and reviewing the field notes, I was able to note the type of classroom environment the teacher encouraged and the way in which the everyday was referenced. My conjecture was that the teacher may privilege and be guided by the learners’ views or she/he may be rigid and in control. This (degree of control the teacher has) is an aspect of framing (Bernstein, 1996). On this basis, I would be able to categorize the lesson as either weakly framed or strongly framed. In relation to the phasing in of the everyday, I focused on whether the teachers presented it as a see-through towards the mathematics or as an aspect which warranted some discussion on its own. The way in which the teacher makes reference to the everyday would serve as an indicator, for the learners, of what a ‘legitimate text’ is (Bernstein, 1996) and may influence their perspectives on the incorporation of the everyday in mathematics.

**Written work:** For all the lessons, three forms of written work were captured: the worksheets (distributed to learners), learners’ written responses on the worksheets and what the teacher wrote on the board. At the end of each lesson, the worksheet used in class and the learners’ written responses were collected and any information written by the teacher on the chalkboard was also copied. I regarded these as a product of the thought process about what was to be learned (worksheet), the outcome of the learning process (learners’ responses) and what was deemed important in the lesson (teacher’s notes on the chalkboard).

Owing to their incorporation of the everyday, the worksheets used by the teachers could be categorized as weakly classified. However, the mode of expression used to ask the questions implied the motivation for incorporating the everyday. For example, questions could be structured in such a way that the everyday is insignificant. These include tasks which Dowling categorizes as expressive. These tasks sideline the value of the everyday and announce their mathematical inclination through the use of the mathematical mode of
expression. The type of the everyday and the extent to which it appeals to learners also play a role in either situating the everyday at the centre of the discussion or in rendering it peripheral. Access to written work provided some clue on how the everyday was regarded in the classroom.

3.2.2 Capturing learners’ perspectives

After each lesson, members of a focus group were shown a video of their actions and responses during the mathematics lesson. This allowed learners to recall and give their own account of their actions. The type of interview we held with learners could be categorized as unstructured since it allowed the introduction of “new material into the discussion which had not been thought of beforehand but arose only during the course of the interview” (Hitchcock & Hughes, 1989). But as Whyte (1982:111) observed, there must still be structure in an unstructured interview. I thus wish to illustrate how the learners’ perspectives about the everyday were captured within an interview structure provided by the LPS (SA).

The LPS (SA) based the post-lesson interviews on the following set of questions:
1. What was the lesson about-student reconstruction of the lesson?
2. What did you learn from this lesson; what was most important or interesting for you?
3. Understanding of mathematics, problem; how is lack of understanding dealt with; explain understanding or difficulties. (Look at work in their books)?
4. Relation between mathematics and context (e.g. substance abuse); mathematics and other subjects.
5. Homework; is it important; is it done; who helps with difficulties?
6. Reflections on teacher practices e.g. going to the board; what is unusual or normal group functioning; different positions; marginalization; decision making, resolving differences and conflicts, gender issues.
7. Views about change to OBE.
8. Liking of mathematics; rating its importance to them; choosing to continue with mathematics.
9. Open questions or comments from students to interviewer.
In order to foreground the interest of my own study, I focused on the way learners responded to questions 1, 3 and 4 or the follow-up questions to these. For example, focus question 1 provides an opportunity to understand, from the learners' perspectives, what learners considered to be substance of the lesson. In relation to my study, this question enabled me to understand whether learners would describe the lesson in mathematical terms or in terms of the context that would have been used. Focus question 2 provided further insights regarding whether learners in a mathematics class would regard the everyday as an object of study; or whether they would attribute its significance in relation to accessing mathematics. Focus question 3 provides an opportunity to find out ways in which learners interpreted a mathematical task presented to them. In instances where these tasks were based on an everyday context, it was possible to probe the extent to which learners negotiated tension between the mathematics classroom expectations and their familiarity with the context used. Nyabanyaba (1999) has, for example, observed that learners do not necessarily divorce their everyday knowledge of a familiar context like soccer, when this context is brought into the mathematics classroom.

There are many other issues, besides the context, that learners may raise with respect to a task. Such issues may include language, clarity of the task, the level of difficulty etc. Thus, focus questions 1, 2 and 3 do not necessarily compel a discussion about the everyday. This makes focus question 4 particularly crucial. Focus question 4 directly sought to elicit the learners’ response with regard to how a particular everyday context informed (or did not inform) the learners’ response. It provided a direct platform for pursuit of questions particularly relevant to this study. This practice ensured that the major concerns of the national study were not deceived, whilst at the same time providing space for my specific study concerns to be realized.

My assumption was that learners’ responses during the interview would provide some clue on whether the everyday was treated as special (and thus needed application of special recognition rules) or as realistic (and thus needed application of non-specialized recognition rules). Secondly, the interviews, I assumed, would provide some indication whether learners find the incorporation of the everyday inhibiting or enabling access to
3.2.3 Capturing the teachers’ views and other lessons

Beyond accessing learners’ perspectives on the incorporation of the everyday in mathematics, this study aimed to offer an explanation of these perspectives. Even though the teachers’ views on the incorporation of the everyday and other lessons in which the everyday was not summoned had an indirect bearing on my study, each could assist in making sense of the learners’ perspectives on the incorporation of the everyday.

Teacher’s views: Given the influence that teachers have over classroom proceedings, my conjecture was that learners’ perspectives (about the everyday) would be informed by what they perceived to be legitimized by the teacher. This made the teachers’ own views about the role of the everyday in mathematics important. Thus, at the end of each data-collection at a school, a mathematics teacher whose class we had observed would be invited to participate in an interview. The questions asked, during the interview, mainly related to (a) the teacher’s views about OBE implementation, (b) teacher’s views about our presence in the classroom, (c) whether learners behaved normally in our presence (d) whether the teachers has attended any OBE workshops. For this particular study, I asked questions that related specifically to the incorporation of the everyday in mathematics. My interest was on what motivated such inclusion and whether the teacher felt it was beneficial for the learners and why.

Other lessons: The lessons observed at each school were not an ‘arranged situation’ but an ‘actual’ one (Vithal, 2000:62). The lessons which incorporated the everyday were part of a series of all these lessons. Most importantly, they were made to fit in with the mathematical themes of solving equations (in one school) and number patterns (in another school). In this way, the type of the everyday incorporated was ‘at the mercy’ of a mathematical theme to be treated for that day. Mathematics came across as the bigger picture within which were embedded everyday-based lessons. These other lessons enabled me to see the way in which the lessons I was interested in gelled in with other
lessons. Particular aspects of my interest were in the way connections were made from one lesson to the other.

Thus far, I have discussed the techniques or procedures used to collect data useful for the study. These include interviews (with teachers and learners), field notes, learners’ written work and worksheets and lessons’ videotapes. At the heart of these techniques are assumptions on what it means to capture reality. “How we understand the social world” argues Scott (1996:74), “will determine how we know it and this in turn will influence how we collect data about it”. In the next section, I reflect on whether and how the techniques mentioned assisted in yielding valid and reliable information for my study.

3.3 METHODOLOGICAL ISSUES

The main interest of this study is to capture the learners’ perspective about the inclusion of the everyday in mathematical tasks. As pointed out already, my research was located within the boundaries set by the LPS(SA). Three aspects I had no influence over were the LPS(SA)’s resolve to

- Use English for the majority of the interviews conducted with the learners
- Conduct group interviews and
- Use attention-capturing material resources (three cameras and video-machines) and human resources (at least four people for each lesson).

I wish to highlight below how each of these aspects had the potential to spark the drawing of contaminated data which would in turn influence the type of observations I would make for this study.

**Constraints of using English**

Most of the interviews at Umhlanga High school were conducted in English even though the learners had an option to use isiZulu. The advantage of using English was that it was the only shared language, albeit with different degrees of fluency, between learners and researchers and among researchers themselves. However, its use during post-lesson
interviews sometimes resulted in the failure of interviewer/interviewee conversation due to lack of shared understanding. For example, the following exchange took place between one researcher (R) and a student, Pinky during lesson 4. The question posed by the researcher was whether learners thought the class had changed because of our presence:

28. P: I think so
29. R: You think so. What’s different?
30. P: We are the best
31. R: Who is the best?
32. P: We are, the class. Yes, most of the people in class are the best in maths.
33. R: Yes. But do you think that now that we are in your class, you are somehow different?

When Pinky says 'we are the best'; she implies that the class is at its best behaviour, a point which is not clear to the interviewer. Convinced that the question was misunderstood, the researcher seeks clarification by asking again (line 31) and repeating the question (line 33). This conversation suggests that Pinky lacked linguistic resources to express her opinion and the researcher also lacked the background to make sense of Pinky’s response; on the basis of which the researcher went on to ask the question already answered.

Repetition of a question, during an interview session, which the interviewee considers answered may suggest that there are particular responses the interviewer is expecting. Such a perception may result in the interviewee attempting to guess the correct answer and this would in turn defeat the study’s purpose of accessing the learners’ perspectives.

*Group interviews*

In citing the advantages of group interviews, Cohen, Manion and Morrison (2000:289) maintain that “Group interviews are often quicker than individual interviews and hence are timesaving and involve minimal disruption.” In our case, the group interviews were certainly quicker, timesaving and enabled us to interact with all learners in each of the
classrooms we visited. However, whether what we teased out from interviewing learners was a ‘group opinion’ or opinions of dominant or confident learners is questionable.

With particular reference to Umhlanga, it became apparent that conducting interviews in English, whilst practically desirable, would bracket off participation by other learners. This was especially the case during the post lesson 1 and post lesson 9 interviews at Umhlanga which involved the same group of learners. In both sets of interviews, one learner, Mpumi offered most of the answers. Some of the learners in the group either lacked the confidence or linguistic capability in English to challenge views expressed by Mpumi. Lack of learners’ confidence or ability to express themselves in English could suggest that what we captured as learners' perspectives are mainly perspectives of learners who were confident and able to express themselves in English.

In this regard, conducting group interviews in English possibly silenced learners who were not confident to express their views in this language. Perhaps a different picture about the classroom proceedings could have been painted had all learners been interviewed in isiZulu.

**Presence of researchers and cameras**

Some learners, like Lucy (lesson 5, Settlers) suggested they were at ease with our presence in the classroom. However others, like Millicent (lesson 4, Settlers) suggested they were conscious of our presence in the classroom. Expressing the effect of our presence in the classroom, Khulu (Lesson 4, Umhlanga) said that some of her classmates generally “don't listen to the teacher and write whatever they like. But now they are behaving because they see the videos”. The substance of Khulu’s view is that some learners regard the presence of cameras (and probably visitors) as a cue to behave in a different way. So what we observed may be not typify the true nature of the classroom’s events.

This discussion suggests that the presence of cameras and strangers in the classroom influenced learners’ behaviour. In addition, the use of English seems to have
compromised some learners’ ability to express their ideas. As a result, group interviews privileged learners who were relatively fluent in English.

If validity refers to “the relationship theoretical, concept variables and empirical, indicator variables” ’ (Brown & Dowling, 1998:26) then some of the views and lessons may, by virtue of the language in which they were described by learners and the context in which they were captured (presence of cameras etc.), be considered invalid indicators of the classroom events and learners’ views. In other words, our presence seems to have altered the ‘normal’ course of events. Yet, as Hammersley admits, even our estrangement as researchers, would not guarantee production of valid knowledge. He notes that

In general, I think that the chances of the findings being valid can be enhanced by a judicious combination of involvement and estrangement. However, no position, not even a marginal one, guarantees valid knowledge; and no position prevents it either. There are no overwhelming advantages to being an outsider or an insider. Each position has its disadvantage and advantages.

(Quoted in Cohen, Manion and Morrison, 2001:110)

In simple terms, whatever distance a researcher keeps from the phenomena under observation, a compromise to the course of events is unavoidable.

With respect to this study, that our participation would shape the course of classroom events and learners’ interpretation of the events was inevitable. It was necessary, for example, to be in the classroom in order to make observations. Yet, it is as a result of our being in the classroom that the classroom community's behaviour was affected. English was by no means the main language the majority of learners and researchers. Yet it was the only common language that enabled some communication between all researchers and learners. The shortcomings of our participation notwithstanding, I attempted to enhance validity for my own study with respect to classroom observations and with regard to learners’ views.
3.4 ENHANCING VALIDITY

Cohen, Manion and Morrison (2001:105) insist that “If a piece of research is invalid then it is worthless”. However, they also acknowledge that at best, a researcher strives to enhance validity. The term, validity, broadly refers to the degree of agreement between a report of or about an event and the actual event itself. For this study, I attempted to enhance validity between: (1) My description of the classroom events and the events themselves; (2) My understanding of the ‘everyday’ and a broader understanding of this concept within the mathematics education community (3) A theoretical explanation resulting from the study and its potential to hold for other similar situations (4) Group opinion and individual opinion. I focus more closely on each of the aforementioned aspects.

Agreement between an event and its description

Even though the main focus of my study was learners’ perspectives on the incorporation of the everyday, I also believed that these perspectives would not arise from vacant minds. One possible source of these learners’ perspectives would be on the presentation of the everyday in class and the degree of control that the teacher commanded over classroom proceedings. In other words, the management of the mathematics/everyday boundary on the one hand, and teacher control/learner control boundary on the other. It was thus possible that my observation and therefore recording of classroom events would be an oversimplified, selective account, bracketing out other essential classroom events. Such an account would consequently lack factual accuracy or “descriptive validity” (Cohen, Manion and Morrison; 2001).

In order to maximize the possibility of descriptive validity, I drew and compiled accounts for each lesson from the field notes written up by myself and other researchers. The provision of an account by more than one observer or investigator triangulation, is regarded as one way in which a full and rich account of complex human behaviour can be mapped out (Cohen, Manion and Morrison, 2001: 112). In addition, I transcribed the
lesson events in details from the tapes (which captured learners’ and teacher actions). The process of transcribing lessons offered me an opportunity to view a replay of reality, foster familiarity with the classroom events and note details I would otherwise miss. In this way, the gap between an event and its description was narrowed.

*My interpretation of the everyday*

I had to appropriate the meaning of the construct ‘everyday’ for making classroom observations, interviews and analysis. In section 1.3 I offered a definition of the everyday, informed by Moschkovitch (2002) as a broad spectrum of contexts or objects which are not mathematics-specific, akin to Dowling’s (1998) description of the public domain. I distinguished these from mathematics figures, which require some familiarity with mathematics. It was thus possible to distinguish between lessons which incorporated the everyday and those which did not. Such a distinction, in turn, enabled me to make reference, during the interview, to an ‘indicator variable’ (Brown & Dowling, 1998:26) for the concept ‘everyday’. In interviewing learners, I needed to interpret the everyday in relation to their own lesson. For example in the extract below (Settlers, lesson 1) I (G) asked one learner (J) a question on the basis of a ‘football team’ referenced in the worksheet.

82 G: Okay, what’s interesting is that in real life, do you, I mean this team has played 20 games and has lost 6. Do you use an equation do solve this?

83 J: Not really, because it is simple because 20 – 14=6.

In this case, the notion of the ‘everyday’ is localized and replaced by indicator variable ‘this team’.

At the level of analysis, I was forced to modify my interpretation of the concept of the everyday concept. In other words I used data to sharpen my theoretical descriptions. As Brown and Dowling (1998:21) admit, theoretical development takes place at various stages of the research process. For example, in analyzing data, I needed to explicate the difference between tasks that referenced pseudo-realistic contexts and those which drew
in more realistic contexts – which Freudenthal (1973) referred to as ‘dead-mock’ reality and ‘lived-through’ experiences, respectively.

In spite of the various ways in which I localized the concept of the everyday for classroom observations, interviews and data analysis, I tried to reduce ambiguity between the everyday and how I recognized and defined it in these different practices. This exercise ensured construct validity which, as Cohen, Manion and Morrison (2001:110) contend, is characterized by clarification of what a construct, in this case the everyday, means (2001:110).

**Group opinion versus individual opinion**

I have already alluded to the limitations of group interviews in the previous discussion. My overall concern is that what is purported as group opinion may actually be an opinion of one confident and fluent member of the group. One advantage of a group interview is that it facilitated the expression of varied opinions from different learners. In this regard, group interviews tend to be self-corrective. For example, in a post-lesson 4 interview at Umhlanga three learners, one researcher (R) enquired from learners whether they generated a sequence themselves or whether they copied it from the textbook*. Two of the three learners, Lusanda and Cathrine agreed. But Ponda (P) disagreed.

69 P: No, no … you see, the worksheet that mam gave us (She consults with others to agree on which worksheet it is) the second time.
70 R: Oh … yesterday.
71 P: Yes Mam.
72 R: Activity 10.
73 P: Yes, that’s where we looked at the numbers and we just changed it.
74 R: So you get the idea from the previous worksheet.
75 P: Yes, Mam.
76 R: Ok. And then you changed the numbers? And…
77 All: Yes Mam.

* For this lesson, Bulelwa had asked each group of learners to generate a sequence to which another group would respond. She found a pattern generated by this particular group interesting.
The point here is that Lusanda and Cathrine’s responses suggested that the group had ‘copied’ from another text, whereas they (according to Ponda) actually modified one. There was thus some level of group triangulation which helped articulate what the group actually did.

3.5 AN OPPORTUNISTIC CASE STUDY WITH AN INTERPRETATIVE PARADIGM

For this study, learners were observed in the course of their mathematical lessons with their own teacher and in their own classrooms. The setting in which data was collected is the one with which the learners are familiar. The unfamiliar elements were the cameras and the researchers, however, the first week of data collection was meant for familiarization purposes so that the presence of cameras and researchers was minimised. In short, there was no (deliberate) attempt to alter the normal classroom on-goings.

This approach is more in conformity with an interpretative paradigm, whose central endeavour is to understand the subjective world of human experience (Cohen, Manion and Morrison, 2000:22). It is in contrast with a normative paradigm, whose orientating idea is that human behaviour is rule governed and should be investigated by methods of natural science. (Cohen, Manion & Morrison, 2000: 22). Though the presence of cameras and researchers rendered the classroom ‘unnatural’, the substance of the argument is that learners were not moved to a special place or locality for observations.

Within the complexity of the classroom situation, my interest was mainly on learners’ arguments, exchange of ideas and interactions during lessons in which the everyday was summoned. In this way, I set up some form of boundary to assist my focus. Learners who engaged mathematics tasks incorporating the everyday constituted a case for my study. As Hitchkock and Hughes (1995:319) admit, a case study is characterised by boundaries which can be set up in terms of temporal characteristics, geographical and institutional parameters, and the role of an individual or characteristics of a group. In brief, a case is
characterized by a definition of some form of boundary. It is characterized by a focus on individual actors and seeks to understand their perception of events and is concerned with a rich and vivid description and analysis of events relevant to the case (Hitchcock and Hughes, 1995:317).

Brown and Dowling point to the significance of admitting that by a selection of a boundary, the case study also acts selectively; in other words it is not a transparent picture of an 'actor' so selected. For example, with particular reference to learners for this study, my interest was motivated by the fact they were mathematics learners at grade 8 level sitting in a lesson wherein the everyday was summoned. Should these individuals cease to be mathematics learners, they would then cease to be a case for my PhD project. Therefore the summoning of the everyday in mathematics lessons and the participation of learners in these lessons provided a 'selective and organizational principle' (Brown & Dowling, 1998:167) imposed as boundaries to obtain empirical data.

Even though I had my own interest and focus, this study is by and large, a result of seizing the opportunity provided by the LPS (SA). The learners’ views on and their engagement of the everyday-laden tasks could have been captured in a variety of ways. It is very unlikely that ‘the state of the art technology’ employed by the Learners’ Perspective Study would have been an option. In fact, it is the first time that such technology is used in South Africa. Brown and Dowling are concerned that “educational researchers attempt to put a gloss of deliberation onto their opportunity samples by referring to them as case studies” (1998:30). The concern in this regard is that educational researchers ‘hide’ the fact that the samples in their case studies are actually opportunity samples. It does not seem that they suggest that an opportunity sample cannot serve as a case.

In this regard, a case study and an opportunity sample are not necessarily mutually exclusive concepts. That this study is characterized by an opportunity sample does not preclude a case study categorization. The sample is opportunistic on my part because had I not been a member of the LPS team I would not have had access to this particular
sample. Even though it is clearly opportunistic, it seems appropriate to suggest that the methodology in this study is a case study with an interpretative paradigm. In other words, it is a research enquiry which attempted to capture a mathematics lesson as it would ordinarily proceed and which focused only on one particular mathematics classroom in each of the schools selected.

I have, in this section, focused more on my own study in relation to ensuring validity and providing reasons for categorizing it as an opportunistic case study with an interpretative paradigm. However, being part of a collective and working in collaboration with more experienced researchers added another dimension for my development as a researcher which I would like to reflect on in the next section.

3.6 BENEFITS AND CONSTRAINTS OF BEING A MEMBER OF A TEAM

Isolation is identified as one of “the most important factors that prevent or inhibit the successful completion of theses” (Mouton, 2001:06). “This loneliness”, Mouton argues further, “unfortunately comes with the territory” (2001:07). Being a member of the LPS provided an environment in which I was part of a collective and therefore prevented my studies and research from being a ‘lonely territory’. I was particularly exposed to tools for capturing data, ways of handling practical challenges related to data-gathering and exposure to ideas.

Exposure to tools
One of the aims of the LPS(SA) was to create a cadre of researchers skilled in the use of what Prof. David Clarke, Director of International Learners’ Perspective Study, refers to as ‘state of the art’ technology. This labour-intensive data collection method exposed me to the use of a split-screen to view simultaneously the actions of the teacher and focus group. This made it possible for me to observe the learners’ immediate reaction or lack thereof, to an instruction, comment or action by the teacher. Such an observation was significant for my own study because the learners’ perspectives about a lesson are mainly influenced by what they hear or observe from the teacher, and not necessarily by what the
teacher does or says (if learners are not paying attention). As Ernest (2004:28) points out, “The making of meanings by a person always draws upon their active (if unconscious) mobilization of existing elements of meaning and understanding, within a social context.” (2004:28). In other words, these perspectives are formulated on account of active and conscious participation of learners in the classroom goings-on. The split-screen allowed access to the learners’ reactions towards the teacher’s utterances.

Handling practical challenges
The written form of research reports masks the practical and dynamic nature of the data-collection process which Ball (1995:259) describes as “messy, mobile and ad hoc”. My participation in the LPS exposed me to ways in which the more experienced researchers handled such challenges.

For example, on 10th day of data collection at Umhlanga, learners who had not paid school fees were ordered out of the school premises by the principal. Yet on seeing us, they, as well as the teacher herself, were willing to ‘stage’ a lesson. For me, it was possible and appropriate that we could make classroom observations under the circumstances. My main reason was that both the teacher and learners were not coerced but were willing and thus there would be nothing unethical about the lesson. However, Renuka and Herbert disabled the staging of the lesson on the grounds that it would be a dishonest and an artificial representation of what was taking place at the school on that day.

Ethical considerations
As a novice researcher, I was eager for data. This eagerness tends to overwhelm the notion that data may not be collected at all costs. In particular, researchers are required to strike a balance between pursuing the truth and being sensitive to their ‘subjects’ rights (Brown & Dowling, 1998; Cohen, Manion & Morrison, 2001). In all the three schools, learners who were to be observed, their parents and teachers completed a consent form (See appendix 3.1, appendix 3.2 and appendix 3.3 respectively). Incorporated in this form was information about the study, its purpose and an undertaking by us as researchers that
the views expressed by both the learners and the teachers as well as their names would remain confidential. Completion of this consent form was preceded by a meeting with the school authorities and the teacher concerned to provide further clarification on the study. The signing of the consent form by the participating teachers, participating learners and their parents was an attempt to strike a balance between pursuing our research interests and respecting the rights of the participants. This is known as the cost/benefit ratio, a concept which describes a social scientists’ consideration of the likely social benefits of their endeavors against the personal cost to the participant (Cohen, Manion & Morrison; 2000: 50).

**Exposure to ideas**

The three of us, Renuka, Herbert and myself, were involved in the transcription of most lessons. Thus, one lesson would be transcribed and described from at least three different perspectives. This process made possible what Cohen, Manion and Morrison (2000: 113) refer to as “investigator triangulation”. It helped me validate my own observations and descriptions of lessons. We also engaged in informal discussions about the lessons, the interviews we conducted and the setting of the school in general. Our different interests were often reflected in these discussions. For example, Renuka found it interesting to explore the girls’ views about mathematics and whether being a girl mathematics learner was socially acceptable. This aspect was not appealing to me, however, it pointed me towards a number of issues one could explore with learners. Such sharing of ideas about data and data-collection process is termed ‘theoretical triangulation’ (Cohen, Manion and Morrison, 2000:113).

In spite of these benefits, there were some constraints. In fact, according to Lincoln and Guba (1985), working as a team of researchers is not necessarily advantageous. They contend that it is ‘erroneous’ and indefensible to assume that the one researcher will corroborate the other, particularly in the case of qualitative and reflexive enquiry. The specific challenges of my participation in the LPS(SA) were the possibility of seeing data through the eyes of the more experienced and that the presence of the more senior researchers seemed to influence events in a different way. I elaborate on these aspects
Seeing data through the eyes of the experienced

In my case, my ideas were shared with members who are more experienced in research. Thus our relationship resonated more with what Dowling (1998) refers to as a pedagogic relationship of the form of apprenticeship. Such a pedagogic relationship entails a situation in which the one participant is a novice or ‘object’ and the other is an experienced or ‘subject’ (Dowling, 1998:30). Because of their experience, exposure and familiarity with debates and issues in mathematics education; this asymmetric relationship tends to favour the more experienced. Since the more experienced researchers are not necessarily ‘theoretically innocent’, the interaction carries the risk that the data could be seen through the eyes of the more experienced.

Abnormalising the empirical setting

It has already been pointed out that the presence of researchers in the class ‘abnormalised’ the classroom situation. I argue that the presence of the more experienced researchers seemed to influence the situation differently. For example, the first Friday of our data collection at Settlers (26/04/2002) the two experienced researchers could not make it for data collection, thus leaving me ‘in charge’. Two unusual events took place. Firstly, the teacher, Mr. Smith, engaged the learners in a non-mathematics conversation about cricket and what learners knew about it. This took place in the context of introducing geometry. Mr. Smith seemed to be in a jolly mood and the class was also unusually noisy and excited. Mr. Smith had to find a way of establishing order as each learner was keen to participate:

392 Teacher: [(points to learner)] Two lines meeting. So it must do have something to do with lines so (learners noisy) shhh, relax, relax [writes on board] Okay. Right so let’s stop so that it [the classroom atmosphere] doesn’t get completely and totally out of hand. Let’s start with the ladies at the back of the church. I want you to tell me one thing that you know about angles-and then I will start working down there. Yes?

[Lesson 5, Settlers]

This was in contrast to the other days when he focused on the maths activities and only focused a little on the non-mathematics. Secondly, one of the senior technicians initially
protested against setting up the television monitor for the post-lesson interviews. He argued that the procedure was time-consuming and unnecessary. This technician had participated in all the post-lesson interviews and had never, in the presence of senior researchers, protested against the use of a television set in post-lesson interviews. The point here is that these two ‘unusual events’ occurred in the absence of the more experienced researchers. Could it be that there are other events, less noticeable but more significant, that were affected by the presence of the experienced researchers?

Given the context in which I collected data for this study, it was important for me to create a conceptual distance which would allow me to reflect critically on inputs from the more experienced researchers and ensure that my study did not become a transparent report of the LPS(SA).

**Finding my voice**

The theoretical framework, though later modified as a result of engagement with data, provided a necessary zoom for what I needed to focus on. The process of writing also forced a re-evaluation of ideas. Richardson views the process of writing as a method of research in itself. He observes that, “In standard social scientific discourse, methods for acquiring data are distinct from writing of the research report, the latter presumed to be an unproblematic activity, a transparent report about the world studied. When we view writing as a method, however, we experience ‘language-in-use; how we word the world’ into existence.” (2000:923). Richardson is thus critical of the static model which portrays writing as mechanistic and devoid of creativity and sensibilities of individual researchers. Richardson’s argument suggests that, to the extent that I, and not members of the LPS(SA) team, are involved in the write-up of this study, then the product can be considered to be independent of the LPS(SA).

Practically, it is not unusual to have researchers working collaboratively in some research project. Areas of research collaboration could include the process of data collection, transcription of observations and analysis. It is not unusual for individual researchers to zoom in on particular issues, analyse them and write about them. For example, a
University of the Witwatersrand research project in the Limpopo province involved nine researchers, yet individual researchers have been able to write up their own papers on the basis of data collected in collaboration with other researchers (see Adler and Reed, 2003).

CONCLUSION

I have argued, in this chapter, that this study can be categorized as an opportunistic case study with an interpretative framework. I have also tried to capture my experiences in divorcing my own interests from those of the LPS(SA). More challenging though, was an engagement with a maze of ideas generated through my discussions with the more experienced, but inevitably not theoretically-impartial researchers. I have, in this regard, provided my attempt to allow dialogue between ideas from other researchers with my own ideas. In next chapter, Chapter 4, I introduce the first of the two schools from which I collected data, Umhlanga High school.