

THE PEDAGOGY OF LARGE CLASSES :
CHALLENGING THE "LARGE CLASS EQUALS
GUTTER EDUCATION " MYTH.

Shireen Maged

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**The pedagogy of large classes :
Challenging the "large class equals gutter education" myth.**

by

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for the degree of Master of Education specialising in primary education.**

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This is my original and unaided work and has not been submitted to any other institution before for assessment purposes. All sources, references and other assistance have been acknowledged.

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CHAPTER 1 : Introduction

1.1. Post apartheid education and the principle of equity

After South Africa's first democratic elections in April 1994, the key role players in education were faced with the challenge of redressing the inequalities of the Apartheid era. The racially segregated departments of education merged into one and the educational sector very early on attempted to move towards establishing national equity in education in general, and in the schools (primary and high) in particular. One of the first changes proposed in 1995 and effected in early 1996 was the redistribution of human resources, viz. the teachers, within the schools. By means of the process of rationalisation which was later called right-sizing, the education department attempted to achieve a situation of equity in all the schools with regard to the teacher-pupil ratio. The national ratio proposed was that of 1:35 for high schools and 1:40 for primary schools.

The implications of right-sizing for the schools previously governed by the Department of Education and Training (DET) were that class groups would become smaller and more teachers would be employed. For the "White" , "Coloured" and "Indian" schools though, right-sizing meant that classes would become larger and fewer teachers would be needed.

Rather than to employ many more teachers and bring the teacher-pupil ratio closer to what it was in "White" education, the national government and Department of Education decided on a ratio that they felt the country could economically afford. The process of right-sizing was to be implemented over a period of five years.

1.2. Apartheid education and the principle of equity

In order to contextualise the study, a brief overview on apartheid education and the principle of equity is necessary.

During the apartheid years in South Africa, education, like all other social fields, was organised and structured along racially and economically discriminative lines. What was known as "Native Education" before 1949 (Molteno in Kallaway; 1986, 66) , became segregated education, in that the education of the "Black" people was further divided. According to Frank Molteno :

The National Party brought to government a new emphasis on black schooling. In January 1949, a commission on Native Education under DR W M Eiselen was appointed. . . . the Bantu Education Act was passed in 1953. A Commission on Coloured Education was set up in the Cape in 1953. . . . This provided for the control of education for children classified Coloured. . . . the Indian Education Act of 1965 . . . similarly provided for the transfer of the control of education for people classified Indian(Kallaway , 1986 , 88).

This development eventually led to the formation of four education departments, viz. the House of Assembly ("White" education) , the House of Delegates ("Indian" education) , the House of Representatives ("Coloured" education) and the Department of Education and Training ("Black" education). Each educational department provided for the needs of each racial group. This provision was highly inequitable in every sphere. The per capita expenditure on education, for example, clearly reflected the level of inequality. According to the SAIRR surveys of 1982/3, the expenditure per "Black" child was one hundred and forty six Rand (R146.00) , per "Coloured" child was four hundred and ninety eight Rand (R498.00) , per "Indian" child was seven hundred and eleven Rand (R711.00) , and per "White" child was one thousand two hundred and eleven Rand (R1 211.00).

The inequality was experienced in terms of physical resources as well as human resources. It resulted in a polarisation of education, with each pole displaying characteristics of extreme affluence and extreme poverty. The middle ground ("Coloured" and "Indian" education) was characterised by varying shades of grey, with some schools developing sophisticated educational resources and others remaining poorly equipped to meet their educational needs.

With regard to the human resources, a comparison of the pupil-teacher ratio in each of the racially segregated education departments reflect the extent of the inequality. The pupil-teacher ratio for the different departments was 46:1 in the "Black" schools, 25:1 in the "Coloured" schools, 22:1 in the "Indian" schools and 22:1 in the "White" schools (Arnott and Bot , 1993 , 1). As a result class sizes in the "Black" schools were much larger than class sizes in the "White", "Indian" and "Coloured" schools.

In order to give every child the same standard of education as the "White" child received under apartheid would cost an enormous amount of money. What would this mean in terms of teachers? According to the De Lange Report of 1981:

The position with regard to Black teachers gives most cause for concern. To reduce the teacher-pupil ratio from the present 1 : 43 to 1 : 30 , the number of teachers will have to increase from 95 501 in 1980 to 239 943 in the year 2000 (Christie and Collins , 1986 , 117).

1.3. Large classes equal gutter education

The outrage felt by teachers, pupils and parents of the Western Cape Province in particular was articulated in the form of mass demonstrations. The underlying assumption which characterised the protests was that an increase in class size would axiomatically result in a dropping of educational standards, i.e. **a higher teacher-pupil ratio would**

inevitably lead to gutter education or a dropping of standards, I felt, based on my teaching experience, that the criticism was essentially an emotive one which lacked substance. I felt that the proposed ratio of 1 : 35 in high schools in particular was not too high to prevent quality instruction from taking place. Thus I decided to embark on the current research project.

1.5. The research study in brief : A synopsis

The study takes the work of three teachers to examine whether the popular belief of "small is better" is substantiated in the practice of these teachers. The study observes and analyses the classroom instruction of each of these teachers in a small class as well as in a large class. The observation is done with the use of an observation schedule, and the analysis of the data is done within a Vygotskian framework. The study shows that the pedagogy and the teaching style of the three teachers does not change when they teach differently sized classes. In other words, their classroom practice is the same for both the small and large classes. The study further shows that the pedagogy of the teacher determines the effectiveness or quality of instruction, and that class size does not impact, either positively (in the case of the small class) or negatively (in the case of a large class) on the effectiveness or quality of instruction.

1.6. Research constraints

According to two of the three teachers, my presence in the classroom and especially the presence of the video camera, impacted on the performance of the pupils. To what extent the study is unable to assess. However, since the teachers are most likely to know if their pupils behaved differently when observed by an outsider, the observer effect must be seen to have impacted to some extent on the data collected during observation and therefore indirectly on the subsequent analysis.

The study initially defined a small class as consisting of less than twenty pupils. Except for Teacher A, I was unable to find two other teachers whose classes were smaller than twenty and who satisfied the criteria of the research design. Hence the study re-defined small as twenty-five and less. In the present South African context, twenty-five pupils is indeed regarded as a small class, but ideally the study would have liked the gap between small and large to be a substantial one (like that of Teacher A where the gap between small and large is twenty pupils). This was not possible, however. The cases of Teacher B and Teacher C, therefore, where the difference in the number of pupils is thirteen and twelve respectively, do not represent the ideal in terms of what the study was looking for.

Because of rationalisation, 1996 proved to be a traumatic year for teachers. With the prospect of having to teach larger classes as well as the accompanying job insecurity, the morale of teachers was particularly low. This situation possibly impacted on the classroom practice of teachers (perhaps even pupils). The above scenario must be borne in mind when reading the study.

CHAPTER 2 : Survey of Research Literature

2.1. Surveying the international field

Information provided by current research data bases like the education data base ERIC reflect that the impact of class size on effective teaching and student achievement has been very well researched internationally , especially in the United kingdom and the United States of America.

In the USA , a state-wide longitudinal evaluation of the effects of class size on student achievement was conducted. The study was called *Project STAR* (Student Teacher Achievement Ratio) and was conducted over a period of four years (1986 - 1990). The study focused on the first four years of primary schooling (Kindergarten to Level 3) and analysed demographic and basic skill data from student records of 2 837 students in classes of various sizes. The final summary report was written up by Elizabeth Word et al. A fact sheet on the study was constructed and this reflected that the smaller classes reflected higher scores on the Stanford Achievement Test and Basic Skills First Test in all levels and all locations viz. rural, suburban, urban and inner-city.

A number of secondary studies based on the data of Project STAR were conducted. Helen Bain et al conducted a study in 1989 entitled : *A study of First Grade Effective Teaching Practices from the Project Star Class-Size Research*. Fifty effective first grade teachers (effectiveness was determined in terms of the outstanding grades achieved by students) and the materials they used were studied in an effort to determine what effective teachers do to promote learning in reading and mathematics. The data indicated that effective teachers reflected the following : a) ¹ high expectations for student learning; b) ² provided clear and focused instruction; c) ³ closely monitored student learning progress; d) ⁴ retaught using alternative strategies when children did not learn; e) ⁵ used incentives and

rewards to promote learning; f) were highly efficient in their classroom routine; g) set and enforced high standards for classroom behaviour; h) maintained excellent personal interaction with students; i) reflected enthusiasm in the form of acting, demonstration and role playing. Of the fifty teachers, forty three had small classes or large classes with an aide, and **seven teachers had large classes without an aide.**

In 1989 John Folger also conducted a secondary study based on data from Project STAR. He entitled his study *Lessons for class size policy and research*. His paper summarises policy and research implications of studies on Project Star. He recommends that class reduction be used to improve achievement and he suggests that future research on teaching styles, curriculum objectives and inter classroom organisation be conducted.

John Johnstone in his study entitled *Teacher perceptions of changes in Teaching when they have a Small Class or an Aide*, reports on the Project Star interview study that examined teachers perceptions after teaching for a year in small classes or regular classes with aides. The study which was conducted in 1989 found that teachers believed that small classes or the assistance of aides in regular classes impacted positively on teaching and learning. The teachers felt that they were more effective since they were able to provide more individual attention.

John Folger and Carolyn Breda in 1989 conducted yet another secondary study which they entitled : *Evidence from Project STAR about Class Size and Student Achievement*. They found that students in all types of schools scored significantly higher in the small classes than they did in the large classes, especially in the subjects of reading and mathematics.

The American based Project STAR and its smaller secondary studies have generally found that teacher effectiveness and student achievement levels are higher in smaller classes (15 - 20 pupils) and regular classes (21 - 30 pupils) with an aide, rather than in large classes (35 + pupils) . What is significant for this particular research study , however, is

the finding of Helen Bain's study, that of the fifty effective teachers, **seven had large classes without an aide**. Admittedly this does show that the majority of effective teachers were effective in smaller classes, but what it also interestingly shows is that effective teaching (as described by the Bain study) is indeed possible in large classes. The seven effective teachers who had large classes without an aide showed this.

At this stage it is worth noting that a recent article in the publication, *Research Focus*, reports on a recent study which re-analysed the data of Project Star. Professor Sig Prais of the National Institute of Economic and Social Research re-examined the data of Project Star and reached the conclusion that the study did not prove that the reduction in class size to 15 pupils resulted in infants progressing at a faster rate. He found that a reduction in class size only had a “negligible effect on most children’s rate of progress during the first three years of school” (*Research Focus*, 1997, 13). According to the article, Prais claims that the reduction in class size only benefited six-year-olds. He argues that there is no point in conducting any further research on the effects of class size on pupil achievement and that there should instead be attempts to rather “. . . investigate the benefits of alternative textbooks, more detailed teachers’ manuals, other forms of class organisation and **teaching styles** and more lesson preparation time for teachers” (*Research Focus*, 1997, 13, My own emphasis).

Many other international studies on class size and teacher effectiveness / student achievement contest the findings of the STAR project. Litke in 1993 investigated student attitudes towards large classes. The research is entitled : *Learning Lessons from Large Classes; Student Attitudes toward Effective and Ineffective Methods in Large Classes*. Litke found that the assumptions held by faculty regarding large classes were not entirely correct. In surveying students she found that a significant number of students did not share the belief that increased class size leads to decreased student learning and satisfaction. She also found that the data in her study suggested that quality teaching is possible in large classes and so challenged yet another assumption held by faculty.

Another American based research study conducted by S. Goettler - Sopko in 1990 entitled *The Effect of Class Size on Reading Achievement* found that determining the ideal class size is a complex issue which depends on a number of variables. It shows that academic achievement does not necessarily improve with a reduction in class size unless the appropriate learning styles and effective teaching styles are used. What it does find is that an increase in class size decreases the morale of teachers as well as increasing the stress level of teachers.



Douglas Mitchell and Sarah Ann Beach in 1990 did a study concerned with class size, but this time the study focused on the economic consequence of reducing class size and they found that the economic cost needed to reduce class size in America would be enormous and that there would be no public support for the kind of funding that would be necessary to sustain such small classes. The sustaining of such small classes would require the continuous expansion of facilities as well as the employment of more teachers. They suggest that one cost effective way of utilising the already employed staff is by re-deploying teachers for part or all of a school day.

In the United Kingdom Dick Allwright in 1989 conducted a study which he entitled *How Important are Lessons Anyway ? Lancaster-Leeds Learning in Large Classes Project*. Allwright reviewed relevant research in this study and he found that research did not generally support the idea that class size is a determining variable in student achievement. He found also that students viewed classroom lessons in general as futile and in fact a hindrance to their learning and that they pursued extra learning elsewhere. He expresses the need for more research on the study habits of language learners.

In 1983 Harry Mayhew reviewed research conducted on class size. He called his review *Related Research on Class Size* in which he did a bibliographic study of the then current research on class size. He found that research generally showed that academic achievement of learners did not necessarily improve when student - faculty ratios were reduced unless appropriate learning styles and effective teaching styles were utilised.

In 1980 Mark Salser conducted a study in the United Kingdom which he called *Individualised Instruction*. Salser claims that most instruction time is taken up by teachers lecturing and if live lectures could be replaced by recorded lectures the teacher would be free to provide personal individual attention to pupils. In this way an effective one-to-one student teacher ratio is established. [He further claims that individualised instruction requires a higher teacher-student ratio if it is to achieve cost effectiveness.] Since the teacher is freed from routine tasks the high teacher-pupil ratio does not present a problem. He adds that the school could offer more courses since students in the same learning centre would not necessarily have to be engaged with the same material. [The Salser study reinforces the popular assumption that individualised instruction is necessary for effective teaching to take place. It displays a lack of appreciation for whole class instruction or front-of-class teaching, where the teacher mediates within a constructivist paradigm.]

The above summary of some of the relevant international research indicates that besides the four year research study of Project STAR (the findings of which is currently being questioned and contested by Professor Sig Prais), researchers have generally found that class size is not necessarily a significant variable in determining quality teaching and student achievement. It is significant to note that many of the researchers found that it is rather the **teaching style adopted by the teacher that determines the quality of the teaching**. Particular strategies therefore need to be employed if quality teaching is to take place with larger groups. Helen Bain's STAR - related research clearly shows, as indicated earlier, that **effective teaching is indeed possible in large classes**.

This view is supported in the South African publication, **Edusource**, which claims:

Research in some developed countries suggests that variations in class-size between 25 to 40 pupils have no consistent effect on a child's educational performance, as several other factors such as the quality of teacher training and the availability of textbooks and pedagogical materials also have a significant impact on performance (Arnott and Bot, 1993, 3).

2.2. Surveying the South African field

The issue of class size and its impact on student achievement and teaching effectiveness or quality teaching is, as discussed in chapter one, an extremely contentious and emotional issue in South Africa. When consulting the necessary data bases, research journals and magazines for information on the issue, I found that except for an article in the publication *The Teacher*, which reports on the efforts of a Westerford High School Mathematics teacher who is currently experimenting with effectively teaching one hundred pupils at a time (*The Teacher*, 1996, 4), no South African literature or research studies have been produced in this specific area. In fact, I encountered very few South African educational research studies in general. I think this situation can be attributed to a number of reasons which could be speculated on, but which would also make interesting research in itself. However, I am of the opinion that the following two reasons may be among the many which contributed to the above situation.

- a) During the apartheid years South African authorities generally looked to Europe and North America for guidance in terms of socio-political issues in general and educational issues in particular, many times consulting and quoting international research studies to substantiate the social and educational policies in South Africa and so not encouraging or funding local research. Kallaway argues that British educational policy has always served as a model, not only for the provision of education in South Africa, but also for South African educational research (1986 ; 5). He argues further that :

Any consideration of South African education has to take account of the conservative nature of the available secondary sources and the current state of educational research which offers a paradigm case of academic colonialism (1986 , 3).

- b) Educational researchers conducting research in Apartheid South Africa must have encountered a significant measure of inaccessibility at especially the schools of politically oppressed communities, since the presence of strangers at such schools and in such classrooms were viewed with a high degree of suspicion and were often seen as part of the educational authorities' means of surveillance. This must have been a huge constraining factor for researchers who may have been interested in entering such schools for research purposes.

2.3. The South African research problem stated

My research focus is by no means novel, in the sense that the effect of class size on student achievement and teacher effectiveness is an issue which has been researched internationally for many years. However, when reflecting specifically on the South African research scenario, the lack of research as well as the dire need for such research become painstakingly obvious. Kallaway argues :

... the poverty of educational research in South Africa ... is ... reflected by the absence of independent research programmes into education even at the present time (1986 , 4).

I hope my research project will contribute to a South African understanding and interpretation of the issue of class size and quality teaching. I hope, too, that the study will trigger other research studies on the issue of class size and quality teaching. A South African conversation on the issue, a conversation which should have started, at this level at least, long ago, may well become established.

CHAPTER 3 : Vygotskian Pedagogical Theory

Chapter three attempts an explication of Vygotskian pedagogical theory, particularly those notions which are relevant to the study. Vygotskian theory serves as a broad theoretical framework which informs not only the study's conceptualisation of quality teaching, but also the research design (which follows this chapter) , as well as the subsequent analysis of the data.

3.1. What is pedagogy

Pedagogy is the theory and practice of the social relationship between teacher and learner, teacher and task and learner and task. In other words it is concerned with the theory of how we learn and with the practice of teaching for learning. Theory and practice are inextricably linked, informing each other constantly, the one theorising on how learning happens, the other testing the theory and feeding back into it.

The above description of pedagogy relates to the micro, formal, institutionalised situation in which the individual's consciousness is formed and shaped by highly structured and formal relations and systems of communication.

A Russian theorist and pedagogue who has made a significant though relatively recent impact on the theory of learning and the practice of teaching is Lev Vygotsky. Vygotsky was born in the USSR and was particularly influenced by the writings and ideology of Karl Marx. He studied cognitive and developmental psychology and focused his thinking for a significant part of his short life on human development and human learning. Vygotsky believed that knowledge is socially constructed and he saw learning and teaching happening

within a social context. A Vygotskian theorist explicates :

(Vygotsky's) educational theory is a theory of cultural transmission as well as a theory of development. For 'education' implies for Vygotsky not only the development of the individual's potential, but the historical expression and growth of the human culture from which Man springs (Moll , 1990 , 1).

Vygotsky does not however completely negate the biological development of humans, as another Vygotskian theorist explains :

Vygotsky does not deny biological development, however, human biological development is shaped and concretised through societal and historical development (Hedegaard in Moll , 1990 , 351).

Human development and learning are seen in a social, cultural and historical context.

Vygotsky developed

... a historical approach to mental functions. In this way Vygotsky was able to propose the sociocultural determination of the human mind. (Flanagan , 1991 , 107).

The teaching - learning dynamic is seen from a social perspective. Learning is seen to happen in a collaborative relation between teacher and pupil, where meaning/knowledge is socially and collaboratively constructed. The teacher or mediator instructs by mediating between the learner and the task. The nature of the knowledge is that of conceptual knowledge which is mediated through language. Language itself is seen as a social construct and is regarded as an important tool for mediation.

I find Vygotsky's pedagogical theory attractive in that he emphasises the important social character of mind. In my opinion human beings are integral parts of the societies in which they function - they shape it and are in turn shaped by it - it is a dialectical

relationship which needs to be taken into consideration in social and educational theory. Vygotsky recognises this social relationship and theorises from this perspective. His theoretical constructs of the Zone of Proximal Development together with his emphasis on the role of language (itself regarded as a social, semiotic construct) in the process of mediation, suggests a social manifestation of mind. For me this is an invaluable perspective to have when attempting to understand how human beings learn and develop within society, in other words how human consciousness is formed pedagogically , not only in the broader, informal sense but more specifically in the formal, institutional, educational sense.

3.2. Vygotsky and pedagogy.

According to the Vygotskian theorist Moll (1990) , Vygotsky saw education as being essential to cognitive development as well as being the embodiment and manifestation of socio-cultural activity. The ability to benefit from explicit, educational instruction is seen as a fundamental human quality. According to Premack, as quoted by Moll :

The presence of pedagogy in human affairs introduces a cognitive gap that is not found in other animals. If the adult does not take the child in tow, making him the object of pedagogy, the child will never become an adult (in competence) (1990,1).

For Vygotsky pedagogy is about developing human consciousness, the mind in society, it is about enculturating the human child or human novice into the social practices of essentially adult human society. Riviere (1984) as referred to by Moll, observed that Vygotsky regarded schools and other formal educational institutions as " cultural laboratories" - i.e. institutions which shape and modify human thinking.

Vygotsky emphasises the social nature of thinking, the social formation of mind and thus the social organisation of the formal educational institution. The unique social relationship between teacher and pupil is an essential manifestation of formal school

pedagogy. He sees the development of human cognitive processes (human thinking) in a social context and views pedagogy in its broad sense (the enculturation of human consciousness by formal and informal social means) and its narrow institutional sense as being the means through which society passes on its values, its culture, its traditions and its language to the learner or novice who can be anybody who has not been socio-cognitively initiated, anybody whose thinking processes have not been developed pedagogically.

Vygotsky's understanding of knowledge has a strong socio-cultural and socio-historical dimension as well as a strong constructivist thesis to it. Vygotsky's socio-historical approach to science for example, allows us to view science as a " type of historically conditioned knowledge " (Rosa and Montera in Moll , 1990 , 63). Science is seen to be composed of systems of knowledge which are based on theory and practice which in turn are based on very specific rules. Rosa and Montera explicate :

. . . science does not explain the world as it is ; instead, it presents an image of the world 'as if' things were as theory presents them. Thus we have . . . a real world (of things as they are, in themselves) , the world as we conceive it (the image of the world that we perceive through phenomena that theory and prior experience allows us to perceive) , and a theoretical world (the more or less rational reconstruction of reality that science offers us) . The real world does not present itself to us in a direct way . . . whereas the other two worlds relate to each other in a dialectical manner through scientific practice or, in other words, through the process of transformations by the action of conceptual tools and the facts that they allow us to examine (in Moll , 1990, 63).

Scientific knowledge is seen to be part of a more rational but still theoretical reconstruction of the world or reality. According to Rosa and Montera, "The real world does not present itself to us in a direct way " , the real world is whatever we conceive it to be . Our conception of the real world is based on our empirical experience as well as our theoretical experience of it and our scientific reconstruction of the world is based on these subjective conceptions. Hence, science "presents an image of the world " , an image based on empirical, theoretical and conceptual understandings. Our conceptual knowledge allows us

to interpret reality / the world in certain ways. In other words our conceptual knowledge frames our understandings and interpretations and assists in the construction of smaller and bigger pictures which make sense to our own rationality. From this perspective, conceptual constructs are formed by language, and language is seen as a social, semiotic construct. Hence our conceptual, scientific reconstruction of our world is essentially a social, semiotic reconstruction. It is this conceptual - social nature of knowledge, of teaching and learning, which Vygotsky stresses in his pedagogy.

3.3. The zone of proximal development.

Vygotsky introduced a pedagogical theoretical concept to the educational domain, which has significantly impacted on teaching practice internationally. He calls the concept the zone of proximal development (ZPD). The zone of proximal development is the generally accepted English translation of the Russian term which, if translated literally means, “the zone of closest or nearest development” (Rogoff and Wertsch , 1984). The literal translation is helpful in that it clarifies the meaning of the English word proximal and so helps to clarify the meaning of the entire concept. Proximal, therefore, refers to the closest or nearest developmental level to which the child's existing developmental level can be developed when collaborating with a more competent person. In explicating the ZPD Vygotsky says :

(The ZPD) is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (1978 , 86) .

In other words, Vygotsky argues that each child or learner has an "actual developmental level" which is the level at which the child can solve problems independently without help.

The proximal level of development is the highest level at any particular time to which the

child's cognitive processes can be developed when collaborating with a " more capable peer " or an adult or expert. The novice matures cognitively in the process of collaborating with a more competent person on a problem-solving task. Given this idea of maturation, Vygotsky also describes the ZPD as defining

... those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the 'buds' or 'flowers' of development rather than the 'fruits' of development (1978 , 86).

Vygotsky's metaphoric description illuminates the way he sees development and mental maturation as being largely dependent on collaboration with a more capable, more knowledgeable and more socialised peer or adult. The level and nature of this collaboration is of crucial importance since Vygotsky believes that learning spearheads development, hence learning in the ZPD must always be at the level of the potential development of the learner so that learning can promote the learner's actual developmental level. According to Wertsch and Rogoff :

Vygotsky criticised the view of instruction that is based on an assumption that "instruction must be oriented towards stages that have already been completed. He argued instead that *instruction is good only when it proceeds ahead of development. It then awakens and raises to life those functions which are in a stage of maturing, which lie in the ZPD. It is in this way that instruction plays an extremely important role in development* (1984 , 3 , Authors' italics) .

For Vygotsky, then, instruction or mediation of the task (within the ZPD) should always be in advance of the actual developmental level of the child if the child is to develop and progress to its potential level of development.

At this point a note of clarification on the term "instruction" is needed. Wertsch and Rogoff (1984) alert us to the Russian meaning of the word "instruction", which is not the

same as the English. In English the word “instruction” essentially refers to what is said and done by the teacher, in other words it generally refers to the action of the teacher. However, Vygotsky used the Russian word “obuchenie” which, according to Wertsch and Rogoff, means “teaching - learning process”. When Vygotsky speaks about instruction therefore he refers to the teaching - learning process, he refers to the interaction between teacher and learner, the collaboration between the two and not only the action of the one. The English term “instruction” could therefore be misleading if used without this clarification. (This is a good example of how meaning is often lost during linguistic translation. It also exemplifies the socio-specific meanings of linguistic concepts.) In this essay instruction will mean teaching - learning process or pedagogy.

Vygotsky's concept of the ZPD cannot be seen in isolation to the theoretical context in which it was constructed, as Jonathan Tudge reminds us:

The ZPD, as a concept, cannot be separated from the broader theoretical system in which it is set . . . failure to see the connection between the zone and the theory as a whole means that it is difficult to differentiate Vygotsky's concept from any instructional technique that systematically leads children, with the help of an adult, through a number of steps in the process of learning some set of skills. The difference for Vygotsky is that the **context** in which the interaction occurs is of crucial importance (in Moll , 1990 , 156).

Vygotsky's conception of pedagogy which emphasises the socio-cultural nature of instruction, is important to bear in mind when attempting to locate and understand the pedagogical concept of the ZPD. Bruner's contextual remark is valid at this point :

. . . when we think of Vygotsky's psychological theories, we must remember not only that he was a Marxist but that he was devoted to the intellectual freshening of Marxist doctrine (quoted in Wertsch and Rogoff, 1984,93).

It is imperative to understand Vygotsky's socialist perspective of philosophy, sociology, psychology and educational theory in order to appreciate the social emphasis in his pedagogy in general and the concept of the ZPD in particular.

3.4. Conceptual learning using the ZPD

The notion of a ZPD is crucial to this study as mediation or the process of instruction is understood to be most effective when it takes place within the learners' ZPD. Hence a detailed explication of the mediation of conceptual knowledge within the ZPD is necessary.

The kind of knowledge that Vygotsky describes as important in developing the higher psychological functions of the learner is that of conceptual knowledge. Vygotsky also stresses the importance of language in the teaching or mediating process, since the explaining and teaching of concepts rely on the extensive use of language.

The idea that the development of language itself produces a **qualitative** change in the development of representation and thought is important . . . Vygotsky was concerned with the **social** activity or **communicative** aspect of speech . . . (Flanagan ; 1991 , 114 , author's emphasis).

Since language is itself a socio-cultural construct (a sign system which is constructed by society) , the conceptual knowledge which is passed on to the learner is knowledge which has a social and cultural bias. The Vygotskian teacher is aware of this bias and makes her learners aware of this bias as well. In so doing the teacher introduces a critical element into her teaching and makes her learners not only internalise but also to simultaneously be critical of the knowledge which they acquire. Hedegaard illuminates :

Children's learning activities may be characterised as guided investigations. Through working with the central

conceptual relations and procedures that characterise a subject area, the children acquire the scientific concepts of the subject. The children acquire the concepts as active concepts . . . the scientific concepts will become everyday concepts allowing the children to orient themselves theoretically to the surrounding world (in Moll, 1990 , 158).

The child's active participation in the lesson is of central importance to the acquisition of knowledge, especially conceptual knowledge. Depending on the nature of instruction the scientific concepts would, eventually (ideally) acquire concrete meaning for the child and will then be able to be used spontaneously.

According to the Vygotskian theorists Panofsky et al (in Moll , 1990 , 251), Vygotsky investigated the effect of formal school pedagogy on the cognitive development and thinking processes of the child, and he found that formal school instruction of scientific concepts was significantly different to the spontaneous learning of everyday concepts. The school-going child's mental development, he believed, would be profoundly changed by the formal instructional experience. Panofsky et al elucidate further :

. . . the distinction between spontaneous or everyday concepts and scientific concepts is central to a Vygotskian analysis. A scientific concept is purely denotative in the sense of being defined in terms of perceptual or functional or contextual properties of its referent. In contrast, the relationship (of a scientific concept) to an object is mediated from the start by some other concept . . . the very notion of scientific concept implies a certain position in relation to other concepts, i.e. a place within a system of concepts (in Moll , 1990 , 251).

Panofsky et al explain that whereas the development of spontaneous concepts rely on concrete experience, the development of scientific concepts rely on analytic procedures, which lead to the development of higher psychological functions. However, the spontaneous, concrete, everyday knowledge of the child plays an important mediating role in the internalisation of the scientific, abstract, theoretical concepts. Panofsky et al see the everyday concepts as standing “between the conceptual system and world of objects” in the

same way that one's "first language mediates between one's thoughts and a second language" (in Moll , 1990 , 252). During the process of formal instruction (teaching - learning process) therefore, the child is exposed to scientific concepts and the child will internalise the scientific concept if mediation takes place within the child's ZPD. Vygotsky explains :

The teacher, working with the child on a given question, explains, informs, inquires, corrects, and forces the child himself to explain. All of this work on concepts, the whole process of their formation, is worked out by the child in the process of instruction in collaboration with an adult (Vygotsky quoted by Panofsky et al in Moll , 1990 , 252).

The concept of the ZPD is therefore practically implemented by the mediator in the sense that the mediator carefully considers the level, form and content of the conceptual task to be taught. In utilising the concept of the ZPD, the teacher is able to instruct at a level which will not alienate the learner, the teacher actively works with the prior, spontaneous, conceptual knowledge of the learner, using it as a medium through which the new, scientific concepts are to be internalised. The teacher carefully chooses her language ensuring that it is a language which the learner understands conceptually. The teacher uses the chosen language to negotiate the meaning of the new concept, the new knowledge, the new language. Since school knowledge is essentially knowledge that is negotiated via language, since "formal instruction is above all verbal instruction" (Panofsky in Moll , 1990 , 252), the choice of language used by the mediator in the process of teaching - learning is of crucial importance.

3.5. The teacher as mediator : A central figure in the learning process

According to Vygotskian theorists, the teacher or mediator and the tools used for mediation are seen to be central to the process of instruction.

The notion of mediation, and the tools, specifically language, which generate higher mental functioning, become crucial to explicating the interrelation between the teacher's instructional processes and the learners' existing level of development (Flanagan , 1991 , 116).

The teacher has to pitch her/his lesson in both form and content within the learners' ZPD . If the task is pitched above the learners' level of potential , learning will be impossible. If it is pitched below the learners' actual developmental level, teaching is unnecessary since the knowledge is already known. Vygotsky believes (as discussed earlier) that learning must always be in advance of the learner, but within the ZPD. In a class situation therefore the actual and proximal levels of development of the pupils must be taken into account by the teacher if she/he wants her/his teaching to be effective.

Vygotsky explains that each child has her own ZPD. However, in a classroom situation where the teacher has to teach a group of learners at one time, it may not be possible to establish the ZPD of each and every learner. So how does the teacher implement Vygotsky's ZPD in a classroom situation ? Hedegaard offers some guidance :

A child is unique and individual, but children's individuality have common features. If these features are not developed, we tend to regard the child as deviant and offer special instruction. It should not be the function of school pedagogy to offer special instruction to each child in a class. Instead, instruction must be based on the development of common knowledge and skills. Consequently, the ZPD must be used as a tool for class instruction (in Moll , 1990 , 369).

It is thus the task of the teacher of any group of learners to firstly establish exactly what those "common knowledge and skills" are and so determine the ZPD of the class group as a whole, before deciding at which level to pitch the form and content of the task.

Vygotsky stresses the important role played by the teacher or as he prefers, mediator, in the teaching - learning process. He explains :

An interpersonal process is transformed into an intrapersonal one. Every function in the child's cultural development appears twice : first, on the social level, and later on the individual level; first *between* people (interpsychological), and then *inside* the child (intrapsychological). This applies equally to voluntary attention, to logical memory and to the formation of concepts. All the higher functions originate as actual relations between human individuals (1978 , 57 , author's emphasis).

The learning process initially comprises of the collaboration between teacher (expert) and learner (novice) , that is it takes place on an interpsychological level (between people), and then it comprises of the internalisation of knowledge by the learner, that is it takes place on an intrapsychological level (inside the learner) . In other words, the tasks in which the learners are engaged with are initially directed and regulated by the more competent expert. At this level of learning (interpsychological level), the learners are other - regulated. The expert directs the learning process. The learners are in this sense dependent on the expert until the learners reach a level where the knowledge/task/concept is internalised (interpsychological level) and they can engage with the knowledge independently. The learners are then self-regulated. Simply put, self-regulation can only come after other-regulation. Development first happens on a **social level** and then on an **individual level**. According to Diaz et al, higher psychological functions like voluntary attention, for example, “appear first in the interpersonal plain, **social plain** before they appear as part of the child's cognitive/behavioural repertoire in the intrapsychological plane” (1990,128, my own emphasis). Thus the social relationship between the teachers and the learners is of crucial importance to the instructional process and the role played by the teacher/expert/mediator.

The mediator is the one who pushes the learner to higher cognitive levels, the mediator has to set the lesson within the learner's ZPD, the mediator chooses the conceptual language used during mediation, the mediator has to be familiar with the prior knowledge of the learners so as to use relevant examples and tasks during mediation, the mediator has to

design her lessons to ensure active participation from the learners and the mediator has to closely collaborate with the learners and together with them construct meaning and knowledge. The relationship between the mediator and the learner is of crucial importance. In addition the relationship that the mediator has with the task or content or knowledge will determine the nature of the relationship that the learners eventually have with the task. If the mediator is seen to own the knowledge, this will hinder the learner's access to the knowledge. For Vygotsky, therefore, the mediator or teacher is the central figure in the teaching and learning process and holds the key to unlocking the cognitive capacities of the children.

The child does not know what she does not know. This is the metacognitive paradox. The teacher on the other hand knows what the child does not know. The teacher is able to establish what the child knows and she can then assist the child in getting to know what she does not know. The teacher, the task and the learner. Of the three constituents in the teaching learning dynamic, the teacher is the one with symbolic capital (perceived by the children as having status and power by virtue of her position) , the teacher is the one with the power. In other words she is the one who is in control of the teaching - learning process in that she frames the lesson by implicitly or explicitly making important decisions, like who talks when, the status of the text, the level of interaction between pupil and teacher, the status of pupils' voices, the status of the teacher's voice and the level of activity of pupils.

Hence the quality of teaching and learning that takes place in the classroom is largely determined by the teacher. The teacher is the key figure in ensuring that the learners internalise the task, whether they are single learners or whether they are part of a group. The size of the group is not as important as the qualitative input of the teacher.

CHAPTER 4 : Research Design

4.1. Situating the research question in a research paradigm

The research study attempts to investigate whether class size impacts, either positively or negatively, on the quality of instruction. The research endeavours to make an in-depth study of a few specific cases where a teacher teaches both a large class (35 - 45 pupils), and a small class (25 - pupils), the same subject, at the same level, during the same academic year. Since the study concentrates on the scrutiny of three specific cases and attempts to give an in-depth description of the quality of the teaching and learning process in these cases, it can be described as qualitative and exploratory research.

The study may therefore be situated within a qualitative or humanistic research paradigm. "The . . . paradigm is derived from the humanities with an emphasis on . . . qualitative information and interpretive approaches" (Husen in Keeves , 1988 , 17). The research method and data collection techniques are utilised with the intention of gaining as accurate and as detailed a picture as possible. The techniques will contribute to an in-depth knowledge and understanding of three specific cases.

4.2. The case studies : Description of sample

All three cases are situated at the secondary level of schooling. This is because it is the level of education with which I am familiar and in which I have years of experience. The three cases are taken from two different schools / sites where the large and small classes occur naturally. These schools will from this point onwards be referred to as School 1 and School 2.

Both School 1 and School 2 are from previously House of Representatives schools ("Coloured" schools) in the Western Cape. These are the schools at which I taught for many years, to which I can get access easily and where my presence would not be overly conspicuous. Also, these schools represent the middle of the two educational extremes of apartheid education. They were considerably less privileged than the "White" schools, but more privileged than the "Black" schools. The two sites were in the middle of two economic extremes, one being characterised by extreme affluence, the other by extreme poverty. At both School 1 and School 2 the large and small class groups occur naturally and have coexisted in this way for many, many years. (Besides having taught at ex- House of Representative schools for ten years, I also attended these schools as a primary and high school pupil, where large and small classes coexisted even then.)

School 1 is situated in an ex- "coloured", working class area. Social problems like unemployment, poverty, gangsterism and violence, teenage promiscuity and sexually related crimes abound. The residents live in government built flats or small "council houses" . Many of the parents receive government grants for their children while they are still at school. The school itself is situated in the heart of the area and is surrounded by the characteristic flat-dwellings. The community is predominantly Afrikaans speaking.

School 2 is situated in an ex - "coloured" area which has a mixture of working class, lower middle class and a few upper middle class residents. The majority of residents can be described as lower middle class though, with most of them living in privately owned homes. The area experiences a fair level of similar social problems, but not to the same extent as the School 1 area. Most families can afford to send their children to school and keep them at school until they matriculate. Both English and Afrikaans is spoken in the community. However the school itself receives predominantly English-speaking students.

The three teachers from this point on will be called Teacher A, Teacher B and Teacher C. Teacher A teaches at School 1 and Teacher B and C teach at School 2. The

subjects taught in the three cases are Geography (Teacher A), Business Economics (Teacher B) and Mathematics (Teacher C) . The subjects taught were not a factor in my selection of the cases.

In the following table (Table A), the relevant details of each of the cases is presented. These details will facilitate the reading and understanding of the study.

TABLE A: SAMPLE INFORMATION

Information	TEACHER A	TEACHER B	TEACHER C
School	<i>school 1</i>	<i>school 2</i>	<i>school 2</i>
Subject	<i>Geography</i>	<i>Business Economics</i>	<i>Mathematics</i>
Years of Experience	<i>10 years</i>	<i>4 years</i>	<i>25 years</i>
Standard	<i>9</i>	<i>9</i>	<i>8</i>
No of Pupils			
Large Class	<i>38</i>	<i>38</i>	<i>37</i>
Small Class	<i>17</i>	<i>25</i>	<i>25</i>
Medium of Instruction	<i>Afrikaans</i>	<i>English</i>	<i>English</i>

4.3. Criteria for selection of cases

I identified three specific high school cases where three subject teachers each teach a large class (35 - 45 pupils) and a small class (-25 pupils) their subject, at the same level, during the same academic year. The reasons for my choice of cases are as follows:

- a) I decided on three cases since I intend them to be in-depth, detailed studies.

The case studies can be seen to be evaluative case studies, where, according to Stenhouse,

... a single case or a collection of cases is studied in depth with the purpose of providing educational actors ... with information that will help them to judge the merit and worth of policies, programmes or institutions (in Keeves, 1988 , 50).

I decided to look at three cases rather than a single case. A single case could possibly be seen as an exception and may therefore not be very convincing. Three cases also allow for comparison across cases.

- b) The reason for choosing teachers who teach both large and small classes is that I intend to compare and contrast the pedagogy (the relationship between teacher and task, pupil and task and teacher and pupil) and teaching style of the three teachers in each particular setting. By doing this I hope to determine whether the size of the class significantly impacts, either positively or negatively, on the quality of instruction or the teaching style of the teacher. I intend comparing the pedagogy of the three teachers. I also intend to compare the formal examination, informal class test and project results of the larger and smaller groups to establish whether, in terms of outcomes (the academic results of the learners) , there is a significant difference between classes.
- c) I have deliberately chosen three cases where the teachers teach the two differently sized classes the same subject, at the same level (standard), in the same academic year. This is in order to reduce the number of variables in the study and also to ensure that the variable essential to this study, i.e. the pedagogy of the teacher , is constant.
- d) Two of the three cases which I have chosen to study (viz. the Geography and the Business Economics teachers) are teachers who generally enjoy the reputation of being good, innovative teachers by both their colleagues and pupils. Their reputation has been built up over a number of years of teaching (nine and four years respectively) in which they produced good academic results and displayed extraordinary commitment towards their pupils. The third case study (the Mathematics teacher) is generally perceived by her colleagues as being from the “old school” , employing traditional methods of teaching. Her teaching experience is that of twenty-five years.

The historical background of the three cases proves interesting for the research since it intends to determine firstly, whether the teaching styles of the teachers differ in the two different settings and secondly, whether quality teaching is not more a matter of teaching style than class size.

4.4. Data collection : qualitative methods.

In the collection of the data I make use of more than one data collecting technique in order to ensure as in-depth and detailed a study as possible. The qualitative techniques which I use are observation by means of an observation schedule, video analysis and a partly semi-structured and partly open-ended questionnaire.

a) Observation with an observation schedule

Firstly, I observe each of the three teachers three times in each of the two settings [i.e. large and small class] during three consecutive lessons. This means I observe each teacher six times, three times in the large class and three times in the small class. This makes a total of eighteen observations. My observations span the months of August, September and October 1996.

The observations are structured observations around a structured observation schedule. According to Galton :

Structured observation, as used to monitor classroom events, requires an observer to assign such events into previously assigned categories. . . . the observer can record and code the events simultaneously while present in the classroom (in Keeves, 1988, 474).

The structured observation schedule is of utmost importance since it provides the study's definition of quality teaching. The observation schedule is a measuring instrument of performance and therefore the main indicator of quality teaching. The schedule attempts to capture to what extent quality teaching is happening in the lessons. The observation schedule which I use to observe the quality of teaching is a schedule which has been designed by Cheryl Reeves and tested by the Primary Education Project [PREP] in 1995/6. The schedule is entitled: *Pointers To Measure The Extent To Which Teachers Are Focusing Their Mathematics Teaching On Pupil Construction Of Mathematical Concepts*. Table B below sets out the observation schedule.

TABLE B : Observation schedule for Mathematics lessons

Name Of Teacher:

Principal:

School:

Number Of Pupils:

Date:

POINTERS TO MEASURE THE EXTENT TO WHICH TEACHERS ARE FOCUSING THEIR MATHEMATICS TEACHING
ON PUPIL CONSTRUCTION OF MATHEMATICAL CONCEPTS

CONCEPT FORMATION

1	Teacher teaches mathematics as if all pupils calculate in the same way. Teacher repeats and drills in one particular method for calculating.	2	Teacher occasionally encourages pupils to use their own methods for calculating but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for calculating and to experiment with different ways of finding the answer.
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Comment:

PROBLEM SOLVING:

1	Teacher tells or shows pupils how to solve problems. Teacher does not ask pupils to explain. Teacher sets routine problems which have a specific method that is followed in order to solve them.	2	Teacher occasionally emphasises independent problem solving but this is mainly with routine problems. Teacher tends not to push pupils' thinking.	3	Teacher emphasises independent problem solving and reasoning by asking questions which push pupils' thinking. Teacher sets non-routine problems so pupils need to think about how they will work them out but assists pupils by asking them to explain their reasoning.
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Comment:

CONCEPTUAL UNDERSTANDING:

1	Teacher focuses on teaching pupils number facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for mathematics by explaining and showing connections, e.g. $3 \times 4 = 3+3+3+3$ or number patterns.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
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Comment:

DEVELOPING THINKING SKILLS:

1	Teacher does not comment on or evaluate pupils' responses but tells pupils whether their responses are right or wrong.	2	Teacher comments on pupils' responses but does not use the responses as a means to develop pupils.	3	Teacher listens carefully to pupils' explanations so that she can understand how they are thinking and push their thinking further.
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Comment:

METACOGNITION (EXPLANATION):

1	Teacher does not encourage pupils to explain what and how they are thinking.	2	Teacher occasionally encourages pupils to explain what and how they are thinking	3	Teacher encourages pupils to explain what they are thinking and how they work out their answers.
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Comment:

SELF-CONFIDENCE:

1	Teacher does not actively build pupils' confidence in working with numbers.	2	Teacher tries to build pupils' confidence by encouraging them to take risks but does not provide them with sufficient opportunities to develop the skills that make confident.	3	Teacher encourages pupils to feel confidence in working with numbers by encouraging them to take risks and sharing their strategies with the class. Teacher encourages and shows pleasure in, children's individual efforts.
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Comment:

PEER TEACHING and LEARNING:

1	Teacher discourages pupils from discussing their work and seldom organises activities where pupils collaborate to solve problems.	2	Teacher occasionally organises activities where pupils work together but activities are not structured in a way that pupils benefit from each other's thinking.	3	Teacher encourages pupils to talk to each other about how they work out problems to compare answers and check each other so pupils can benefit from each other's thinking. Teacher organises activities where pupils work together, listen and share ideas so they are able to create meaning together.
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Comment:

CLASSROOM ORGANISATION:

1	Teacher does not organise her classroom to ensure that pupils are involved in different kinds of learning.	2	Teacher occasionally organises her classroom so that pupils are involved in different kinds of learning.	3	Teacher organises her classroom so that pupils are involved in different kinds of learning, e.g. sharing, inventing (doing something new or different), evaluating (judging the value of something), negotiating (explaining something to someone else and trying to convince them but also listening to their opinion) and explaining.
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Comment:

TEACHING AIDS:

1	Teacher does not use apparatus for teaching mathematics.	2	Teacher occasionally uses apparatus for teaching mathematics.	3	Teacher uses a variety of apparatus to help pupils learn mathematics
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Comment:

TIME MANAGEMENT:

1	Teacher does not plan and use her maths time effectively.	2	Teacher sometimes plans a lesson using the time well.	3	Teacher uses her maths time as effectively as possible.
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Comment:

The observation schedule measures the extent to which the teacher's classroom practice allows for or contributes towards the conceptual development of the learner. The observation schedule with its indicators also allows for the measurement of pupil activity and the level of collaboration between pupil and teacher during the process of instruction. According to Vygotskian theory, it is imperative that the learner be actively involved during mediation. Flanagan argues that "Through the process of mediation, in action, . . . functions are internalized for future self-regulation" (1991 , 120). Flanagan argues further that :

Vygotsky's argument on thought as action enriches the notion of praxis. . . . thinking is not the product of action but the action itself (1991,126, Author's emphasis).

Although the Mathematics schedule was specifically designed for the teaching of Mathematics, it contains in my opinion the essential qualities of effective or quality teaching in general. The schedule is therefore entirely appropriate as a measuring instrument for the Geography and Business Economics lessons as well as Mathematics. I have however adapted the schedule slightly for the former two subjects, but these minor modifications do not change the descriptions of quality teaching in any significant way. I consulted with a number of Geography and Business Economics teachers who agreed that the Mathematics schedule could be appropriately used for the observation of their subjects as well. Table C and Table D set out the two schedules of observation. Only those sections which have been modified are reflected.

TABLE C : Observation schedule for Geography lessons.

Name Of Teacher: Principal:
 School: Number Of Pupils: Date:

POINTERS TO MEASURE THE EXTENT TO WHICH TEACHERS ARE FOCUSING THEIR GEOGRAPHY TEACHING ON PUPIL CONSTRUCTION OF GEOGRAPHICAL CONCEPTS

CONCEPT FORMATION:

1	Teacher teaches geography as if all pupils conceptualise spatiality in the same way. Teacher repeats and drills in one particular method of conceptualising spatiality.	2	Teacher occasionally encourages pupils to use their own methods for conceptualising spatiality but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for conceptualising spatiality and to experiment with different ways of finding the answer.
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Comment:

CONCEPTUAL UNDERSTANDING:

1	Teacher focuses on teaching pupils geographical facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for geography by explaining and showing connections, e.g. windmills, storage dams and sparse vegetation as evidence of low rainfall.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
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Comment:

SELF-CONFIDENCE:

1	Teacher does not actively build pupils' confidence in working with maps.	2	Teacher tries to build pupils' confidence by encouraging them to take risks but does not provide them with sufficient opportunities to develop the skills that make confident.	3	Teacher encourages pupils to feel confidence in working with maps by encouraging them to take risks and sharing their strategies with the class. Teacher encourages and shows pleasure in, children's individual efforts.
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Comment:

TEACHING AIDS:

1	Teacher does not use apparatus for teaching geography.	2	Teacher occasionally uses apparatus for teaching geography.	3	Teacher uses a variety of apparatus to help pupils learn geography
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Comment:

TIME MANAGEMENT:

1	Teacher does not plan and use her geography time effectively.	2	Teacher sometimes plans a lesson using the time well.	3	Teacher uses her geography time as effectively as possible.
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Comment:

TABLE D : Observation schedule for Business Economics lessons
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Name Of Teacher:

Principal:

School:

Number Of Pupils:

Date:

POINTERS TO MEASURE THE EXTENT TO WHICH TEACHERS ARE FOCUSING THEIR BUSINESS ECONOMICS TEACHING
ON PUPIL CONSTRUCTION OF BUSINESS ECONOMICS CONCEPTS

CONCEPT FORMATION:

1	Teacher teaches business economics as if all pupils conceptualise in the same way. Teacher repeats and drills in one particular method of conceptualising business concepts.	2	Teacher occasionally encourages pupils to use their own methods for conceptualising but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for conceptualising and to experiment with different ways of finding the answer.
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Comment:

CONCEPTUAL UNDERSTANDING:

1	Teacher focuses on teaching pupils business facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for business economics by explaining and showing connections, e.g. formal business, informal business, economic principle, tax.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
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Comment:

SELF-CONFIDENCE:

1	Teacher does not actively build pupils' confidence in working with concepts.	2	Teacher tries to build pupils' confidence by encouraging them to take risks but does not provide them with sufficient opportunities to develop the skills that make confident.	3	Teacher encourages pupils to feel confidence in working with concepts by encouraging them to take risks and sharing their strategies with the class. Teacher encourages and shows pleasure in, children's individual efforts.
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Comment:

TEACHING AIDS:

1	Teacher does not use apparatus for teaching business economics.	2	Teacher occasionally uses apparatus for teaching business economics.	3	Teacher uses a variety of apparatus to help pupils learn business economics
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Comment:

TIME MANAGEMENT:

1	Teacher does not plan and use her business economics time effectively.	2	Teacher sometimes plans a lesson using the time well.	3	Teacher uses her business economics time as effectively as possible.
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Comment:

b) Video Analysis

At least one lesson per teacher per setting [i.e. a total of six lessons] are video recorded. The video recording is analysed by using the same observation schedule. By doing this I can compare the observation schedules completed during the actual observation in class to those completed while observing the video recording. The video recording will positively impact on the observation task in two significant ways:

- i] It highlights possible areas of discrepancy in observation which I am then forced to reconcile by thinking more clearly and "objectively" on what I have observed. In other words, if the video recording contradicts an observation made on the observation schedule during the "live" lesson, it forces me to rethink and clarify my thoughts around that particular point. In this way it will add more clarity and precision to the observation task. It is in a sense a mechanism for observation regulation and therefore a form of triangulation between collection points.
- ii] The video recording could also highlight incidents or interesting interactions which I may not have noticed during the "live" lesson. The recording contributes towards a thicker description of each case.

c) Questionnaire

Each of the teachers is provided with a questionnaire once the observation of their lessons is completed. The questionnaire is based partially on what was observed during the lessons. The questionnaire is divided into two sections. The first section consists of standard questions on teaching style and pedagogy. This section is the same for all three teachers and is entitled *General*. Table E sets out the questions asked in the *General* section of the questionnaire.

TABLE E : General questions of questionnaire

1	<i>How long have you been teaching?</i>
2	<i>How would you describe your teaching style?</i>
3	<i>Which of the two classes that I observed do you prefer teaching? Please explain and clarify with reasons.</i>
4	<i>Does your approach to these two classes differ ? If so, how and why does it differ?</i>
5	<i>How do you check to see if the pupils have understood the content/concepts taught in the lesson?</i>
6	<i>Are you aware of or involved in current trends and developments in Mathematics/Geography/Business Economics education ? If you are, kindly elaborate.</i>
7	<i>How does the number of pupils in your class impact on your teaching style?</i>
8	<i>How does the syllabus/prescribed curriculum affect your teaching style (if at all)?</i>
9	<i>How do you view the role of your pupils in the teaching-learning process?</i>

The second section poses questions around specific issues/points which emerged during observation. This section contains different questions directed at the specific practices of each of the teachers. It is entitled *Specific*. Tables F , G and H set out the questions asked in the *Specific* sections of the questionnaire for each case / teacher. The sections are labelled accordingly.

TABLE F : Specific questions of questionnaire (TEACHER A)

1	<i>Why do you keep the pupils' notebooks in the cupboard ? Do you allow them to take their books home at any point ?</i>
2	<i>Your lessons appear to be exam - oriented. Do you agree? If so, why are they?</i>
3	<i>Explain the motivation for the group-organisation of the desks.</i>
4	<i>Please feel free to comment here on any aspect / s of the lessons that I observed.</i>

TABLE G : Specific questions of questionnaire (TEACHER B)

1	<i>Why are your desks arranged in groups ?</i>
2	<i>Please explain your reference to rote learning as stupid learning. Are your pupils aware of what you mean when you say this ?</i>
3	<i>How does your teaching style discourage rote learning?</i>
4	<i>Please explain the motivation behind the story - reading .</i>
5	<i>Please feel free to comment here on any aspect / s of the lessons that I observed.</i>

TABLE H : Specific questions of questionnaire : (TEACHER C)

1	<i>What factors influence how fast or how slowly you teach?</i>
2	<i>Please explain the motivation for reading the dictionary definition of the word quadratic to the class.</i>
3	<i>Explain the reasoning behind instructing the pupils to work in pairs.</i>
4	<i>Please feel free to comment here on any aspect / s of the lessons that I observed.</i>

The aim of the questionnaire is to get teachers to reflect on their teaching style and to make explicit their implicit theories regarding their practice. Their responses provide even more detail and insight into their classroom practice, thus assisting with detail and with the subsequent analysis.

The questionnaire facilitates the task of describing, explaining and theorising around the data. The questionnaire is given to the teachers about a week after observation and they are allowed to complete it in their own time. This allows the teachers to reflect carefully on the issues concerned and to respond thoughtfully. This is the main motivation for using a questionnaire rather than the interview schedule, for example. With the questionnaire the teachers have time to reflect on the issues, with the interview the teachers have to respond almost immediately. Also the questionnaire can be filled in at a convenient time and place, and is possibly less intimidating than the pre-arranged and often tape-recorded interview.

At the same time though, Wolf cautions that questionnaire respondents " cannot be expected to spend a great deal of time answering a questionnaire" . A long questionnaire requires a lot of effort and may lead to "respondent fatigue" . This is when respondents become tired and as a result answer questions carelessly and inaccurately (in Keeves , 1988 , 479). The questionnaire should therefore be developed carefully including only that which is necessary.

4.5. Data collection : Examination and test results.

The research study embarks on the collection and analysis of the tested performance of the pupils in all three cases in each of the two settings (large and small class) . The following statistical data is collected from each of the three teachers :

- a] June and November examination results: class average of large and small class
- b] Symbol distribution - June and November examination
- c] Number of failures in each class
- d] Continuous assessment results (projects) : class average.

Table I sets out the statistics sheet which was given to each of the three teachers at the end of the November examinations.

TABLE I : STATISTICS SHEET		
Teacher:		
Subject:		
Class:		
Number of Pupils:		
1. June Results : Class Average		
2. Number of Failures:		
3. Symbol distribution:	A	
	B	
	C	
	D	
	E	
	F	
	F	
	G	
	H	
4. November results: Class Average		
5. Number of failures:		
6. Symbol distribution	A	
	B	
	C	
	D	
	E	
	F	
	FF	
	G	
	H	

The statistical data will inform the study in two ways. It will show differences and similarities between the tested performances of the learners in each of the two settings, and whether there is a correlation between the size of a class and the tested performance of the learners.

The motivation for making a statistical analysis of the tested performance of the learners is that most of the role players in education, i.e. the teachers, pupils and indeed parents are essentially concerned with the academic results, success rates or outcomes of their pupils. It cannot be denied that school success is measured by individual performance. It is thus an added interest to this study to establish if, in the three specific case studies concerned, there is a correlation between class size and individual academic achievement.

However, with regard to the methods of statistical data collection, two points are pertinent: The statistical analysis simply shows if, in the three case studies concerned, there is a correlation between class size and academic achievement. As this study is essentially of a qualitative nature and based on three specific cases, the results of the statistical analysis cannot be generalised to any significant degree. Second, the academic achievement of pupils is generally assumed to be an indicator of quality teaching. Because of the limited scope of the study, the statistical analysis cannot and does not promote this assumption. The quality of teaching and learning as demonstrated by the three case studies is essentially defined and measured in terms of the observation schedules used during observation. The questionnaire and the examination and test results are secondary forms of data used to support or to show contradictions in the analysis.

4.6. Analysis of the data : Using a theoretical construct for analytical purposes

The main purpose of this study is to determine whether class size in any way impacts on quality teaching. The data collected therefore has to be interpreted and analysed by using

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4.6. Analysis of the data : Using a theoretical construct for analytical purposes

The main purpose of this study is to determine whether class size in any way impacts on quality teaching. The data collected therefore has to be interpreted and analysed by using

techniques which will allow the researcher to extract the appropriate information from the data. Since the research study is essentially concerned with quality teaching and how it is affected by the specific variable of class size, an analytical tool has to be used which will make provision for the description of quality teaching as well as account for when it does or does not occur. For the purposes of analysis, two analytical tools are used.

The first tool of analysis is that of the **observation schedule**, which is in itself an itemised description of different teaching performance. It describes each style using categories and indicators for each category. The categories focus particularly on how a style facilitates and contributes towards the construction of conceptual knowledge by the learner. The observation schedule defines quality teaching in terms of how it develops the learners' ability to actively construct conceptual knowledge and to conceive of it in terms of their own life worlds. Quality teaching is interpreted and analysed in terms of the general categories on the observation schedule. For this study, the following specific categories of the observation schedule, which focus on the conceptual nature of knowledge, are used for analysis (refer to observation schedule on page 37 for the elaboration of these categories) :

- i) Concept formation
- ii) Conceptual understanding
- iii) Problem solving
- iv) Developing thinking skills

The second analytical tool which is used to interrogate the data is one which is based on Vygotsky's theoretical construct, the Zone of Proximal Development (as discussed in Chapter 3). The concept of the ZPD used as an analytical tool allows the analyst to determine whether the teacher is aware of the actual developmental level of the class, whether the teacher is able to use the appropriate language to facilitate understanding of the task/knowledge, whether the teacher uses the prior knowledge of the learner to facilitate the concretisation and internalisation of the new scientific concepts and whether, in general, the teacher is able to raise the actual performance of the learner to his/her potential level.

Table J reflects the categories and indicators of categories which the study constructed around the Vygotskian notion of a zone of proximal development. The indicators are numbered.

TABLE J: ZPD CATEGORIES and INDICATORS of CATEGORIES

	CATEGORY	INDICATORS
A	<i>Scientific Concepts</i>	<ol style="list-style-type: none"> 1. Teacher uses familiar scientific concepts during instruction. 2. Teacher allows pupils to use familiar scientific concepts during instruction. 3. Teacher uses familiar scientific concepts as scaffolding to mediate the new scientific knowledge.
B	<i>Prior Knowledge</i>	<ol style="list-style-type: none"> 1. Teacher uses the prior knowledge of the pupils during instruction. 2. Teacher allows pupils to use their prior knowledge during instruction. 3. Teacher uses the prior knowledge as scaffolding to mediate the new scientific knowledge.
C	<i>Language Usage</i>	<ol style="list-style-type: none"> 1. Teacher uses language that is appropriate to the task. 2. Teacher encourages pupils to use language that is appropriate to the task. 3. Teacher's language serves as scaffolding during mediation of the new scientific knowledge.

The above analytical tool is used to note down any **single moment** in which use of scientific knowledge, prior knowledge and appropriate language usage is evidenced in the lesson. Thus the ZPD categories serve a different function from that of the observation schedule. The observation schedule indicators are a more overall or **general impression** of the lesson, whereas the ZPD category indicators mark **single instances** within the lesson.

The above chapter sets out the research design for the study. It elaborates on the sample of the study, the instruments used for data collection, the data-collecting techniques as well as the methods for analysis. Except for one of the instruments used, i.e. the observation schedule, the research design has been entirely constructed by the study. In a later chapter the usefulness and effectiveness of the research design is evaluated. A descriptive analysis of the data follows.

CHAPTER 5 : First Level of Analysis

5.1. The process of data collection

5.1.1. Field notes

During my observation of each teacher, I sat at the back of the classroom in order to reduce the observer effect on the lesson. I also hoped that my familiar status at both schools (I am personally related to Teacher A of School 1 and am currently employed as a teacher at School 2) would contribute to a reduction of the observer effect on the observed lesson.

I discovered during the first 10 - 15 minutes of observation of my first class (Teacher A) , that I was unable to fill in the observation schedule while observing the lesson. I realised that I needed to observe the entire lesson before I could categorise the teacher's pedagogy according to the schedule. I started making detailed field notes as a reference point for completion of the schedule. Field notes were divided into two columns: **Observation** and **Comment**. The **Comment** column I used for any comment (mainly my own thoughts) which was not a direct recording of what was happening in the classroom. In the end my field notes were detailed records of the observed lessons. The field notes were a record for the observation schedule so I essentially concentrated on the words and actions of the teacher, the nature of interaction between teacher and pupils as well as the level of activity of the pupils. I wrote down interactions between teacher and pupils which I thought typically characterised the teacher's teaching style.

In all I had field notes for each teacher in each lesson (18 sets of notes in all). The field notes have been numbered and are listed in the Appendix. An extract taken from each field note also appears in the Appendix (Texts 1, 2, 3 and 4). Excerpts from the extracts are used in this and other chapters as substantiation of choice of indicators, interpretation or analysis.

Each of the three teachers was video recorded in each setting, i.e. large and small class. This means that six lessons were video recorded. A transcript of a section of each of the video recorded lessons is provided in the Appendix (Text 5). Excerpts from the transcripts are also used selectively in this and other chapters.

The field notes contain rich detail of the lessons. The field notes became an important source of information in this study. This was especially true with the completion of the observation schedule. Although I completed the observation schedule immediately after each lesson, while the memory of the lesson was still fresh in my mind, I consulted the field notes extensively. The notes, in addition, serve as detail and explanation of my choice of indicator.

5.1.2. Observation Schedule

The observation schedule required me to be very clear regarding the pedagogy of each teacher. This I discovered during the observation of my first lesson (as explained above). I filled in the observation schedules immediately after the lessons. I consulted the field notes extensively. I was able to extract examples from the field notes to substantiate my choice of category. There were times when I wasn't sure, especially with Teacher A and B, which indicator of a category they displayed, as they fell almost between indicators (I discuss this more fully in chapter 6). I resolved this by choosing the indicator which they reflected most regularly. With the first and second lesson of each teacher I completed the observation schedule immediately after the lessons. The third lesson of each teacher was video-recorded. In this case I completed one observation schedule immediately after the lesson with the help of my field notes, and another observation schedule after watching the video recording. There were therefore two completed observation schedules on the third lesson of each teacher - one based on classroom observation and the other based on the video recording. The two observation schedules of lesson three of each teacher, allowed for cross checking of interpretation. In addition the video recording served as confirmation for choice of the various indicators.

5.1.3. The Questionnaire

After I completed my observation of all three teachers, I constructed a questionnaire for each teacher (as discussed in Chapter 4 and in Appendix, Text 7 and 8). I handed the questionnaires to the teachers and asked them to return them at their earliest convenience. Teacher A returned his after one week, Teacher B after one month (he said he was too busy to fill it in immediately) and Teacher C after two weeks.

5.1.4. Examination results

I handed the statistics sheet (as discussed in Chapter 4) to the teachers just before the November / final examination, and collected them after the results of the November examination had been processed , i.e. early December.

5.2. Managing the data

5.2.1. Field Notes

The field notes were a data collecting technique which developed out of the research study. In other words, it was not a technique which I decided on before the time, like the observation schedule, questionnaire and statistical information. The field notes evolved as a necessity during observation. The examples from the field notes, which are discussed in 5.1.1, however, illustrate the interesting detail which the field notes contain. They illustrate information which the field notes give on the teaching style and pedagogy of the teacher. However, the main purpose of the field notes was to assist with the filling in of the observation schedules. They also assisted with the filling in of the ZPD categories. The field notes per se will therefore not be analysed, but used, where necessary, to support or contradict the analysis of the other data.

5.2.2. The observation schedule

I chose the first four categories of the observation schedule for analytical purposes (as discussed in Chapter 4) . The other categories are thus ignored at this level of analysis.

The results of the categorisation of the pedagogy of the three teachers according to the observation schedule are presented in tabular form. The tables facilitate management and analysis of the data. The tables are presented and discussed later in this chapter. The tables prove to be useful in that they allow for patterns to be recognised and identified fairly quickly and easily and they also allow for a comparative analysis of the data. A variety of tables also allow for the data to be analysed and viewed from a variety of perspectives, thus facilitating a thicker analysis of the data.

5.2.3. Categories based on the Zone of Proximal Development

The observation schedules as well as the field notes were used to fill in the categories constructed around the concept of the Zone of Proximal Development (as discussed in Chapter 4). In this instance the field notes once again proved very useful. The categorising of the data into the three categories constructed around the theoretical construct of the ZPD, are also depicted in tabular form later in this chapter.

5.2.4. Questionnaire

The questionnaires were given to the teachers in order to gain more insight into their classroom practice and to get them to make explicit their implicit theories of their classroom practice. Section A of the questionnaire consisted of standard questions and teachers were allowed to respond without restriction. The standard questions, i.e. questions 1 to 9, are presented in a table in section 5.3 of this chapter. Where the responses were too long they were edited, i.e. the key words and phrases were highlighted and used in the tables (The completed questionnaire of Teacher C is provided in the Appendix as Text 8). The tabular presentation of the responses facilitates the analytical process in that responses can be easily compared and also easily related to the results of the observation schedule and the ZPD categories. The non-standard questions of the questionnaire, which were specifically related to the individual classroom practice of each teacher, will be used, where necessary, in Chapter six when a further and deeper analysis of the data is undertaken.

5.2.5. Examination results

The examination results of the six classes were requested from each teacher. A statistics sheet (see Chapter 4) was handed to each teacher and collected after the final examination results were processed. These statistics are presented and discussed in tabular form in section 5.3 of this chapter. The possible significance of the statistics are discussed in Chapter 6.

5.3. Analysis of data by tables

5.3.1. Observation schedule

The observation schedule measures the extent to which the teachers focus their instruction on the pupil construction of conceptual knowledge. The four categories of the observation schedule with their indicators are provided below. These categories and indicators are applicable to all the tables on the observation schedule.

The following points are important to note in terms of the tables presented on the observation schedule.

1. A tabular analysis of the four selected categories of the observation schedule is given. Hence, there are four tables : Table K, Table L, Table M and Table N. Each table is an analysis of one category of the observation schedule.
2. The horizontal axis reflects the three indicators of each category, while the vertical axis reflects the teacher as well as the lesson observed. The letter S represents "small class" and the letter L represents "large class".
3. The teachers are labelled as in Chapter 4, viz. Teacher A, B and C. The indicators are numbered 1, 2 and 3, as reflected on the observation schedule above.
4. The categories are analysed per teacher, per lesson.
5. Examples from the field-note-extracts in the Appendix (Texts 2, 3 and 4) are given in small font immediately below each table to substantiate the choice of each indicator.

6. A brief description follows each table. An explanatory analysis is undertaken in Chapter 6.
7. The category as well as the indicators of each category are provided with each table.

TABLE K : CATEGORY : CONCEPT FORMATION

CONCEPT FORMATION: [TEACHER A]

1	Teacher teaches geography as if all pupils conceptualise spatiality in the same way. Teacher repeats and drills in one particular method of conceptualising spatiality.	2	Teacher occasionally encourages pupils to use their own methods for conceptualising spatiality but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for conceptualising spatiality and to experiment with different ways of finding the answer.
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CONCEPT FORMATION: [TEACHER B]

1	Teacher teaches business economics as if all pupils conceptualise in the same way. Teacher repeats and drills in one particular method of conceptualising business concepts.	2	Teacher occasionally encourages pupils to use their own methods for conceptualising but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for conceptualising and to experiment with different ways of finding the answer.
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CONCEPT FORMATION [TEACHER C]

1	Teacher teaches mathematics as if all pupils calculate in the same way. Teacher repeats and drills in one particular method for calculating.	2	Teacher occasionally encourages pupils to use their own methods for calculating but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for calculating and to experiment with different ways of finding the answer.
---	--	---	---	---	---

Concept	Teacher	Lesson	Indicators		
			1	2	3
Spatiality	A	1S		*	
		1L		*	
		2S		*	
		2L		*	
		3S		*	
		3L		*	
Business	B	1S		*	
		1L		*	
		2S		*	
		2L		*	
		3S		*	
		3L		*	
Calculation	C	1S	*		
		1L	*		
		2S	*		
		2L	*		
		3S	*		
		3L	*		

TEACHER A : 1S : Pupils listen attentively to teacher, taking down notes from the overhead screen ; 1L : Teacher gives correct answer and explains why the pupil's answer is incorrect ; 2S : Teacher hands out textbooks to be used in answering the questions on the worksheet ; 2L : Pupils are taking down notes from the overhead screen ; 3S : Teacher points out that while his (the pupil's) scale is wrong, his method is right ; 3L : Teacher : You must first do that step and then that step. And people, you must show all your calculations.

TEACHER B : 1S : Teacher explains the difference between formal and informal business ; 1L : Teacher places lesson firmly in the context of the pending examination ; 2S : Teacher explains the following key concepts. . . Pupils take note ; 2L : Task - a short concise definition of concepts . Refer to notes on worksheet ; 3S : Teacher constantly places the content into broader context ; 3L : Teacher : What type of job creation would there be if there is goat and sheep farming there?

TEACHER C: 1S : Teacher : An equation in the second degree is called a quadratic equation. Say it ; 1L : Teacher : Your starting point is to make each factor equal to nought ; 2S : (Teacher) shows all the necessary steps and explains as she goes along ; 2L : The examples are on the board with the answers next to them ; 3S : Teacher : That is how I remember it ; 3L : Teacher : Now 2 is a whole number which you can write 2 over 1.

The above table suggests that both Teacher A and Teacher B display the middle of the two extreme indicators of this category, which means that although they encourage pupils to use their own methods of conceptualising, they still favour a method and either directly or indirectly teach that favoured method to form concepts. Teacher C, on the other hand, is firmly placed within the first indicator, suggesting that her approach towards the teaching of Mathematics is one which favours repetition and drilling of one particular method of calculating. She teaches Mathematics as if all pupils calculate and conceptualise in the same way. Interestingly, the above table shows that in the case of all three teachers, the approach and classroom practice is the same in both the large and small classes.

TABLE L : CATEGORY ; PROBLEM SOLVING

PROBLEM SOLVING: [TEACHER A, B AND C]

1	Teacher tells or shows pupils how to solve problems. Teacher does not ask pupils to explain. Teacher sets routine problems which have a specific method that is followed in order to solve them.	2	Teacher occasionally emphasises independent problem solving but this is mainly with routine problems. Teacher tends not to push pupils' thinking.	3	Teacher emphasises independent problem solving and reasoning by asking questions which push pupils' thinking. Teacher sets non-routine problems so pupils need to think about how they will work them out but assists pupils by asking them to explain their reasoning.
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Teacher	Lesson	Indicators		
		1	2	3
A	1S			*
	1L			*
	2S		*	
	2L		*	
	3S		*	
	3L		*	
B	1S		*	
	1L		*	
	2S		*	
	2L		*	
	3S		*	
	3L		*	
C	1S	*		
	1L	*		
	2S	*		
	2L	*		
	3S	*		
	3L	*		

TEACHER A: 1S : Teacher asks the two pupils to explain their answers. Pupils attempt an explanation. Teacher listens carefully ; 1L : Teacher compares his (pupil's) answer to the other (pupils') answers ; 2S : Pupil: Are flood plains the same as quicksand? Teacher : No, flood plains are . . . ; 2L : Teacher answers question and uses worksheet to explain ; 3S : Teacher : Shane, you say you don't agree. Why not? ; 3L : Teacher : Shafiek, how is yours different from Nathan's?

TEACHER B : 1S : Teacher asks them (class) to identify formal and informal businesses on the chart ; 1L : Teacher stresses the importance of "what is a business" for the exams ; 2S : Teacher explains the following key concepts. Refers to notes on worksheet ; 2L : Teacher refers to notes - where the notes apply to the concepts ; 3S : Teacher : Yazeed, what was the thing that we said about the formal sector ; 3L : Teacher : The process is either semi-skilled or highly skilled, okay.

TEACHER C : 1S : Teacher : Now, in standard 8 this is what you must be able to do ; 1L : Teacher : Your starting point is to make each equation equal to nought ; 2S : Teacher : You must use the foil method ; 2L : Then she illustrates how to use the cross method ; 3S : Teacher : Now listen, before you look at the next row ; 3L : Teacher asks question with her back to pupils. No response.

Table L shows that both Teacher A and Teacher B fall within the second indicator of this category. This means that they occasionally emphasise independent thinking, but do not tend to push the pupils thinking further, in other words they don't question the pupils on their thinking and on their reasons for their opinions. Teacher A, however, in his first lesson, asks his pupils to explain the reasons for their responses. He attempts to push their thinking further. Teacher C, on the other hand, who falls within the first indicator, tells and shows her pupils how to solve problems. She emphasises a specific method for the routine problems which she sets. Once again, all three teachers do not reflect a difference in approach between the small and large classes.

TABLE M : CATEGORY : CONCEPTUAL UNDERSTANDING

CONCEPTUAL UNDERSTANDING: [TEACHER A]

1	Teacher focuses on teaching pupils geographical facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for geography by explaining and showing connections, e.g. windmills, storage dams and sparse vegetation as evidence of low rainfall.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
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CONCEPTUAL UNDERSTANDING: [TEACHER B]

1	Teacher focuses on teaching pupils business facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for business economics by explaining and showing connections, e.g. formal business, informal business, economic principle, tax.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
---	---	---	---	---	--

CONCEPTUAL UNDERSTANDING: [TEACHER C]

1	Teacher focuses on teaching pupils number facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2	Teacher occasionally focuses on developing conceptual understanding for mathematics by explaining and showing connections, e.g. $3 \times 4 = 3+3+3+3$ or number patterns.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
---	---	---	--	---	--

Teacher	Lesson	Indicators		
		1	2	3
A	1S		*	
	1L		*	
	2S		*	
	2L		*	
	3S		*	
	3L		*	
B	1S		*	
	1L		*	
	2S		*	
	2L		*	
	3S		*	
	3L		*	
C	1S	*		
	1L	*		
	2S	*		
	2L	*		
	3S	*		
	3L	*		

TEACHER A : 1S: Teacher uses the example of hosing a garden and how it disperses the sand ; 1L: Teacher explains how the lesson relates to the bigger picture ; 2S: Texts used in the lesson - maps, overhead notes, worksheet, textbook ; 2L: Teacher answers the question and uses the worksheet to explain ; 3S : Teacher : Your calculation Wesley is correct, if one looks at the calculation only. It is just that your scale is different ; 3L : Teacher : And what Beverly and Dominic just said now is what you need to do at number 2.3.

TEACHER B : 1S : Teacher calls on pupil to identify what kind of employment is created there ; 1L : Teacher : Is it fair that Stanfield doesn't pay tax but your parents pay tax ; 2S : Teacher : What are the most important characteristics of a person you wish to employ ; 2L : Teacher : Mary, are you applying the economic principle ; 3S : Teacher : Okay. One would be that it has a fixed address ; 3L : Teacher : Cattle, but more goat farming, ne, goat and sheep farming.

TEACHER C : 1S : Teacher : How many answers do we have for x ? We have one answer for x ; 1L : Teacher : You must see that each factor is equal to nought ; 2S : Teacher puts up answers from the textbook on the board ; 2L : Teacher : Look at the board and do it with me ; 3S : Teacher : The smaller the number, the wider. The bigger the number, the narrower ; 3L : Teacher: We start with our y intercept which is plus three.

In Table M above, Teacher A and B once again display the qualities of the second (middle) indicator in that they occasionally focus on developing conceptual understanding. Teacher C once again embodies the qualities of the first indicator in that she does not develop conceptual thinking at all, but instead focuses on training pupils to get a particular answer.

TABLE N : CATEGORY : DEVELOPING THINKING SKILLS

DEVELOPING THINKING SKILLS: [TEACHER A, B AND C]

1	Teacher does not comment on or evaluate pupils' responses but tells pupils whether their responses are right or wrong.	2	Teacher comments on pupils' responses but does not use the responses as a means to develop pupils.	3	Teacher listens carefully to pupils' explanations so that she can understand how they are thinking and push their thinking further.
---	--	---	--	---	---

Teacher	Lesson	Indicators		
		1	2	3
A	1S		*	
	1L		*	
	2S		*	
	2L		*	
	3S			*
	3L			*
B	1S		*	
	1L		*	
	2S			*
	2L			*
	3S		*	
	3L		*	
C	1S	*		
	1L	*		
	2S	*		
	2L	*		
	3S	*		
	3L	*		

TEACHER A : 1S : Pupils attempt an explanation. Teacher listens carefully ; 1L : Teacher gives an explanation ; 2S : Teacher: What do you think it is? ; 2L : Teacher asks one pupil to explain ; 3S : Teacher : Shane, you say you don't agree. Why not? ; 3L: Teacher : Okay now, you take us through it, Janine.

TEACHER B : 1S : Teacher doesn't ask pupil to explain further ; 1L : Teacher : Well done, Mary. Very good ; 2S : Teacher interacts with pupils from different groups ; 2L : Teacher : Do you think the SRC should use the economic principle ; 3S : Teacher : Register. Very good Amina ; 3L : Final consolidation of work done by teacher.

TEACHER C : 1S : Teacher : Yes. An equation in the second degree is called a quadratic equation ; 1L : Teacher : No. You are jumping now ; 2S : Teacher : Yes it is possible. I will look up an example later so that you can see that it can be equal to nought ; 2L : Teacher gives the other answer. 3S : Teacher : You must remember one of the two ; 3L : Teacher asks question with her back to pupils.

It is with the category of Developing Thinking Skills [Table N] that Teacher A and Teacher B's pedagogy almost fell between indicators, viz. indicator 2 and 3. I had to think very carefully on each lesson and evaluate which qualities or indicators were displayed more prominently. Most of the time, Teacher A and B would comment on the pupils' responses without developing their thinking further. However, there were a few occasions, (Teacher A - Lesson 3 and Teacher B - Lesson 2) where they listened carefully to the responses and attempted to use the responses to show the pupils how they were thinking . Teacher C's interaction with her pupils exhibits the qualities of the first indicator of this category, where she does not comment on or evaluate her pupils thinking, except to say whether they are right or wrong. Once again, there is no difference in approach between the large and the small classes.

5.3.2. Categories based on the Zone of proximal development

The categories for analysis which are based on Vygotsky's theoretical construct of the ZPD are presented in tabular form. The ZPD categories and the indicators of each category are presented below.

TABLE O: ZPD CATEGORIES and INDICATORS of CATEGORIES

	CATEGORY	INDICATORS
A	<i>Scientific Concepts</i>	1. Teacher uses familiar scientific concepts during instruction. 2. Teacher allows pupils to use familiar scientific concepts during instruction. 3. Teacher uses familiar scientific concepts as scaffolding to mediate the new scientific knowledge.
B	<i>Prior Knowledge</i>	1. Teacher uses the prior knowledge of the pupils during instruction. 2. Teacher allows pupils to use their prior knowledge during instruction. 3. Teacher uses the prior knowledge as scaffolding to mediate the new scientific knowledge.
C	<i>Language Usage</i>	1. Teacher uses language that is appropriate to the task. 2. Teacher encourages pupils to use language that is appropriate to the task. 3. Teacher's language serves as scaffolding during mediation of the new scientific knowledge.

It is important to note the following regarding the tables :

1. The tables are presented per category. Since there are three categories, there are three tables, viz. Table P, Table Q and Table R.
2. Each category has three indicators (as reflected above) , and the data is measured in terms of whether an indicator is applied or not. An asterisk * reflects that an indicator is applied and a hatch sign # reflects that an indicator is not applied.
3. The data is analysed per category, per teacher, per lesson. There are six lessons per teacher. L represents large class and S represents small class.
4. The horizontal axis reflects the indicators. They have been numbered 1, 2 and 3 (as in the above presentation) .
5. The same convention applies for the teachers, viz. A, B and C.

6. Examples from the field-note-extracts in the Appendix are given in small font immediately below each table to substantiate the choice of each indicator.
7. A descriptive comment is given after each table. The more in-depth explanatory analysis is undertaken in Chapter 6.

TABLE P : CATEGORY : SCIENTIFIC KNOWLEDGE

Teacher	Lesson	Indicators		
		1	2	3
A	1S	*	*	*
	1L	*	*	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
B	1S	*	#	*
	1L	*	#	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
C	1S	*	#	#
	1L	*	#	#
	2S	*	#	#
	2L	*	#	#
	3S	*	#	#
	3L	*	#	#

TEACHER A : 1S : 1. Key concepts are underlined on overhead screen ; 2. Pupil attempts an explanation ; 3. Teacher uses example of hosing the garden and how it disperses the sand ; 1L : 1. Teacher asks pupils to identify items on the map ; 2. Pupil tries to answer ; 3. After general response, Teacher explains using some of their responses. 2S : 1. Teacher asks questions regarding the key concepts ; 2. Pupils respond well ; 3. Teacher explains referring to map, pictures, textbook and overhead screen ; 2L : 1. Pupils take down notes from overhead screen. Key words underlined ; 2. Some pupils discussing the task ; 3. Teacher asks one pupil to explain ; 3S : 1. Teacher : From there to there it is between the contour lines ; 2. Pupil : Sir, the scale sir ; 3. Teacher : Do you see that? ; 3L : 1. Teacher : Now what I asked you in the question is to calculate the gradient ; 2. Pupil : There by the contour lines sir ; 3. Teacher : And as Shafiek says, . . .

TEACHER B : 1S : 1. Teacher asks pupils to identify formal and informal employment on the chart ; 2. Pupils listen attentively ; 3. Teacher uses hypothetical examples which pupils can relate to ; 1L : 1. Teacher : Informal business does not pay tax ; 2. Virtually absolute silence while teaching ; 3. Teacher : Tax evasion. Is it good? ; 2S : 1. Teacher explains the key concepts ; 2. The group discusses qualities that a teacher should have ; 3. Teacher interacts with pupils in groups ; 2L : 1. Teacher : So the economic principle is when . . . 2. Teacher : Do you think that . . . 3. Teacher allows discussion to continue ; 3S : Teacher : We looked at the rural environment ; 2. Pupil : Business licence! ; 3. Teacher : Very good. A dressmaker . . . ; 3L : 1. Teacher : Do you think it is highly skilled or semi-skilled? ; 2. Pupil : No sir, not highly skilled ; 3. Teacher : Okay. If you look at sheep farming, ne, . . .

TEACHER C : 1S : 1. Teacher : Which degree is the equation in? ; 2. Teacher : We have one answer for x ; 3. Now in standard 8 this is what you must do ; 1L : 1. Teacher : 4 times 0 is equal to? ; 2. Teacher : No, you are jumping now ; 3. Teacher explains slowly ; 2S : 1. Teacher emphasises the importance of making the quadratic equal to nought ; 2. Teacher does not check their understanding ; 3. Teacher : You must use the foil method ; 2L : 1. Teacher : Take out the papers you used yesterday ; 2. Teacher : Now I am going to read out examples ; 3. Teacher : Examples are on the board with the answers next to them ; 3S : 1. Teacher : That is your x squared shape ; 2. Pupils mumble. Response incoherent ; 3. Teacher : That is how I remember it ; 3L : 1. Teacher : Y is equal to $m x$ plus c ; 2. Teacher asks question with back to pupils ; 3. Pupils reluctant to come forward.

Table P suggests that Teacher A uses familiar scientific concepts during instruction, encourages the pupils to use the scientific concepts themselves and utilises the scientific concepts as scaffolding in mediating new knowledge. Teacher B uses familiar scientific

concepts during instruction, he allows pupils to utilise the scientific concepts themselves and he utilises the concepts as scaffolding during mediation of new knowledge. Teacher C uses familiar scientific concepts during instruction, but does not allow the pupils to utilise the concepts themselves. She does not use the concepts as scaffolding during mediation of new knowledge. Once again, Table P shows that the teaching style of the three teachers are exactly the same in the large and small classes.

TABLE Q : CATEGORY : PRIOR KNOWLEDGE

Teacher	Lesson	Indicators		
		1	2	3
A	1S	*	#	*
	1L	*	#	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
B	1S	*	*	*
	1L	*	*	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
C	1S	*	#	#
	1L	*	#	#
	2S	#	#	#
	2L	#	#	#
	3S	#	#	#
	3L	#	#	#

TEACHER A : 1S : 1. Teacher points out how river looks on map ; 2. Pupils listen attentively ; 3. Teacher uses example of hosing ; 1L : 1. Teacher talks about excursion to Table Mountain ; 2. Pupils do not give own examples though ; 3. Teacher uses their words in explanation ; 2S : 1. Teacher : Will you build your house there? ; 2. Teacher : What do you think it is? ; 3. Teacher explains, referring to map . . . ; 2L : 1. Teacher refers to river running from Muizenberg to Lakeside ; 2. Pupils say they know the river ; 3. Teacher explains further referring to river ; 3S : 1. Teacher : There are two steps you need to do before that ; 2. Teacher : What kind of rain do we have here in Cape Town? ; 3. Teacher : Okay, now for the part that you always complain about ; 3L : 1. Teacher : You say the sun shines over the ocean ; 2. Pupil : The rain falls on the mountain ; 3. Teacher: Okay, you say the sun shines over the ocean.

TEACHER B : 1S : 1. Teacher uses a business of a pupil's father to explain ; 2. Zaida talks about the rose picking which she is doing ; 3. Teacher uses a business of a pupil's father to explain ; 1L : 1. Teacher : He did not pay tax ; 2. Pupil : Grassy Park pays the highest rates ; 3. Teacher : Is it fair that Stanfield does not pay tax? ; 2S : 1. Teacher interacts with pupils in groups ; 2. The group discusses the different qualities of a teacher ; 3. Teacher interacts with pupils in groups ; 2L : 1. Teacher : Do you think the SRC should apply the economic principle? ; 2. Pupil : Yes sir, but we have very little money at this stage ; 3. Teacher : Mary, are you applying the economic principle? ; 3S : 1. Teacher : Flea market is one example ; 2. Pupil : Flea market! ; 3. Teacher : Give me an example of . . . ; 3L : 1. Teacher : What do you think runs around there? ; 2. Pupil : Not anybody can shear a sheep ; 3. Teacher : So, sheering sheep will be a skill.

TEACHER C : 1S : 1. Teacher : Put yourself back in Sub A ; 2. Teacher : Say it ; 3. Teacher : Now in standard 8 this is what you must do ; 1L : Teacher : Take your minds back to Sub A ; 2. Teacher : We must cover this work in this period ; 3. Teacher explains slowly ; 2S : 1. Teacher does not check their understanding at any point ; 2. Teacher puts up answers from textbook on the board ; 3. Teacher : If your answer is not the same, come to me ; 2L : Teacher : Now I am going to read out examples ; 2. Teacher threatens to keep class in until 3.45 if they do not finish the required number of examples ; 3. The examples are on the board with the answers next to them ; 3S : 1. Teacher : What is your coefficient of x squared? ; 2. Teacher appears to be rushing ; 3. Teacher : In standard 8 the graph will turn at the axis of symmetry ; 3L : 1. Teacher : We are going to switch to straight line graphs ; 2. Pupil participation a bare minimum ; 3. Teacher asks question with her back to pupils.

According to Table Q, Teacher A utilises the prior knowledge of the pupils during instruction, he encourages his pupils to talk about and use their prior knowledge

themselves and he uses this prior knowledge as scaffolding to mediate new knowledge. Teacher B utilises the pupils' prior knowledge during instruction, he often encourages the pupils to talk about and use their prior knowledge themselves and he uses this prior knowledge as scaffolding to mediate the knowledge. Interestingly, Teacher A and Teacher B are almost exactly the same. Teacher C ignores the prior knowledge of the pupils during instruction, she does not encourage the pupils to use their prior knowledge and does not use their prior knowledge as scaffolding to mediate new knowledge. Once again, the approach of the teachers does not differ between the two differently sized classes.

TABLE R : LANGUAGE USAGE

Teacher	Lesson	Indicators		
		1	2	3
A	1S	*	*	*
	1L	*	*	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
B	1S	*	*	*
	1L	*	*	*
	2S	*	*	*
	2L	*	*	*
	3S	*	*	*
	3L	*	*	*
C	1S	*	#	#
	1L	*	#	#
	2S	*	#	#
	2L	*	#	#
	3S	*	#	#
	3L	*	#	#

TEACHER A : 1S : 1. Key concepts are underlined on the overhead screen ; 2. Teacher asks the pupils to explain their answers; 3. Teacher emphasises key concepts ; 1L : 1. Teacher puts pupils' answers into context ; 2. Teacher listens carefully ; 3. Teacher explains why his answer is correct ; 2S : 1. Teacher asks questions regarding the key concepts ; 2. Pupil : Is floodplains quicksand? ; 3. Teacher explains referring to maps and real life pictures ; 2L : Teacher asks one pupil to explain ; 2. Pupils discussing the task in groups ; 3. Teacher explains referring to river ; 3S : Teacher : You took the scale of the topographical map ; 2. Pupil : You must look at the scale sir ; 3. Teacher : Do your own calculation ; 3L : Teacher : Nathan, give a cross section of March Street ; 2. Pupil : The gradient sir ; 3. Teacher : How do you know yours is like that?

TEACHER B : 1S : 1. Teacher explains concepts by asking leading questions ; 2. Pupil : There are milkers and herders ; 3. Teacher : Okay, Kevin said there are milkers and herders ; 1L : 1. Teacher : There are lots of skilled labour in the factories ; 2. Class uses the word 'urban' instead of 'city' ; 3. Teacher : Yes. And what about Grassy Park's roads? ; 2S : 1. Teacher explains the key concepts ; 2. Groups discuss the question of employment ; 3. Teacher interacts with different pupils in groups ; 2L : Teacher : So the economic principle is when we . . . ; 2. Pupil : We pay tax ; 3. Teacher : Mary, are you applying the economic principle? ; 3S : 1. Teacher : We are still busy with junior achievement ; 2. Pupil : It has a fixed address . . . ; 3. Teacher : Okay, one would be that it has a fixed address ; 3L : 1. Teacher : So you say it is highly skilled or semi-skilled? ; 2. Pupil : No sir, not highly skilled ; 3. Teacher : Okay. If you look at sheep farming ne. . .

TEACHER C : 1S : 1. Teacher : An equation in the second degree is a quadratic equation ; 2. Teacher : Say it ; 3. Now in standard 8 this is what you must be able to do ; 1L : 1. Teacher : One of the variables must be equal to nought ; 2. Teacher gives them 8 minutes for 8 sums/problems ; 3. Teacher explains slowly ; 2S : 1. Teacher shows all the necessary steps ; 2. No response from pupils ; 3. Teacher : This is how you do it ; 2L : Teacher : 1. What type of factorisation can we use for two terms? ; 2. Some not working on problems ; 3. Examples on the board with answers next to them ; 3S : 1. Teacher : What is your coefficient of x squared? ; 2. Pupil has a question - perhaps not heard by teacher. Pupil's question ignored ; 3. Teacher : In standard 8 the graph will turn at the axis of symmetry ; 3L : 1. Teacher : We are going to switch to straight line graphs ; 2. Pupil participation a bare minimum ; 3. Teacher asks question with her back turned to pupils.

The above table suggests that Teacher A and B use language that is appropriate to the task, encourage the pupils to use appropriate language and their language usage serves as scaffolding during mediation. Teacher C uses language that is appropriate to the task, but she does not encourage pupil utilisation of the appropriate language and she does not use her language as scaffolding during mediation. Once again Table R displays that the approach of the teachers are the same in the large and small classes.

5.3.3. Questionnaire

The questionnaire results are presented in tabular form. A few important points about Table S (questionnaire results) are listed :

1. The responses of each of the teachers to each of the nine standard questions of the questionnaire are provided in Table S.
2. The horizontal axis reflects the teachers, the vertical axis reflects the questions. The questions have not been coded. This will facilitate the reading of the table.
3. Because of the open-ended nature of the questionnaire, the responses of the teachers are very different and do not lend themselves to effective coding. Therefore the original responses are presented here, but in a shortened form. A concerted effort has been made to maintain the main thrust of the responses. A sample of an original completed questionnaire is in the Appendix (Text 8).
4. A descriptive comment follows the table. An explanatory analysis is undertaken in Chapter 6.



TABLE S : QUESTIONNAIRE

No	Question	Teacher A	Teacher B	Teacher C
1	<i>How long have you been teaching ?</i>	10 years	4 years	25 years
2	<i>How would you describe your teaching style ?</i>	Interactive. Refer to pupils' experiences whenever I can	Conversational and interactive Very informal.	Repetitive Style. I do most of the work and guide pupil participation.
3	<i>Which of the 2 classes that I observed do you prefer teaching ? Please explain and clarify with reasons.</i>	Enjoy the large class more . More lively, more responses, more stimulating and better peer interaction.	Enjoy the large class more . More responsive. Small class, generally performs better but want to receive info and not contribute.	Enjoy the large class [8e1]. Eager and participate freely. The small class a nonchalant attitude - don't seem to enjoy the subject.
4	<i>Does your approach to these 2 classes differ ? If so, how and why does it differ.</i>	Approach the same, except with the small class, must give more input - I talk more. In large class, I'm more of a facilitator.	No. Provide same information in both classes.	Preparation for both classes the same. I use the same approach.
5	<i>How do you check to see if your pupils have understood the content / concepts taught in the lesson.</i>	Through my interaction with them - can see if they understand. If they don't, shows need for more interaction.	I ask specific questions. I give examples from current events.	Give them exercises , mark books. Mark one example at a time to check if they understand.
6	<i>Are you aware of and involved in current trends and developments in your subject ? If so , kindly elaborate.</i>	Yes , New geography syllabus workshopped via Sadtu. Attended workshops on new approaches to geography teaching , i.e. more community oriented geography.	Yes, Junior Achievement Programme - promoting enterprise education. Stellenbosch University entrepreneurship school for pupils. Participate in Music-Active creative teaching workshop.	Yes, attended MEP [Maths Education Project] workshops. On MEP and AMESA [Assoc. of Maths Education in SA] mailing list.
7	<i>How do the number of pupils in your class impact on your teaching style [if at all]?</i>	Numbers don't matter. With large class - more viewpoints and many different experiences. Pupils seem to have more confidence to speak out.	Not sure. I know my style is different when I teach Business Economics and when I teach Accountancy. Not sure if size affects my style.	Does not really impact on my teaching style. Pupils work in pairs. I encourage peer teaching.
8	<i>How does the syllabus / curriculum affect your teaching style [if at all] ?</i>	Use syllabus as a guide. Don't stick to it. Directed by the interests of the pupils.	Use syllabus as a basis, but very rarely stick to text-book content.	No pressure to finish syllabus [internal exam]. Omit certain areas to emphasise basics. Leave some Std.8 work for Std.9. Cover some of the work thoroughly.
9	<i>How do you view the role of your pupils in the teaching-learning process.</i>	Pupils the focal point of the lesson. Directed by their interests and responses. If responses more vigorous and interactive, the concept is explored further [to higher level].	Pupils expect too much from teachers. Pupils expect to be entertained and not contribute themselves. I expect them to be actively involved in the lesson.	Today's teaching method is more discovery-based. Old methods of teacher talking is out. I try to let pupils "see" and "do" as much as possible - and not just "hear".

According to questions 2, 5 and 9, Teacher A sees himself as having an “interactive” teaching style and checks his pupils' understanding during interaction with them. He regards

the pupils as being “the focal point of the lesson” and he is often “directed by their interests and responses”. His response to questions 3, 4 and 7 reveal that he enjoys teaching the larger class more, since they are “more lively” and more responsive and there is “better peer interaction”. His approach to the two differently sized classes is the same and the number of pupils in his class do not impact on his teaching style. An analysis of the same questions for Teacher B reveal that he sees his teaching style as being “conversational, interactive” and “very informal”, that he checks his pupils' understanding by asking “specific questions” as well as giving “examples from current events” and that he expects his pupils to be “actively involved in the lesson” although this does not often happen. Teacher B enjoys teaching the larger class more since they are “more responsive” although the smaller class “generally performs better”. His approach to the two differently sized classes do not differ at all since he provides the “same information in both classes” and he is not sure whether the size of a class affects his teaching style, although he knows that he changes his style of teaching when teaching different subjects (There appears to be an apparent contradiction here. This will be further analysed and explained in Chapter 6). Teacher C feels that she has a “repetitive” style of teaching since she does most of the work and “guides pupil participation”, that she tries to keep up with the new “discovery-based” teaching methods by trying to let her pupils “see” and “do as much as possible” and that she checks her pupils' understanding by giving them exercises and marking their books, “one example at a time”. Teacher C feels that she enjoys teaching the larger class more since they are “eager and participate freely”, that her approach and preparation for the two differently sized classes are the same and that the size of a class “does not really impact on (her) teaching style”.

5.3.4. Examination results

The examination results reflected in Table T below are that of the mid-year/June results and that of the final/November results. Initially, the smaller project and test results were also to be collected and recorded, but since the schools have been using a system of continuous evaluation, this has proved to be unnecessary. Both the June and November results incorporate the smaller project and test results and are therefore a reflection of the

pupil's performance throughout the year. The following points are important to note in terms of Table T :

1. The statistics sheet (see Chapter 4) of the three teachers are synthesised into one table, viz. Table T. The table reflects the examination results of each of the six classes.
2. The horizontal axis reflects the teachers as well as the size of the classes.
3. The vertical axis reflects the different statistical information regarding the tested performance of the classes. It is divided into two sections, viz. the mid-year or June examination results and the final or November examination results.
4. Once again a descriptive comment is given below the table. The possible significance of the examination results is discussed in Chapter 6.

TABLE T : EXAMINATION RESULTS

		Teacher A		Teacher B		Teacher C	
		S	L	S	L	S	L
1	JUNE						
	<i>Class Average [%] :</i>	63 %	62 %	50 %	53%	49 %	59 %
	<i>Failures :</i>	0	1	0	2	6	2
	<i>Symbol Distribution : A</i>	1	7	1	0	2	6
	<i>B</i>	5	9	2	1	2	6
	<i>C</i>	4	8	4	7	3	6
	<i>D</i>	5	7	4	4	4	5
	<i>E</i>	2	5	8	14	4	8
	<i>F</i>	0	1	6	10	4	4
	<i>FF</i>	0	0	0	2	0	1
	<i>G</i>	0	1	0	0	5	1
	<i>H</i>	0	0	0	0	1	0
2	NOVEMBER						
	<i>Class Average [%] :</i>	64 %	64 %	43 %	44%	48%	46 %
	<i>Failures :</i>	0	0	2	4	6	8
	<i>Symbol Distribution : A</i>	2	8	0	0	1	0
	<i>B</i>	6	7	3	1	2	6
	<i>C</i>	3	11	3	4	3	4
	<i>D</i>	6	5	2	9	4	6
	<i>E</i>	0	5	10	14	4	9
	<i>F</i>	0	0	5	6	5	4
	<i>FF</i>	0	0	2	3	0	1
	<i>G</i>	0	0	0	1	5	7
	<i>H</i>	0	0	0	0	1	0

Teacher A - School 1:

1. In June the average percentage of the small class was 63 %, and the average percentage of the large class was 62 %. No failures were recorded in the small class and one failure was recorded in the large class. In the small class, 15 pupils (i.e. 88% of class) achieved a result above 50% (D symbol), and in the large class, 31 pupils (i.e. 81,5% of class) achieved a result above 50%.
2. In November the average percentage of the small class was 64% and the average percentage of the large class was 64 %. No failures were recorded in the small class and no failures were recorded in the large class. In the small class, 17 pupils (i.e. 100 % of class) achieved a result above 50%, and in the large class, 31 pupils (i.e. 81,5% of class) achieved a result above 50% .

Teacher B - School 2 :

1. In June the average percentage of the small class was 50 %, and the average percentage of the large class was 53 %. No failures were recorded in the small class and 2 failures were recorded in the large class. In the small class, 11 pupils (44 % of class) achieved a result above 50% (D symbol), and in the large class, 13 pupils (36 % of class) achieved a result above 50%.
2. In November the average percentage of the small class was 43 % and the average percentage of the large class was 44 %. 2 failures were recorded in the small class and 4 failures were recorded in the large class. In the small class, 8 pupils (32 % of class) achieved a result above 50%, and in the large class, 14 pupils (37% of class) achieved a result above 50% .

Teacher C - School 2 :

1. In June the average percentage of the small class was 49 %, and the average percentage of the large class was 59 %. 6 failures were recorded in the small class and 2 failures were recorded in the large class. In the small class, 11 pupils (1%

of class) achieved a result above 50% (D symbol), and in the large class, 23 pupils (62% of class) achieved a result above 50%.

2. In November the average percentage of the small class was 48 % and the average percentage of the large class was 46 %. 6 failures were recorded in the small class and 8 failures were recorded in the large class. In the small class, 10 pupils (40 % of class) achieved a result above 50%, and in the large class, 16 pupils (43% of class) achieved a result above 50%

The above chapter developed a tabular analysis of the data which is of a descriptive nature. It is the task of the next chapter to analyse the data on a more theoretical level. ||

CHAPTER 6 : A Theoretical Analysis of Data

A theoretical analysis of the data as tabulated and described in Chapter 5 , is undertaken in this chapter. Each case is analysed and explained separately. The tabulated results of the observation schedule, Zone of Proximal Development (ZPD) categories, the questionnaire and examination results are used for analytical purposes. The field notes are used where necessary to support or contradict an interpretation. The chapter attempts to analyse the pedagogy of each teacher separately, using the observation schedule, the ZPD categories, the questionnaire and field notes. Then a comparative analysis is undertaken. Most important for this study, the impact of class size on the pedagogy and effectiveness of the teacher and hence the quality of instruction, is discussed. The chapter concludes with a theoretical perspective on class size and effective instruction.

6.1. Teacher A

According to the tabular results of the analysis of the observation schedule (Chapter 5), Teacher A can be seen to display mainly the qualities of the second and sometimes the qualities of the third indicator. This means that when it comes to focusing his teaching on the construction of conceptual knowledge, teacher A occasionally encourages pupils to use their own methods to form concepts (concept formation), e.g. “Teacher points out that while his (the pupil's) scale is wrong, his method is right”, he occasionally emphasises independent problem solving, but mainly with routine problems (problem solving), e.g. “Teacher gives correct answer and explains why the pupil's answer is incorrect”, he occasionally focuses on the development of conceptual understanding by explaining and showing connections (conceptual understanding), e.g. “Teacher explains how the lesson relates to the bigger picture”, and he comments on pupils responses, but does not generally use their responses as a means to develop their thinking further (developing thinking skills),

e.g. “Teacher answers the question and uses the worksheet to explain”. However there are two occasions when Teacher A displays the qualities of the third indicator of the observation schedule. On these occasions he encourages independent problem solving (problem solving) and he uses the pupils’ responses to develop their thinking further (developing thinking skills), e.g. “Teacher : Shane, you say you don't agree. Why Not?” ; “Teacher : Don't you understand? Okay, now take us through it, Janine. How do the clouds form over the ocean - come now, try” .

The questionnaire reflects that Teacher A regards his pupils as being the focal point of his lessons, and he believes that he is “directed by their interests and responses” . He describes his teaching style as “interactive”. He understands that he has to be directed by his pupils’ needs and interests. He checks their understanding during interaction with them and believes that he is directed by their responses. There appears to be a strong sense of the importance of pupil activity in the teaching and learning process. According to the observation schedule his pupils are not as active as he believes them to be or as he would like them to be, e.g. “Pupils listen attentively to teacher, taking down notes from the overhead”. His belief in the importance of pupil action during instruction , however, explains the two occasions when he does allow the pupils to construct for themselves and where he pushes their thinking further by questioning them on their responses.

Teacher A’s understanding of pupil activity during instruction does not fully include pupil construction of conceptual knowledge. It is possibly indicative of Teacher A’s understanding of knowledge per se, in that the teacher has not fully grasped the notion of socially constructed knowledge. The following example from the field notes of Teacher A possibly illustrates the phenomenological position of the teacher. Teacher A, after being asked by a pupil what quicksand is, responds by asking : “What do you think it is?” Three pupils offer an explanation. Immediately afterwards, without questioning them on their responses, Teacher A provides them with an explanation.

In other words, Teacher A invites the pupils to participate, to interact, to think for themselves, he listens carefully to their responses, but that is where the level of their activity usually ends. He does not regularly use their thoughts to develop their thinking further. He provides them with a more suitable explanation, e.g. “Teacher gives correct answer and explains why the pupil's answer is incorrect” ; “Teacher : You must first do that step and then that step. And people, you must show all your calculations”. The conditions for gaining conceptual knowledge are evident in that the pupils are active, but the notion of collaboration is poorly developed. Vygotskians are insistent that “Through working with the central conceptual relations and procedures that characterise a subject area, the children acquire the scientific concepts of the subject” (Hedegaard in Moll, 1990, 158). The pupils appear to be active so that they can effectively acquire the given knowledge not so that they can construct knowledge for themselves. Rather than pushing the pupils to construct knowledge for themselves, his teaching is directed at the pupil acquisition of the given knowledge and not the pupil construction of conceptual knowledge. This explains why he does not regularly allow them to solve problems independently and why he does not regularly question them on their responses. He essentially wants them to acquire a particular meaning, but does not assist them sufficiently to construct the meaning collaboratively.

Collaboration between teacher and pupil is crucial in determining the effectiveness of the instructional process. The teacher collaborates with the learner on a problem-solving activity and during collaboration pushes the learner's thinking further. According to Vygotskian theory regarding the conceptual and collaborative nature of the instruction process, one may argue that Teacher A's classroom practice does not contribute sufficiently to the conceptual development of the learner and does not sufficiently allow for collaboration between teacher and learner.

However a further analysis of Teacher A's approach using the categories based on the Zone of Proximal Development (Tables K, L, M and N), reveals that there are instances or moments (although they may be occasional) when Teacher A uses familiar scientific concepts during instruction (scientific concepts), e.g. “The key concepts are underlined on

the overhead screen. Teacher emphasises these concepts”, and when he encourages the pupils to use the scientific concepts, e.g. “Pupil : Sir, the scale sir, you must look at the scale of the autophoto”. He also uses the scientific concepts as scaffolding in mediating the new knowledge, e.g. “After general response, teacher explains using some of their (the pupils’) responses”. There are instances when Teacher A uses the prior knowledge of the pupils during instruction (prior knowledge), e.g. “Teacher refers to river running from Muizenberg to Lakeside”, he encourages pupils to use their prior knowledge, e.g. “Pupils say they know the river”, and he uses their prior knowledge as scaffolding to mediate the new knowledge, e.g. “Teacher asks them to describe it (the river)”. Teacher explains further, referring to the river”. There are occasions when Teacher A uses language that is appropriate to the task, e.g. “Teacher : You took the scale of the topographical map and not the autophoto. Do you see that?”, he encourages his pupils to use appropriate language, e.g. “Two contradictory answers. Teacher asks the pupils to explain their answers”, and his language usage serves as scaffolding during mediation, e.g. “After general responses, teacher explains using some of their responses”. The indicators suggest that there are moments or instances within the lessons when Teacher A actively works with the prior, scientific and conceptual knowledge of the learners, e.g. “Teacher: And as Shafiek says, if you look at your contour lines here, it is nearer to each other” (scientific concepts); “Teacher uses example of hosing in garden and how it disperses the sand” (prior knowledge); “Teacher : Nathan, give an example of your cross section of March Street” (language usage).

The above is a descriptive analysis of Teacher A in terms of the Zone of Proximal Development (ZPD) categories. Vygotsky’s pedagogical construct of the Zone of Proximal Development focuses on the process of mediation within the ZPD. In other words, it focuses on how “a significant other mediate (s) the meaning of objects and events in the world for the learner” (Flanagan, 1991, 121). The indicators of scientific knowledge, prior knowledge and language usage function as measures of whether a teacher is or is not mediating the meaning of “objects and events” within the ZPD of the learner.

The descriptive analysis of Teacher A reveals that there are instances or moments within the lessons when Teacher A actively works with the scientific, prior and conceptual knowledge of the learners. Theoretically it may be argued that Teacher A , albeit unconsciously (according to the questionnaire) , and albeit occasionally (according to the observation schedule) uses the ZPD as a tool for class instruction. In other words, Teacher A attempts to mediate within the ZPD. If, according to Vygotskian theory, mediation within the ZPD leads to development, then one may argue that Teacher A's instruction could lead to development. The apparent contradiction between the observation schedule and the ZPD categories can be explained by referring to the specifics of these tools as discussed in Chapter Four. The observation schedule measures **the extent** to which the teacher focuses instruction on the construction of conceptual knowledge, while the ZPD categories look for **instances or moments** of mediation within the ZPD.

According to the analysis of the observation schedule and ZPD categories therefore, one may suggest that while, on the one hand, Teacher A's pedagogy does not regularly focus on the construction of conceptual knowledge and does not regularly encourage collaborative learning , on the other hand some mediation takes place within the ZPD and can be seen to lead to development. Teacher A may serve as an example of how front-of-class instruction in a large or small class can lead to learning and further development.

Both the observation schedule and the ZPD categories reflect that Teacher A's pedagogy is the same in both the small and large class, with the exception of one instance. In other words Teacher A is as effective in his large class as he is in his small class, and vice versa. The questionnaire reveals that Teacher A prefers teaching the large class since they are " more lively " and responsive and there is " better peer interaction " . The examination results as analysed in Table T reflect that there is not a significant difference between the class average percentage of the small and large class, in both June and November, and that there is not a significant difference in the failure rate of the small and large class. Teacher A manages to achieve a very high class average in both classes (small

class : 62% ; large class : 64%) . This may be seen as a further illustration of his effectiveness. The implication of the above analysis is crucial for this study, and will be discussed in greater detail in section 6.5 of this chapter.

6.2. Teacher B

According to the results of the tabular analysis of the observation schedule, Teacher B displays the qualities of the second indicator, except for one occasion (Lesson 3). Teacher B's approach regarding concept formation, problem solving, conceptual understanding and developing thinking skills, is similar to that of Teacher A. The analysis of Teacher A therefore holds for Teacher B.

According to the questionnaire Teacher B describes his teaching style as “conversational” and “interactive” as well as “very informal” . He expects his pupils to be “actively involved in the lesson” although he claims that this does not always happen. Teacher B appears to be more aware than Teacher A that his pupils are not as active as he would like them to be. He however blames this on the expectations of the pupils.

According to the ZPD categories, Teacher B's approach is once again very similar to that of Teacher A. The analysis of Teacher A with regard to the categories of scientific concepts, prior knowledge and language usage, holds here too for Teacher B.

The descriptive analysis of Teacher B therefore is very similar to that of Teacher A and thus the same comments apply here as with Teacher A.

According to the observation schedule and the ZPD categories, Teacher B's pedagogy is exactly the same in the large and the small class, without exception. He appears to be as effective in both settings. The questionnaire reveals that Teacher B enjoys teaching the large class more, since he finds them to be “more responsive” . The analysis of the examination results reveal that the class average percentage of the large class is greater than

the class average percentage of the small class. The difference in June is that of three percent and in November that of one percent. This suggests that the difference in the academic results of the two classes is not significant. A more thorough examination of this is done in section 6.5 of this chapter.

6.3. Teacher C

According to the tabular analysis of the observation schedule, Teacher C, without exception, displays the qualities of the first indicator. This suggests that when it comes to focusing her instruction on pupil construction of conceptual knowledge, Teacher C teaches Mathematics as if all pupils calculate in the same way, she repeats and drills pupils in one method of calculating (concept formation), e.g. “Teacher : An equation in the second degree is a quadratic equation. Say it”, she shows her pupils how to solve problems and does not ask them to explain (problem solving), e.g. “Teacher : You must use the foil method”, she trains her pupils to get a particular answer rather than to develop their conceptual thinking (conceptual understanding), e.g. “Teacher : The smaller the number, the wider. The bigger the number, the narrower”, and she does not comment or evaluate on the pupils' responses, but tells them whether their responses are right or wrong (developing thinking skills), e.g. “Teacher: Yes, an equation in the second degree is called a quadratic equation”.

According to the questionnaire, Teacher C describes her style as “repetitive” and says that she does most of the work. She feels that she “guides pupil participation” and that she tries to keep up with the “discovery-based” teaching methods by letting her pupils “see” and “do” more. She also checks to see if her pupils understand by marking their books “one example at a time” . Her responses favour a step-by-step methodology, where the teacher leads and directs and the pupils follow and agree. Teacher C seems aware that her teaching style and methodology is very orthodox, since she reflects a clear desire to adopt a more “discovery-based” teaching approach. However, her belief that children learn more when they “see” and “do” rather than when they “hear” , appears not to have been effectively translated into practice. The analytical results of the observation

schedule illustrate that she relies heavily on “hear” in her approach. Teacher C exemplifies the teacher who has been made aware of her “outdated” teaching methods, and who is prepared to change from old to new ways, but who does not have the pedagogical knowledge (on a theoretical and practical level) to make that transition. Teacher C knows that she must let her pupils “see” and “do” more, but this knowledge per se appears to be far from adequate to effect what is in fact a change in pedagogical approach to teaching and learning. The tabular analysis of the observation schedule reflects the general passivity of her pupils.

The above descriptive analysis and interpretation of Teacher C's classroom instruction is based on the observation schedule which, as explained earlier, measures the extent to which the teacher focuses instruction on the construction of conceptual knowledge. It also measures the level of collaboration between teacher and pupil which, as argued earlier, is an essential feature of mediation. The descriptive analysis reflects that Teacher C displays the qualities of the first indicator, which reveals that Teacher C does not focus her instruction on the conceptual construction of knowledge, e.g. “*Teacher writes the answers from the textbook next to the problems on the board*”, and “*Teacher: In standard eight the graph will turn at the axis of symmetry. In standard nine and ten it can curve somewhere else*”. The analysis also reflects that the level of teacher - pupil collaboration during instruction is minimal, e.g. “*Teacher asks question while her back is turned to pupils. No response. She continues*”. In this respect then it would seem that Teacher C is unable to push the learners' developmental levels in terms of higher order mental functioning.

According to the ZPD categories, there are instances when Teacher C uses familiar scientific concepts during instruction (scientific concepts), e.g. “*Teacher : Take out your sheets you used yesterday. We are continuing with quadratic equations*”, but Teacher C does not allow the pupils to use the concepts, e.g. “*Teacher does not check their understanding at any point during the explanation*”; “*Teacher asks question while her back is turned to pupils. No response. She continues*”, and she does not use the concepts as scaffolding during mediation of new knowledge, e.g. “*Teacher : That is how I remember*

it”; “Teacher : The examples are on the board with the answers next to them”. Teacher C ignores the prior knowledge of the pupils (prior knowledge), e.g. “Teacher : That is how I remember it”, she does not encourage the pupils to use their prior knowledge, e.g. “Teacher : If your answer is not the same, then come up to me”, and she does not use the pupils prior knowledge to mediate new knowledge, e.g. “Teacher : Now in standard eight, this is what you must be able to do”. Teacher C uses language that is appropriate to the task (language usage), e.g. “Teacher : An equation in the second degree is a quadratic equation”, but she does not encourage her pupils to use the appropriate language, e.g. Teacher : “This is how you do it. Watch the board”, and she does not use language as scaffolding during instruction, e.g. “Pupil has a question. Perhaps not heard by teacher. Effectively ignored. Teacher appears to be rushing”. This suggests that Teacher C does not effectively use the prior, scientific and linguistic knowledge as tools to teach the new scientific knowledge.

The analysis suggests that in Teacher C's class little appreciation is shown for an interpersonal process which must be transformed into an intrapersonal one if students are to become self regulating (Vygotsky, 1978). Theoretically this interpersonal process between expert and novice takes place within the ZPD. Thus according to the analysis of the observation schedule and the ZPD categories, Teacher C does not focus instruction on conceptual development , does not engage in collaborative learning and does not use the ZPD as a construct for class instruction. Her pedagogy may be seen not to lead to the development of those higher order thinking skills which assist in self-regulation.

Both the observation schedule and the ZPD categories reflect that , without exception, Teacher C's pedagogy is the same in both the small and large class. As the quoted examples of Teacher C's field notes illustrate (Chapter 5 and 6), Teacher C experiences disciplinary problems in her small class. Her disciplinary problems cannot be explained in terms of class size though, since, according to the field notes, they are experienced in the large class as well. The questionnaire reveals that Teacher C enjoys teaching her large class more since they are “eager and participate freely”. Teacher C says that class size “does not really impact on my teaching style” . Her statement is in fact

verified by the observation schedule, ZPD categories and field notes. According to Table T which reflects the tabular analysis of the examination results, there appears to be a significant difference of ten percent in the class average achieved in the small and large class in the June examination. In this examination the large class performed better. In the November examination the difference in class average is an insignificant two percent, still in favour of the large class. The average class percentage of Teacher C's small class for the year is 48,5% and for the large class is 52,5%. The total number of failures recorded for the year is that of twelve failures in the small class and ten failures in the large class. Teacher C's high failure rate cannot be explained in terms of class size if one assumes that a small class, by virtue of its size, produces better academic results. An explanation of the above is offered in section 6.5 of this chapter where the impact of class size on quality teaching is explored.

6.4. Comparative analysis

A comparative analysis of the three teachers is undertaken in this section. It involves comparing the four categories of the observation schedule and the ZPD categories, a comparison of question three of the questionnaire and a comparison of the examination results, specifically the class average results and the number of failures per class. The comparison is firstly presented in tabular form and then discussed. The following is important to note about the table (Table U) :

1. The horizontal axis reflects the teachers , viz. Teacher A, B and C.
2. The vertical axis reflects the areas to be compared.
3. The observation schedule : The four categories of the observation schedule are compared. The numbers of the indicators as displayed by the teachers are given.
4. ZPD categories : The three ZPD categories are compared. The three indicators of the categories are numbered accordingly and next to each

indicator are the number of lessons in which the indicator is displayed (yes) or not displayed (no).

5. The questionnaire : Question 3 is chosen since it reflects what the teachers think about their teaching style.
6. Examination results :
 - 6.1 The class average of the two examinations is reflected, small and large class separately.
 - 6.2 The number of failures of the two examinations is reflected, small and large class separately.
 - 6.3 S reflects small class and L reflects large class.

TABLE U : Comparative analysis

Areas of Comparison	TEACHER A	TEACHER B	TEACHER C
Observation Schedule:			
Concept formation	<i>Indicator 2</i>	<i>Indicator 2</i>	<i>Indicator 1</i>
Problem solving	<i>Indicator 2 and 3</i>	<i>Indicator 2</i>	<i>Indicator 1</i>
Conceptual understanding	<i>Indicator 2</i>	<i>Indicator 2</i>	<i>Indicator 1</i>
Thinking skills	<i>Indicator 2 and 3</i>	<i>Indicator 2 and 3</i>	<i>Indicator 1.</i>
ZPD Categories :			
Scientific concepts			
1. Teacher use	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>Yes (6)</i>
2. Pupil use	<i>Yes (6)</i>	<i>Yes (4) No (2)</i>	<i>No (6)</i>
3. Scaffolding	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>No (6)</i>
Prior knowledge			
1. Teacher use	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>Yes (2) No (4)</i>
2. Pupil use	<i>Yes (4) No (2)</i>	<i>Yes (6)</i>	<i>No (6)</i>
3. Scaffolding	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>No (6)</i>
Language usage			
1. Teacher use	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>Yes (6)</i>
2. Pupil use	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>No (6)</i>
3. Scaffolding	<i>Yes (6)</i>	<i>Yes (6)</i>	<i>No (6)</i>
Questionnaire:			
How would you describe your teaching style?	<i>Interactive</i>	<i>Conversational and Interactive</i>	<i>Repetitive</i>
Examination Results:			
a) Class Average: <i>JUNE</i>			
S	<i>63.%</i>	<i>50%</i>	<i>49%</i>
L	<i>62%</i>	<i>53%</i>	<i>59%</i>
<i>NOVEMBER</i>			
S	<i>64%</i>	<i>43%</i>	<i>48%</i>
L	<i>64%</i>	<i>44%</i>	<i>46%</i>
b) No. of Failures: <i>JUNE</i>			
S	<i>0</i>	<i>0</i>	<i>6</i>
L	<i>1</i>	<i>2</i>	<i>2</i>
<i>NOVEMBER</i>			
S	<i>0</i>	<i>2</i>	<i>6</i>
L	<i>0</i>	<i>4</i>	<i>8</i>

According to the analysis of the observation schedule, both Teacher A and Teacher B occasionally focus instruction on the construction of conceptual knowledge and occasionally collaborate with pupils, whereas Teacher C does not focus instruction on the construction of conceptual knowledge and does not collaborate with the pupils. Teacher A and B, according to the analysis of the ZPD categories, occasionally use the ZPD as a tool for classroom instruction whereas Teacher C does not use the ZPD as a tool for classroom instruction. Teacher A and B's pedagogy appears to lead to the development of higher order thinking skills whereas Teacher C's pedagogy appears not to lead to the development of higher order thinking skills.

Teacher A and B both describe their teaching style as “interactive”, and Teacher C describes her teaching style as “repetitive”. The analysis of the observation schedule and the ZPD categories reflect that all three teachers are fairly accurate in their description of their teaching style, with Teacher C possibly the most accurate. The observation schedule and the ZPD categories suggest that Teacher A and B's teaching styles are occasionally interactive. Teacher A and B have much more pupil activity and pupil-talk than Teacher C. Teacher C is accurate in the description of her teaching style as repetitive. The observation schedule and field notes reflect this.

A comparison of the class averages suggests that Teacher A achieves the highest class average in both his small and large classes. This is followed by Teacher C and then by Teacher B. A comparison of the number of failures suggest that Teacher C has the highest failure rate in both her large and small classes, with a total of twenty two failures (small and large class added together) for the year. This is followed by Teacher B with a total of eight failures and then Teacher A with a total of one failure for the year.

All in all Teacher A appears to be the most effective teacher of the three. Teacher A occasionally develops his pupils conceptually, occasionally collaborates with his pupils and occasionally uses the ZPD as a tool for class instruction. His instruction can be seen to lead

to development of higher order thinking skills. He achieves good academic results with hardly any failures. This situation applies to both his small and large classes.

Although Teacher B, according to the observation schedule and ZPD categories, occasionally develops his pupils conceptually, occasionally collaborates with his pupils and occasionally uses the ZPD as a tool for class instruction, he does not appear to achieve as good academic results. In fact, Teacher B and Teacher C appear to produce the same academic results. This may be explained in terms of a statistical analysis of the number of pupils who do the subjects on the higher grade and the standard grade.

According to information from the examination results, 1,6% of Teacher C's pupils wrote Mathematics on the higher grade in June and 42% wrote Mathematics on the higher grade in November. Teacher B had all his pupils writing Business Economics on the higher grade in June, and 88% of them wrote it on the higher grade in November. What is also significant is that Teacher B has fewer failures than Teacher C. In June he had a one hundred percent pass rate in his small class and five percent failed in his large class. In November eight percent failed in the small class and ten percent failed in the large class. Teacher C appears to have a fairly high failure rate amongst her pupils. In June twenty four percent of her small class failed and five percent of her large class failed. In November twenty four percent of her small class failed and twenty one percent of her large class failed. Of the three teachers she has the highest number of failures, for both her small and large classes, while Teacher A has the lowest number of failures in both his large and small classes.

6.5. The impact of class size

Vygotsky's theory emphasises the important role of the teacher during mediation. The teacher or expert has to collaborate with the learner or novice during the process of instruction, and during collaboration the teacher has to "explain, inform, inquire, correct

and force the child to explain” (Vygotsky, 1978). Vygotsky's work is of particular significance in this study because he is not only concerned with one-on-one (dyad) forms of mediation. For Vygotsky mediation can take place on a one-to-many basis if the interpersonal process is transformed into an intrapersonal one wherein the “buds” become “fruits” of development.

It is this shift from the social level to the individual level in terms of cultural development which makes the teacher so central to the learning process. How the teacher explains, informs, inquires, corrects and forces is critical to the whole process.

We can say then that how the teacher understands and constructs the relationship between teacher, learner and task determines what learning outcomes (and development) there will be. And this brings us to pedagogy and large class teaching. Accepting that the teacher's pedagogy determines the teacher's verbal and physical behaviour during instruction, and that this behaviour will have a direct bearing on the verbal and physical behaviour as well as the cognitive development of the learner, it may be said that the teacher's pedagogy is the critically determining factor in the quality of what (or if) pupils learn. And in the case of this study it is the pedagogy of Teacher A, B, and C which determine whether they are effective during instruction in large and/or small classes.

The empirical data in the study suggests that Teacher A will be generally effective during class instruction irrespective of the size of the class. Similarly one could say that Teacher C will possibly be less effective during class instruction, irrespective of the size of the class. In other words, when one analyses the data one can argue that the large class of Teacher A achieved significantly better academic results than the small class of Teacher C (standard or higher grade notwithstanding). Also, the large class of Teacher A had significantly fewer failures than the small class of Teacher C. In other words, Teacher A's large class, because of its size, did not automatically do academically badly, and Teacher C's small class, because of its size, did not automatically do well. The size of class therefore appears to have no impact on the quality of learning outcomes. Teacher A and

Teacher C were effective and ineffective respectively not by virtue of the number of pupils in their class, but by virtue of the pedagogical approach used in the classroom.

6.6. Summary of findings

The theoretical analysis of the data of the three cases concerned reflect that there does not appear to be a causal link between class size and quality teaching. What the analysis appears to show is that the pedagogy of the teacher, that is, how the teacher understands and implements the relationship between teacher and pupil, teacher and task and pupil and task, determines the quality or the effectiveness of the instruction. Within the realm of Vygotskian theory therefore, the study presents the following thesis : The pedagogy of the teacher determines the quality of instruction. The size of the class does not determine the quality of instruction. Good pedagogy will result in good instruction within any class size.

CHAPTER 7 : Conclusion

7.1. Limitations of the study

The limitations of the study will be listed in point form :

- 7.1.1. The research study focuses on an in-depth analysis of three specific cases. The cases are not seen to be representative of the teacher population. The findings of this study can therefore not be generalised to any significant degree.
- 7.1.2. The study measures teacher effectiveness in terms of the categories of the observation schedule as well as the application of the theoretical notion of a Zone of Proximal Development (ZPD) . A major assumption of the study is that an effective teacher is one who embodies the pedagogical qualities as described by the observation schedule and ZPD categories and who follows a constructivist pedagogy . This is one particular perspective on teacher effectiveness. The data has been collected, managed and analysed from this perspective.
- 7.1.3. The data has been analysed and interpreted in terms of categories. Information which fell outside of these categories were regarded as irrelevant. A categorical analysis imposes a highly structured and organised means of analysing and interpreting human interaction which, although it happens in a formal setting (the school), is not always structured. Because of this, some interesting information has been ignored to the detriment of an even thicker description.

7.2. Further research

The study of three cases is not enough to make a generally significant statement on the question of class size and quality instruction. Further studies need to be done in order to enhance the findings of this study. A large scale quantitative or qualitative study on class size and quality instruction may further enhance the findings of this study. The desperate need for research in this area of education cannot be over stated.

7.3. A Final Word

In order to challenge the popular perception that large classes (in this study defined as classes of over thirty five pupils), axiomatically give rise to gutter education, the study needed to be able to show two things : It needed to be able to describe and theorise on what an effective pedagogy is and it needed to show that the effectiveness of the pedagogy is not compromised by class size.

The research design was constructed with these aims in mind. At this point the study is able to claim that the research design has made possible the realisation of the aims. The observation schedule allowed for the collection of data with regard to teachers' lessons and the ZPD categories allowed for a closer analysis of forms of mediation. The research design allowed for observation in small and large classes thus enabling the analysis of the effect of class size on pedagogy.

The tools which were used to describe and analyse the data were constructed within a Vygotskian theoretical framework. The first tool, the observation schedule, which is a previously tested tool, provided the research design with categories and indicators to measure and analyse the data. The schedule focused on four categories which together

indicate aspects of the conceptual development of the learner. The schedule proved to be a useful tool in the analysis for while it provided a way of managing the data, it was also detailed enough to force accurate and careful interpretation of the lessons observed and detailed enough to ensure its own internal coherence.

The second tool, the Zone of Proximal Development (ZPD) categories, was constructed within the study and is at its first level of testing. The tool focused on the Vygotskian notion of creating a ZPD as a tool for class instruction. The ZPD Categories measuring instrument was constructed from the data and attempts at analysing the data. The categories scientific knowledge, prior knowledge and language usage were seen as important and very useful indicators of how (or whether) a teacher was operating within the ZPD of the learners. The ZPD Categories instrument provided a **context** (Tudge, in Moll, 1990, 156) in which to measure the interactions. Taking the point that instruction in schools must be based on the development of common knowledge and skills (Hedegaard, in Moll, 1990, 369), the use of ZPD categories is of particular importance to this study especially in the analysis of effective pedagogy. It will be interesting to see whether this measuring instrument as designed in this study will usefully inform other studies.

As a theoretical framework, Vygotskian theory has been very useful to the study. It has allowed for the construction and use of analytical tools which could be used, on one level, to collect, describe, interpret and analyse the data, and on another level to theorise around the data. Ultimately the theory has been useful in terms of realising the two main aims of the study : A description and analysis of an effective pedagogy and the effect of class size on pedagogy.

The study has convincingly shown that the pedagogy of the teacher and not the size of the class determines the effectiveness of instruction. The findings of the study are similar to the findings of some American and European based studies (see Chapter 2). The

Goettler-Sopko study of 1990, the Helen Bain study of 1989 and the Harry Mayhew study of 1983 found that academic achievement does not necessarily improve with a reduction in class size unless the appropriate learning styles and effective teaching styles are used.

Finally, the design of the study has made it possible to provide evidence to challenge the popular perception that large class teaching invariably results in gutter education.

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APPENDIX

Text 1 : Listing of field notes and transcripts

Text 2 : Teacher A : Extracts from fieldnotes : Lesson 1 : Small and large class
Lesson 2 : Small and large class
Lesson 3 : Small and large class

Text 3 : Teacher B : Extracts from fieldnotes : Lesson 1 : Small and large class
Lesson 2 : Small and large class
Lesson 3 : Small and large class

Text 4 : Teacher C : Extracts from fieldnotes : Lesson 1 : Small and large class
Lesson 2 : Small and large class
Lesson 3 : Small and large class

Text 5 : Transcripts of video recorded lessons (Lesson 3)

Teacher A : Small and large class

Teacher B : Small and large class

Teacher C : Small and large class

Text 6 : Worksheet used during lessons : Teacher A

Worksheet used during lessons : Teacher B

Worksheet used during lessons : Teacher C

Text 7 : Completed observation schedule - first four categories - Teacher B

Text 8 : Completed questionnaire - Teacher C

TEXT 1 : LISTING OF FIELD NOTES AND TRANSCRIPTS

FIELDNOTES

Teacher A : Lesson 1 : Small and large class

Lesson 2 : Small and large class

Lesson 3 : Small and large class

Teacher B : Lesson 1 : Small and large class

Lesson 2 : Small and large class

Lesson 3 : Small and large class

Teacher C : Lesson 1 : Small and large class

Lesson 2 : Small and large class

Lesson 3 : Small and large class

TRANSCRIPTS

Teacher A : Lesson 3 : Small and large class

Teacher B : Lesson 3 : Small and large class

Teacher C : Lesson 3 : Small and large class

TEXT 2 : TEACHER A : EXTRACTS FROM FIELDNOTES

Lesson 1 : Small class

Teacher walks around in the room while talking. Pupils listen attentively to teacher, taking down notes from the overhead screen. Teacher 'lecture' using overhead - slowly pacing himself. Gives pupils a chance to write down notes. Key words are underlined on the overhead screen. Teacher emphasises these words/concepts. Teacher hands out the worksheet. On the overhead screen he shows pupils photos and pictures of rivers and mountains. Asks general questions. Identifies pupil, asks specific questions to individuals. One question, gets two contradictory responses. He asks the two pupils to explain their answers. Pupils attempt explanation. Teacher listens carefully to explanations - allows the pupils to finish. Teacher explains by using the example of hosing a garden and how it disperses the sand. He asks same question to class again. This time many more responses.

Lesson 1 : Large class

Teacher identifies what he'll be looking at in lesson and explains how the lesson relates to the bigger picture. Also explains how lesson fits into examination at end of year. Explains why he is focusing on Mosselbay. Teacher asks question - one pupil - answer not correct. Teacher allows others to interject. Pupils give different answers. Teacher listens patiently. Teacher explains why the pupil's answer is incorrect. He compares it to the other answers. He puts the pupil's answer into context, then explains why his answer/explanation makes more sense. Teacher asks general question : "How do floodplains form?" Asks individuals to identify items on the map. Teacher asks some probing questions - forcing pupils to think deeper. Pupils listen attentively - some respond. Teacher uses their words/explanations/answers to explain further. Pupils appear to be able to relate to teacher's examples. Pupils do not give own examples though. Teacher talks about excursion to Table Mountain - going to take class to see a river.

Lesson 2 : Small class

Teacher hands out textbook to be used in answering the questions on the worksheet and the board. Pupils share textbooks. Resources used in lesson : map, overhead, worksheet, textbook, photographs, pictures. After note Teacher asks questions relating to key concepts. Pupils respond generally , quick responses show possible understanding. Teacher explains extensively, using key concepts in explanation e.g. flood plains. Teacher refers to map, overhead, pictures, textbooks during explanation. Teacher asks *class* "Will you build your house there, a resounding *no* from pupils. Pupil asks : *Are flood plains the same as quicksand*, Teacher : *No. Flood plains are . . .* Teacher explains. Pupil asks, *What is quicksand then* - Teacher : *Well, what do you think it is*. Pupil says what he thinks it is. Two other pupils offer an

explanation. Teacher listens carefully to responses. Does not question them on their responses. Teacher explains what quicksand is using some of the words/explanations offered earlier.

Lesson 2 : Large class

Teacher asks for more quiet while taking notes. A general buzz. Pupils taking down notes from overhead screen. Pupil asks teacher a question about task. Teacher goes over to pupil. Teacher answers question and uses worksheet to explain. Pupils working in groups/pairs on task. Some working on own. Teacher walks around. Checks on progress of groups. Stops at one group - question from group. Teacher asks one pupil to explain. Pupil tries to explain - struggles others offer explanations. Teacher refers to river running from Muizenberg to Lakeside. Pupils say they know the river. Teacher asks them to describe the river. They describe it. Teacher explains further referring to river - pupils appear to understand - nodding heads.

Lesson 3 : Small class

Wesley does calculation on board. Teacher points out, while scale is wrong his method is right. His calculation is corrected by Shane. Teacher encourages Shane to do it his way. Teacher emphasises what gets marks in the exam. Lesson exam-oriented. Problem on rainfall next. Teacher asks for answers - long silence. Teacher waits then asks, *What kind of rainfall do we have in Cape Town*, a variety of responses. Silence suddenly broken by question. Teacher explains cyclic formation - explains using blackboard.

Lesson 3 : Large class

Pupils sit in groups - completed the task. Teacher going through the task with class. At beginning a buzz - Teacher waits patiently for class to settle down. Once everybody paying attention Teacher starts. Teacher asks preliminary questions, identifies individuals - the responses quick. Teacher shows March Street on the overhead. Asks question on March Street. Pupil does sketch on board. Teacher asks pupil to explain using blackboard.

TEXT 3 : TEACHER B : EXTRACTS FROM FIELDNOTES

Lesson 1 : Small class

Two large charts in front of class. Teacher calls on pupils to identify the kind of employment created. Pupil: *There are milkers and herders!* Teacher: *Yes, there are milkers and herders. They milk the cows there. I see an airport also.* Teacher uses language of pupil. He tells class : *Kevin said there are milkers and herders there. What else.* Teacher praises pupils when they give a correct answer. He doesn't ask them to explain their answers. Teacher looks at concepts - formal and informal business. He uses one of the pupil's father's business as an example of formal business. Explains concepts by asking leading questions. Pupils listen attentively. Not too active in lesson but interested. Zaida enters class - late - Teacher asks her why she's late. Explains - rose picking for SRC function, to raise funds. Teacher asks class if selling roses is a form of formal or informal business.

Lesson 1 : Large class

Teacher places lesson into context. Stresses the importance of the essay in the exam. Virtually absolute silence while teaching. Pupils listening attentively. A quiet but relaxed atmosphere. In response to questions, pupils use word "urban" immediately (unlike other class who first used the word "city"). Teacher emphasises the paying of tax as an important distinction between formal and informal business. He explains that an informal business does not pay tax. He uses Stanfield as an example. Pupils seem to know the history of Stanfield , a drug merchant, who is currently in newspapers. Teacher : *Stanfield's house was raided and they found 1 million in cash. He said he sold greens - did not say what kind of greens.* General laughter. Teacher : *Tax evasion. Is it good? Is it fair that Stanfield does not pay tax but your parents pay?* A general discussion follows. Pupil : *Sir, Grassy Park pays the highest rates sir.* Teacher : *Yes, and what about Grassy Park's roads!*

Lesson 2 : Small class

Charts displayed on board. Teacher writes the key concepts very big on board : Analysis, Specification, Description, Jobs. Teacher explains the key concepts. Little participation from pupils. Teacher gives them a group work exercise. In their groups they are to discuss the characteristics of a person that they wish to employ for a particular job. Each group is to have a scribe and a group leader. Pupils already seated in groups. Teacher walks around while group work in progress. Teacher interacts with pupils in different groups. Group where I'm sitting - discussing the qualities needed for employment at a school. Discuss the qualities of teachers at school. Look at the ideal qualities. Discussion quite lively.

Lesson 2 : Large class

Teacher teaching the concept of the economic principle. Teacher : *So the economic principle is when we have minimum input in order to achieve maximum output. This principle is often applied in a business. Do you think the state should apply the same principle? Who pays the state money?* General response. Pupil shouts : *We do! We pay tax!* Teacher : *Okay. Do you think the SRC should apply the economic principle with the variety show tomorrow? Mary, are you applying the economic principle?* Mary : *Yes sir, but we have very little money at this stage sir. They mustn't expect too much . . . they can't see "The Boyz" if they don't ALL pay their one Rands.* Mary is interrupted. A general and quite heated discussion follows about who paid and who did not pay. Teacher allows discussion. Children seem very eager to have the popular musical group "The Boyz" at school for their SRC programme.

Lesson 3 : Small class

Teacher constantly places the lesson into context. Also how the examination will deal with this section of the work. Teacher asks different questions, leading questions, to get a particular response. He asks same question differently. Constantly rephrasing questions until pupils understand what he is asking. Teacher uses different examples when rephrase question. Teacher gets many opinions from class like this. Teacher calls the pupils on their names and uses their names in examples. He constantly comments on their facial expressions, in this way they are part of the lesson, although Teacher is doing most of the talking.

Lesson 3 : Large class

Teacher hands out cards to the pupils. The one who has the same card as the one he identifies has to answer a question. Pupils appear excited and a bit nervous about this selection process. Teacher says that he will be revising the work done so far. Revision is essentially front of class revision using the blackboard extensively. The drawing of the card a creative element in standard revision lesson. Teacher explains the concept of analysis again. He uses an example that pupils can relate to, he refers to teenage relationships between girls and boys and the attitudes of parents to such relationships. Pupils appear to enjoy the examples that he uses.

TEXT 4 : TEACHER C : EXTRACTS FROM FIELDNOTES

Lesson 1 : Small class

Teacher writes : x on board. Teacher : *x is an expression in the first degree. How many answers do we have for x ? We have one answer for x . The answer is called a root.* Teacher writes $x-5x+6=0$ on board. She continues to explain. Teacher : *This is called a trinomial. Read the equation.* The pupils read the equation. Teacher : *Which degree is the equation in?* A pupil shouts out : *Second degree!* Teacher responds: *Yes. An equation in the second degree is called a quadratic equation. Say it.* The pupils repeat what the teacher said. Teacher : *Say it again.* The class repeats again. Teacher takes out a dictionary and reads the definition of “quadratic” from the dictionary and emphasises the words : *Power is 2.* She chastises a few pupils for not listening, then reads the definition again. She proceeds to do some examples on the board.

Lesson 1 : Large class

Teacher: *Put your books in front of you. Leave them closed. Take your minds back to Sub A.* Teacher writes $4 \times 0 = ?$ on board. Teacher asks : *What is the answer?* Class responds generally : *Nought!* Teacher engages in front of class instruction using the blackboard extensively. Asks questions from pupils which require them to give answers, not to explain. Pupil responses confined to one word responses. Pupil calls out an answer. Teacher : *No. You are jumping now.* Teacher explains slowly. Works out examples on board. Her back to pupils most of the time. Teacher puts 8 problems on board. Gives class 8 minutes to solve the problems./sums. Teacher : *You must first see that each factor is equal to nought. Then you must work it out. Now do it.*

Lesson 2 : Small class

Teacher: *Take out your sheets you used yesterday. We are continuing with quadratic equations.* Teacher emphasises importance of getting quadratic equal to nought. Shows all the necessary steps and explains as she goes along - does it quite quickly. Class pays attention. Teacher does not check their understanding at any point during explanation. Pupil asks question : *Is it possible that x can be equal to nought?* Teacher : *Yes it is possible. I will look up an example for you later so that you can see it can be equal to nought.* Teacher does not do an example on the board immediately. Pupil's question does not get dealt with immediately. Teacher carries on explaining. Emphasises the methods to be used while calculating. Some pupils not paying attention. Teacher : *Pay attention or you leave! This is how you do it. Watch the board. You must use the foil method.* After explaining teacher puts up answers from textbook on

board. Pupils must check if they get the same answers as the textbook. Teacher : *If your answer is not the same then come to me.*

Lesson 2 : Large class

Teacher hands out sheets of paper. Class takes long to settle down. Teacher : *I'll wait until you are ready to work.* Class settles. Teacher starts by working out last example of previous day on board. Writes : $x(x-10) = 25$ on board. Teacher : *This is an easy trinomial. Now, I'm going to read out examples, then you can work it out. Work it out on the sheets of paper I have given you.* Some pupils not working out problems. Teacher puts up the answers to the problems on the board. Teacher threatens to keep class until 3:45 if they do not finish the required number of examples. Does the first example on the board. Teacher : *What type of factorisation can we have for two terms?* A general buzz in class. Some not focused on work. One pupil calls out an answer. Teacher waits for more answers. No responses. She then explains, illustrates how to do the cross method. While explaining she mentions the pupils' names who are not paying attention. Teacher : *Look at the board and do it with me.*

Lesson 3 : Small class

Teacher : *Do you remember the equation for the straight line graph? We are going to switch to the straight line graph today.* Teacher uses overhead projector. Shows what a straight line graph looks like. Then shows what the curved graph looks like. Writes equation for the curved graph on the board : $y = x^2$. Teacher gets pupils to plot points on graph. One pupil makes a mistake. Teacher points out the mistake and shows her where to plot the point. A pupil has a question. Trying to get teacher's attention. Perhaps she is not heard - she is effectively ignored. Teacher appears to be rushing. Teacher : *Look here. In standard 8 the graph will turn at the axis of symmetry. In standard 9 and 10 it can curve somewhere else.*

Lesson 3 : Large class

Teacher : *We are going to switch to straight line graphs today. Does anybody want to plot the graph?* Teacher asks the question but continues to plot the graph herself. Pupil participation a bare minimum, except for monosyllabic responses. Teacher calls up pupils to plot points on the graph. Pupils reluctant to come forward. Teacher points out the turning point of the graph. Shows the difference between the straight line graph and the curved graph. Tells pupils to look at worksheet to see whether the graph is curving up or down. Pupils check worksheet. A general buzz. Incoherent, muffled responses. Teacher continues to explain.

TEXT 5 : TRANSCRIPTS OF VIDEO RECORDED LESSONS (LESSON 3)

Teacher A : Small class

- Teacher : Nathan , give me an example of your cross section of March Street. A rough sketch. (Nathan draws cross section on board.) Class do you agree with that? (General response from class.) Shafiek, you say no. Why do you say no? Is there something wrong with that?
- Shafiek : The gradient sir.
- Teacher : The gradient? Okay. Change it. Nathan, don't get angry now. (Laughter. Teacher talks to class.) I asked him for a rough sketch, so don't be too hard on him. (Shafiek redraws the contour line.) Do you agree with that?
- Class : Yes sir.
- Teacher : Shafiek, how is yours different from Nathan's? How do you know yours is like that? Refer to your contour map.
- Shafiek : There by the contour lines sir (pointing to map), on the West coast, it is nearer to each other.
- Teacher : What side? This side?
- Shafiek : Yes, sir
- Teacher : And the other side?
- Shafiek : They are far apart.
- Teacher : Okay, did everybody see that?
- Class : Yes sir. (. . .)
- Teacher : Now what I asked you in the question is to calculate the gradient. As I told you yesterday, you must first do that step (points to board) and then that step. And people, you must show all your calculations. Like you said yesterday, you lose all that marks. (. . .)
- Teacher : Okay, now for the part that you always complain about and that you people always struggle with. (. . .)
- Teacher : Okay. Thank you Wesley. Class do you agree with that?
- Pupil : No sir.
- Teacher : Shane, you say you don't agree. Why not?
- Shane : Sir, the scale sir, you must look at the scale of the autophoto.
- Teacher : Okay. What is the scale of the autophoto?
- Shane : It is 1 is to ten thousand.
- Teacher : Okay. Can you do it for us please? Your calculation Wesley, is correct if one looks at the calculation only. It is just that your scale is different. You took the scale of the topographical map instead of the scale of the autophoto. Do you see that?
- Wesley : Yes sir.
(Shane corrects scale on board. Struggles a bit) (. . .)
- Teacher : The best thing to do Shane is to start from the beginning. Do your own calculation. Don't try to make someone else's right. Then you see how you go.

Teacher A : Large class

- Teacher : And what Beverly and Dominic just said now is what you need to do at number 2.3. Don't you know (Directs question to a specific pupil)? Okay. Now you take us through it Janine. How do the clouds form over the ocean, come now.
- Janine : The condensation sir.

Teacher B : Large class

- Teacher : What do you think runs around there. What type of farming takes place there.
- Pupil 1 : Cattle.
- Teacher : Cattle, but more goat farming, ne, goat and sheep farming.
- Pupil 2 : Sheep ya.
- Teacher : Goat and sheep farming. So what type of job creation would there be if there's goat and sheep farming?
- Pupil 3 : Labourers.
- Teacher : What type of . . . do you think the labourers will be skilled or unskilled?
- Class : Unskilled.
- Pupil 4 : Because anybody can do that work
- Pupil 5 : Sheering
- Teacher : Sheering yes. Sheering sheep. Is that a skill if you sheer sheep?
- Pupils : Yes! No!
- Pupil 5 : Imagine me sheering a sheep!
- Teacher : So sheering sheep is a skill?
- Pupil 5 : Ya.
- Pupil 6 : Not like highly skilled.
- Pupil 5 : Not anybody can sheer a sheep
- Pupil 6 : Semi-skilled, man.
- Teacher : Do you think it is semi-skilled or highly skilled?
- Pupils : Highly skilled, highly skilled!
- Pupils : Semi!
- Teacher : So, do you say it is highly skilled or semi-skilled?
- Pupil 6 : Semi-skilled. No sir, not highly skilled. Hey, . . .
- Pupil 7 : You need to go on a course for that.
- Pupil 6 : Hey, . . .
- Pupil 8 : It's semi-skilled. Cause you only need . . . eh . . . how can I say . . . you just need to watch the next person and you can pick it up. It's not as if you have to go to a certain place to do a course.
- Pupil 9 : To UCT or something. (General laughter.)
- Teacher : Okay. If you look . . . if you look at sheep farming ne, those guys have been doing it for years, not just anybody, you obviously have to go through a process of training. The process is either semi-skilled or highly skilled, okay.

Teacher C : Small class

- Teacher : See the shape of the graph it is more or less the same. More or less this shape here, that is your x squared shape, okay. In your second row (referring to worksheet), what is your coefficient of x squared?
- Pupils : Two!
- Teacher : Two. Is it the same shape as the top one?
- Pupils : No.
- Pupil : Wider . . . no narrower . . . the top one is narrower.
- Teacher : The top row is a little bit wider. If you look at our next row - your coefficient, number coefficient of your x squared is ?
- Pupil : Three!
- Teacher : Three and it is narrower. Now listen, before you look at the next row, what do you think will happen if your coefficient is four? (Incoherent, mumbled response from pupils.) It will

be even narrower, because the first one is one, the second one is two, the third one is three, and it seems to be getting narrower. Now, the next one is a half.

Pupil : Wider!

Teacher : Wider than one. Wider than one. Okay. What deduction can we make here about the number coefficient and the width of the curve? (Incoherent response from some.) The smaller the number, the wider. The bigger the number, the narrower. The smaller the number, the wider. So the number . . . listen . . . your m value in your standard equation y is equal to $m x$ plus c , where c cuts the y axis. The m value will tell us now how wide it is or how narrow it is. The number will tell you and then the sign will tell you whether it is going to curve upwards or whether it is going to curve downwards. Now we already saw now that it is going to curve upwards if that x squared value is negative, and it curves downwards if the x squared value is positive. Now you must try to remember that. I just want to test something with you quickly. Make a plus sign for me in the air. (Watches them make a plus sign.) Again. (Teacher watches them.) Again, okay. Everybody went down and across. Nobody went up and across. That's something else. That is how I remember. You make your plus sign down and across, so if your value is plus, then it will move down - obviously then if your value is minus then it will curve up. You must remember one of the two. Now maybe you can come up with some other way of remembering.

Teacher C : Large class

Teacher : Y is equal to $m x$ plus c . (Writes $y = m x + c$ on board.) Okay. Now if we use an equation as an example (Writes $y = 2x + 3$ on board), y is equal to $2x$ plus 3 , what does the c in the standard equation tell you? (Pause) What does it tell you about the line graph? That is the standard equation for the straight line graph. (Responses incoherent, muffled, some inaudible.) Okay. He says the m is your gradient. (Writes on board.) In other words it is the shape of the line, it tells you something of the shape and c is your y intercept. What does y intercept mean, anybody else on this side. What does y intercept mean? Yes.

Pupil : Crosses the y axis.

Teacher : Where it crosses the y axis. Okay. So if we must draw that graph as a rough sketch (draws on board), does anybody want to come draw it quickly? (Teacher asks question with her back to pupils. No response. She continues.) Where do we start. If we are going to use the gradient method, where do we start? (Muffled, incoherent response.) By plus three. By plus three. We start by the y intercept and the y intercept is plus three. That is our y axis and our x axis. We start with our y intercept which is plus three. From that point we work out our gradient. Now two is a whole number which can be written two over one. (Writes $2/1$ on board.) What is the sign in front here?

Pupils : Plus.

Teacher : Plus, positive, cause we don't have to put in a positive sign, okay. So that tells us we are going to move to the right. How many units to the right?

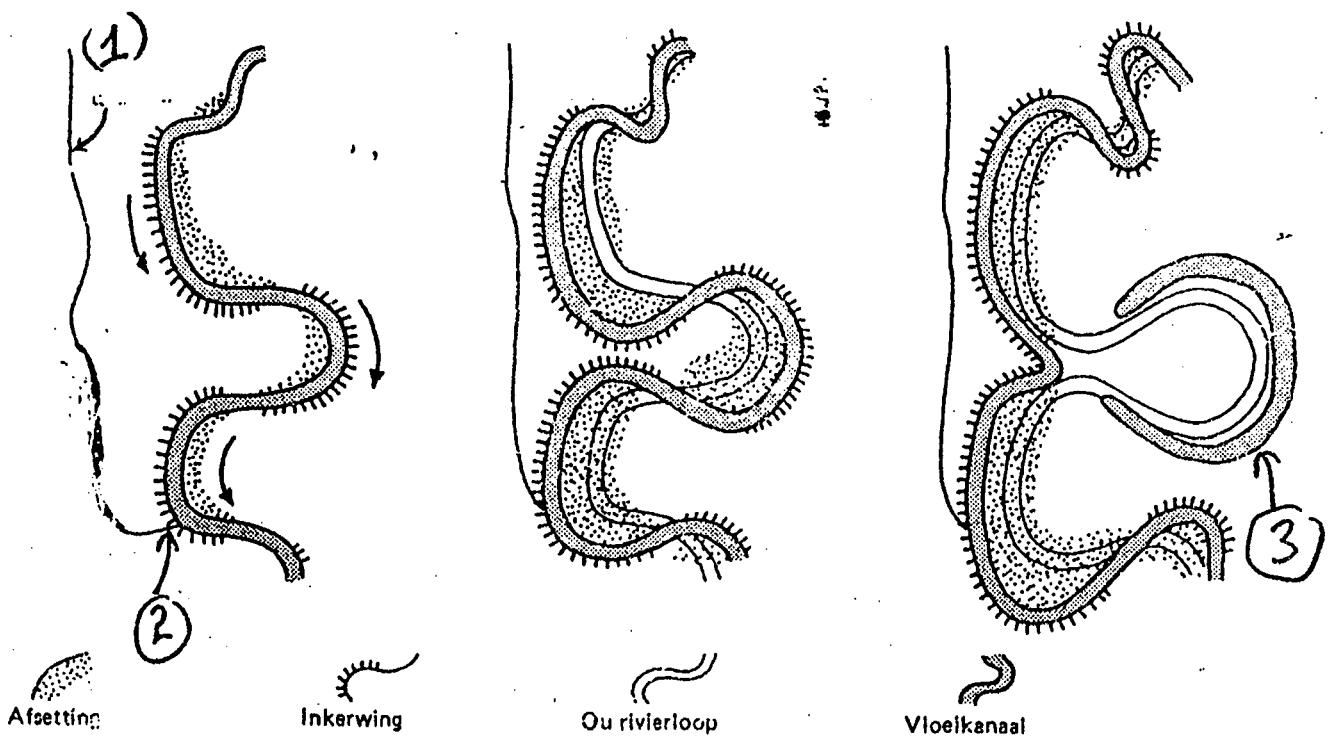
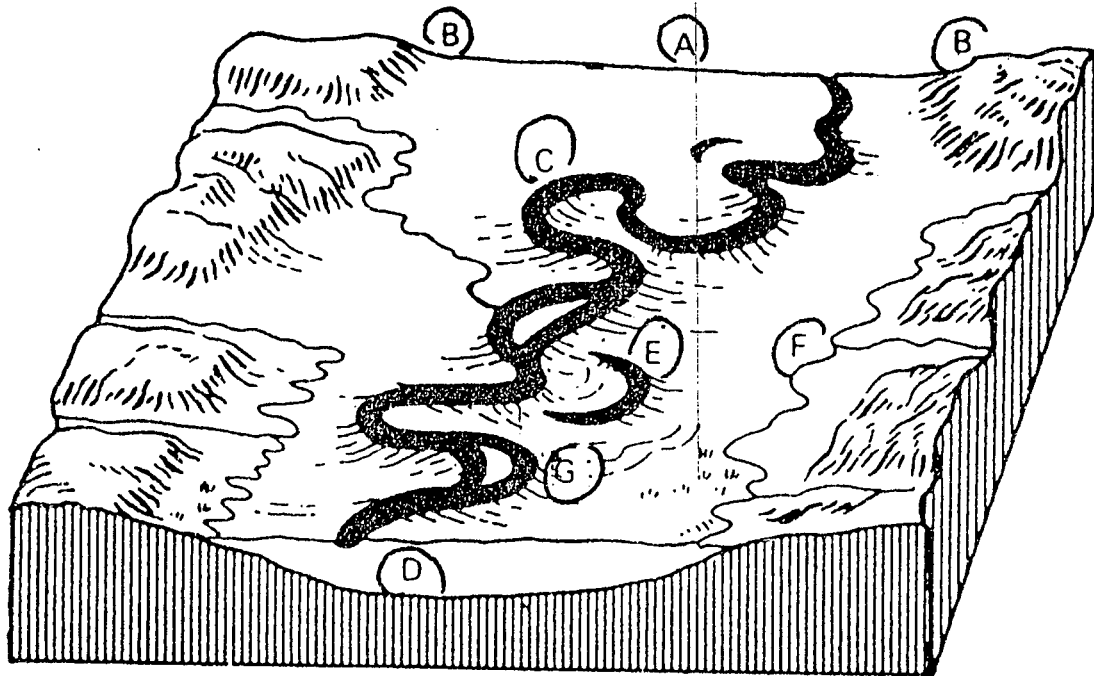
Pupil : One.

Teacher : One unit to the right and two up. That one is above the line so it gives us two to move up. So from there (points to graph on board), we move one unit to the right, more or less, and two up - I suppose it is somewhere up there, and if we join these two point, that will be our straight line.

TEXT 6 : WORKSHEETS USED DURING LESSONS : TEACHER A, B AND C

LOPENDE WATER VLOEDVLAKTES en KRONKELRIVIERE

Bestudeer die onderstaande Figure en verskaf die nodige byskrifte by elkeen [Bl.114].
Skryf die byskrifte langsaan die nommers



In drie sinne verduidelik hoe die hoefystermeer gevorm word, soos aangedui in die figuur: _____

PERSONNEL

What is the personnel function all about? ①

Managing personnel is more important to businesses today than ever before. Some of the reasons for this are foreign competition, a greater need to maintain optimum productivity levels, the demand for more skilled workers, and constantly changing legislation.

Effective personnel management, sometimes called human resources management, demands recognition of the fact that a labour force is an essential element in any business's attempts to achieve its objectives.

In all business enterprises, someone must be responsible for those activities that provide for and coordinate human resources. A large firm may employ a personnel department with a Personnel Manager at its head. Smaller firms may employ one personnel officer, or give a senior member of staff this responsibility. Firms may consult trained personnel specialists on specific personnel management functions.

Aim and functions

The aim of personnel management is to make the very best use of the business's human resources in a way which contributes to the business's achieving its objectives. So the right number of people, with the right skills, should be available at the right time and place to perform specified tasks. Effective personnel management leads to satisfied employees who perform well and produce work of a high quality. This is accompanied by high levels of productivity which contribute to the business's growth and profits.

The various functions of personnel management are:

- ◆ planning and forecasting human resource requirements in terms of numbers and skills
- ◆ acquiring and appointing suitable people to fill vacancies by means of recruitment and selection
- ◆ determining appropriate remuneration of employees
- ◆ appraising employees' work performance
- ◆ training employees and assisting in their development
- ◆ creating and sustaining effective labour relations.

Managing the human factor

Personnel management has a direct effect on the work performance of employees, and consequently on how labour operates as a production factor in an enterprise. While some economists assert that labour is the most important production factor in a business, and others maintain that all production factors are equally important, all would agree that labour requires a particular kind of management.

This is because people are the only living production factor. Other production factors and aids, such as tools and equipment, are only active when people use them. So, the way in which people use the other production factors has a direct bearing on the effectiveness of a business.

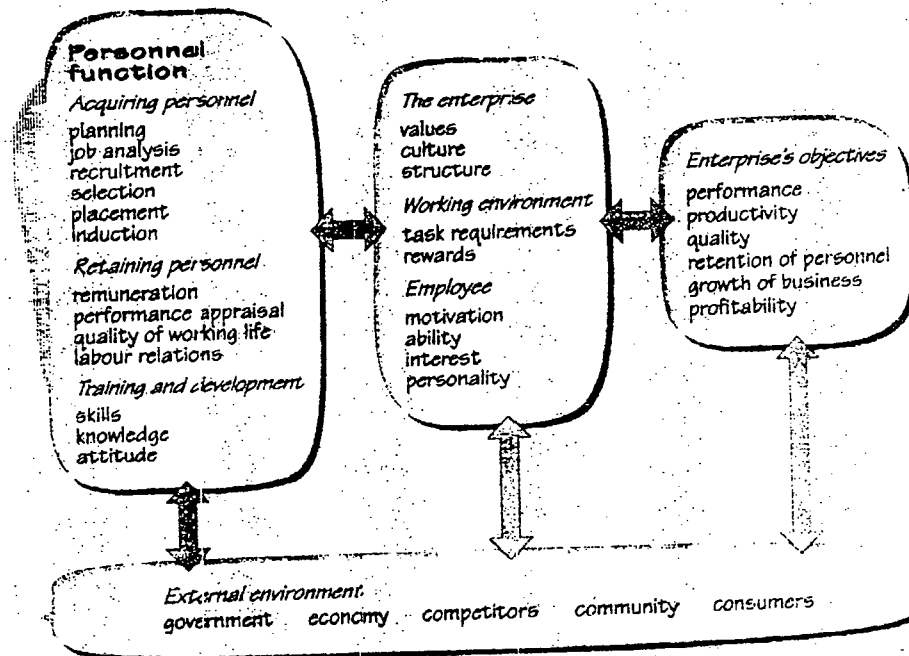
People are complex and require a special kind of treatment and attention. A machine merely requires electricity to start producing, and a manual for repairs. Also, it will produce only what it has been designed to produce. People's actions and performance rely on factors such as ability, personality, conditions of employment, and motivation, and they

can contribute to the enterprise from their own experience and intelligence. So, encouraging positive attitudes, good motivation, and team spirit will go a long way towards attaining high productivity levels.

Factors that can have a negative effect on a business, and that can be prevented by effective personnel management, are excessively high costs of labour, low productivity, conflict in the work place, and potential damage caused by complex social, cultural, statutory, and demographic changes.

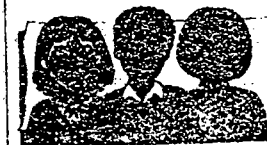
Personnel management within its environment

The business environment, employees, the different types of positions, and the external environment are interrelated. They all affect personnel management. This is shown in the diagram.



Group study

1. Why is the personnel function of such importance to a business, especially today?
2. Outline what personnel management entails.
3. Using the diagram above, each group should choose one area of influence and discuss how it would affect personnel management.



Worksheet : Teacher B

Acquiring human resources for a business primarily involves planning, then recruiting and selecting suitable people, and placing them in appropriate positions.

Planning

When planning for human resources, the personnel officer needs to look into the nature of the labour required to manufacture a product or provide a service, and then identify the various functions, and create the necessary positions. Job analysis is an important part of this process.

Job analysis

Job analysis is a procedure used to obtain information about the skills, activities, and time required for the tasks needed within the enterprise. The personnel officer will use this information to draw up job descriptions, and then job specifications, which, among other things, are vital to any successful recruitment campaign.

To analyse jobs, the personnel officer will first study the business as a whole to determine where each job fits in. She will also decide which techniques to use to analyse the jobs. Accepted techniques must be used, such as preparing questionnaires about the work, conducting interviews with employees, observing the actions of the incumbent of a post, and asking incumbents to keep notes about their activities in a diary.

Job description

The information obtained from job analysis is used to compile a job description, which is a written document describing the purpose and duties of the position. It will state the department under which the position falls, the title of the incumbent, the title and name of his line manager, the equipment he requires, and where the work will be done.

Job specification

A job specification is also based on the job analysis, and describes the qualities the incumbent must have, such as qualifications, knowledge, personality traits, skills, experience, and whether the person will work in a group, with the public, or on his own.

Recruitment

The purpose of recruitment is to employ sufficient and suitable candidates to fill vacancies identified during the human resources planning process. Once the job description and job specification documents are completed, the personnel officer can begin recruitment.

Certain considerations will affect the recruiting process. Examples of external factors are the laws of a country and preferences of trade unions. Some internal factors are the business's image, and its human resources policy. A firm may have established a specific policy on affirmative action, or employing handicapped, retired, or part-time people.

To ensure an efficient recruitment drive, the personnel officer should make sure that she has adequately answered these questions.

- ◆ Is the vacant post in line with the planning document and has approval been given for filling the post?

- ◆ Has the enterprise budgeted for the post?
- ◆ Are a job description and a job specification available?
- ◆ Has the recruitment source been selected?
- ◆ Has an excellent advertisement been drawn up and is there sufficient time to allow people to respond to it?
- ◆ Are the personnel staff ready to begin with selection?

Recruiting sources

People who are already employed by the business may be transferred or promoted to fill vacant posts. The personnel officer may advertise the job internally, consult a skills bank or personnel records, or consider recommendations made by other employees.

The most common methods of recruiting outside of the business are using employment agencies, and advertising the post (usually in newspapers or trade journals), but there are many other external sources for recruiting. Professional associations and educational institutions, such as universities, technikons and schools, may be approached.

Group study

Zanele Sikwebu has been successfully running her own small business, Nobantu Garden Services, for three years. She realizes that as her client base has expanded, she needs to pay attention to the human resources of the firm, and has drawn up this plan.



	In place	Required
Drivers	2	0
Workers	5	0
Mowers	2	0

Services will be extended to another residential area. Two extra delivery vehicles and three extra lawnmowers will be needed.

Drivers	2 drivers
Workers	3 workers to mow lawns

1. What is the purpose of Ms Sikwebu having planned for human resources?
2. Nobantu Garden Services has hired your personnel consultancy firm because of your reputation for efficient and professional job analysis and recruitment. Based on her plan, advise Ms Sikwebu on how to carry out:
 - a) job analysis
 - b) the writing up of job descriptions and job specifications
 - c) a recruitment programme.

Worksheet : Teacher B

- ◆ Medical tests may be conducted to eliminate applicants who are physically unsuitable for a position.

Final selection interview

An interview is the most commonly used technique in the selection process. To facilitate a productive interview, the interviewer should be trained and should prepare for the interview. The office or interview room should be tidy and ready well before the interview time.

It is important to put the applicant at ease. The interviewer should ask pertinent questions, allow sufficient time for answering, and listen critically to what the applicant says and does not say. Although some casual chatting may ease the tension, the interviewer should take care to stay in control of the interview and not digress too much. Arguments must be avoided. The applicant must be given an opportunity to ask questions, and the interview should be concluded on a friendly note. Any important facts mentioned during the interview must be verified.

During an interview, the interviewer is offered an opportunity to find out more about the applicant, about her work experience, interests, and background. The interviewer should also establish:

- ◆ why the applicant is applying for the position
- ◆ whether the applicant is fully aware of what the job entails
- ◆ attitude towards superiors, colleagues, and subordinates
- ◆ leadership qualities.

Letter of appointment

The selected candidate usually receives a letter of appointment from her prospective line manager, who congratulates her on her successful application, sets out her salary and other benefits, and states the date on which she will begin work.

Employment

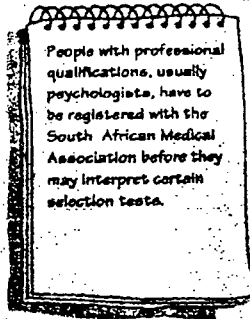
As soon as the applicant accepts the position, there is a contract between her and the employer. It is obviously preferable for both parties to have the contract in writing. A written employment contract sets out aspects such as duties, procedures for termination of employment, leave, and other benefits and conditions of service.

Follow-up

Once the vacant post has been filled, tactful letters should be sent informing the other candidates their applications were unsuccessful.

Individual activity

1. Who is responsible for the selection process in a business?
2. Why do you think it is beneficial to both parties that the employment contract is given in writing?
3. You have to acquire three new delivery-vehicle drivers for Nobantu Garden Services. Write a report on the steps you would take in selecting the new employees.



Selection means choosing the most suitable person from several candidates to fill a vacancy. The benefits of good selection include greater productivity, less absenteeism, and a lower labour turnover. All these contribute to the efficiency of a business.

Having a practical selection procedure in place, and following it carefully, will ensure that employees are acquired who are able to do the work best according to the job description, and job specifications.

Who is responsible for selection?

The manager or designated supervisor of the department in which a vacancy exists is primarily responsible for selection, although the personnel department's staff will assist. The firm may also engage especially qualified people to conduct and interpret various kinds of tests.

Enquiries

Once an advertisement has been placed, potential applicants may begin to contact the firm to request more information. A competent staff member should handle all such enquiries, as potential applicants' first impression of the business should be positive.

Curriculum vitae and application forms

A curriculum vitae (CV) summarizes an applicant's personal details, qualifications, and record of employment, and gives the names of referees.

Application forms may be used instead of or as well as CVs. These are useful as they elicit from applicants precisely the information the prospective employer needs, in a standard format which is easy to interpret. Applicants may be asked, for example, what salary they anticipate.

Preliminary selection

Personnel department staff will check that application forms have been properly completed. They may check the accuracy of information given, especially of the service record. Those candidates who do not meet the minimum requirements of the advertised post will be informed of this. The references of candidates who do meet the requirements may now be approached for more information.

If necessary, preliminary interviews are conducted with suitable candidates, during which selection tests can be carried out.

Testing

For some jobs it may be useful, or even necessary, to carry out one or more kinds of selection tests before a final interview is arranged.

- ◆ Trade tests measure the skills of a candidate against criteria established in the industry.
- ◆ Performance tests determine ability to carry out a task.
- ◆ Intelligence tests measure intellectual ability.
- ◆ Aptitude tests determine ability to learn a specific task.
- ◆ Personality tests aim to gain some insight into character.
- ◆ Interest tests may help to indicate whether the job does or does not tie in with what interests the candidate.

Retrenchment usually occurs when a business has to reduce its work-force for financial reasons. Part of a fair retrenchment procedure is to exhaust every other alternative to retrenchment, so some employees may be transferred to new positions. Those who cannot be transferred are usually offered a retrenchment package based on their positions and years of employment.

Induction

Induction is a process in which new employees are introduced to the procedures, values, and culture of the business. The new employee is introduced to other employees, his work environment, and the business as a whole. A new employee should feel confident and comfortable, and have a positive attitude towards his job within the first few days.

Induction programmes should be adjusted according to the needs of each new employee. People appointed in management positions will undergo a considerably longer induction, and be exposed to a broader range of the business's activities, than someone appointed at a lower level. Part-time employees will also have a much shorter induction programme than full-time workers.

The induction programme

All new employees will be given an overview of these basic aspects of their new work place:

- ◆ the organizational structure and objectives of the business
- ◆ the products or services it manufactures or sells
- ◆ policy on remuneration, fringe benefits, labour relations, and safety
- ◆ facilities and services provided, such as a cafeteria and parking
- ◆ the functions of the section where the employee will work
- ◆ the duties and responsibilities of the employee
- ◆ the business's expectations of the employee
- ◆ the layout of the work place
- ◆ other employees.

Who is responsible for induction?

If the personnel department takes responsibility for the more general aspects of the programme, this will save supervisors' and other employees' time. But the department in which the person works will usually conduct a specific, task-orientated programme.

Individual activity

1. What placement method should a large business (for example with about 10 000 employees) and a small business (for example with about 10 employees) use? Give reasons.
2. Describe three factors that make placement necessary.
3. Is induction essential in a business, or a luxury? Give reasons.
4. Draw up an induction programme for a new teacher appointed at your school. Perhaps your principal would be prepared to assess your programmes.



Did you know? Approximately 600 000 workers in South Africa lost their jobs during 1993 because of the poor economic climate.

Placement

During placement the right person must be placed in the appropriate post. Usually, the first placement occurs when someone joins the business, and follows after the selection process.

Internal placement, which involves promotions and transfers, also occurs regularly, and then the detailed selection process is generally not used. Where employees are placed internally, the following criteria should be taken into account:

- ◆ the employee's performance in the business
- ◆ the employee's own preferences
- ◆ the employee's view of his current job
- ◆ career opportunities in the business
- ◆ the business's human resources policy.

The chances of successful placement will be improved if the needs of both employer and employee are taken into account.

Let's explore three placement methods.

Internal labour market method

A person is transferred or promoted within a specific job family. For example, in a personnel department, a person may be appointed as a leave clerk, then promoted to senior clerk, chief clerk, assistant personnel manager, and eventually personnel manager.

Labour pool method

A number of people who meet the minimum entry requirements are appointed, and form an employee pool. From this pool, the most suitable people may be chosen to fill temporary posts in the business until permanent posts are available. The employees themselves also have the opportunity of seeing where they would most like to work.

External labour market method

People are recruited specifically for a certain job in the business. Small businesses often use this method, as do businesses who wish to fill specialist posts. The appointment is not intended to allow for promotion or career development.

Why is placement necessary?

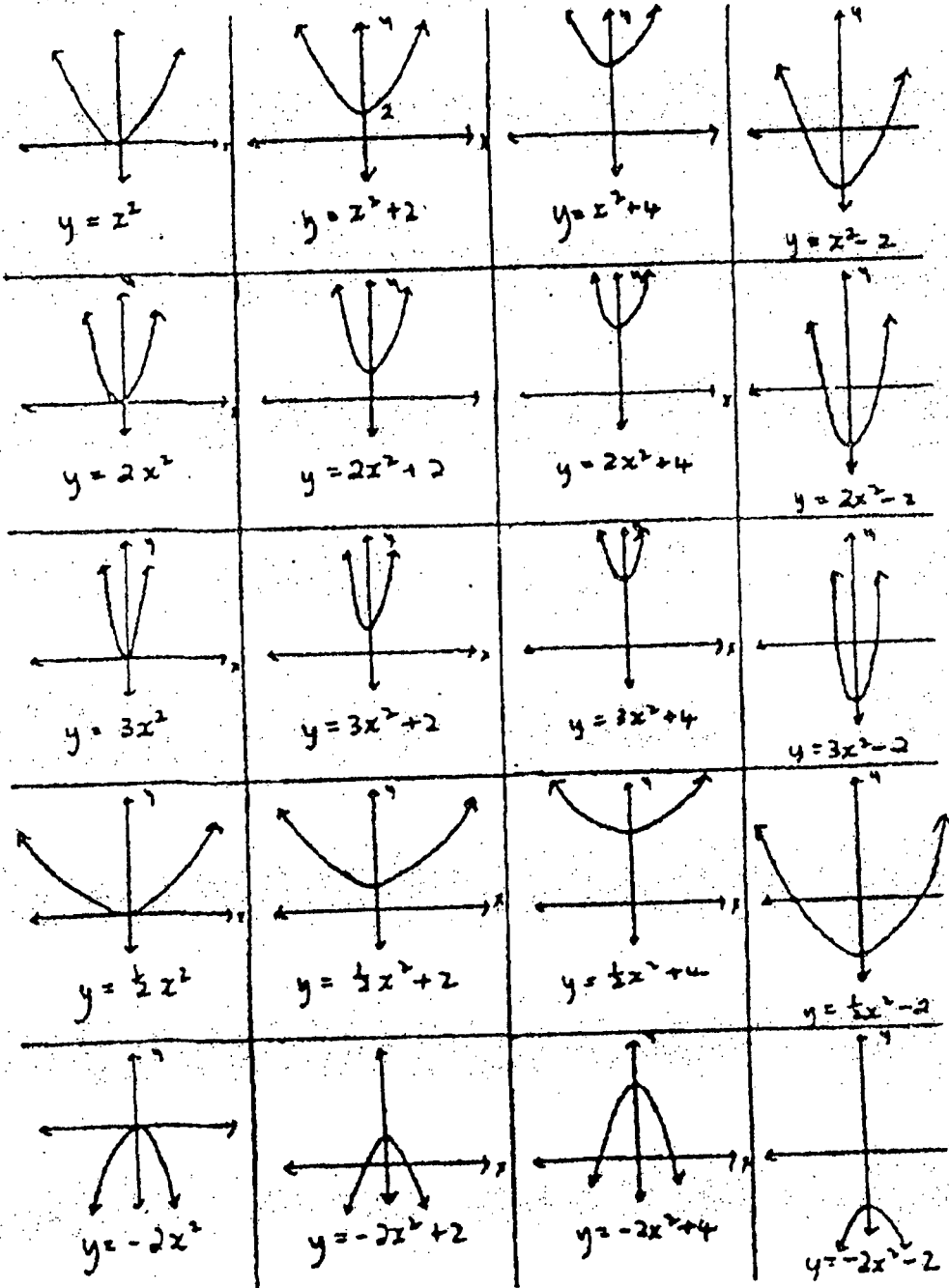
The reasons for placement the personnel officer will most often encounter are promotion, transfer, and retrenchment.

To offer career opportunities and to retain good workers, employer should promote employees from their current jobs to higher posts in the business. This is usually accompanied by greater responsibilities, higher status, and a bigger salary. Employees who are promoted are usually those who perform well in their current jobs, and reveal potential for accepting new challenges.

Where an employee is transferred to another position, it is usually with the same status, salary, and skills requirements. Some reasons for transfer may be the creation of a new department, to eliminate personnel conflict in a section, or to broaden an employee's work experience.

Worksheet 1 Teacher B

WORKSHEET : TEACHER C



**TEXT 7 : COMPLETED OBSERVATION SCHEDULE : FIRST FOUR CATEGORIES :
TEACHER B**

Name Of Teacher: Teacher B

Principal: _____

School: School 2

Number Of Pupils: 21 (4 absent) Date: 10/10/96

* Lesson 1 (small)

POINTERS TO MEASURE THE EXTENT TO WHICH TEACHERS ARE FOCUSING THEIR BUSINESS ECONOMICS TEACHING ON PUPIL CONSTRUCTION OF BUSINESS ECONOMICS CONCEPTS

CONCEPT FORMATION:

1	Teacher teaches business economics as if all pupils conceptualise in the same way. Teacher repeats and drills in one particular method of conceptualising spatially.	2 ✓	Teacher occasionally encourages pupils to use their own methods for conceptualising but teacher still favours one method.	3	Teacher encourages pupils to become independent thinkers. Teacher encourages pupils to use their own methods for conceptualising and to experiment with different ways of finding the answer.
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Comment
T. applies concepts to different situations. T. does not ask pupils to apply concepts themselves. Few some pupils active - must not.

PROBLEM SOLVING:

1	Teacher tells or shows pupils how to solve problems. Teacher does not ask pupils to explain. Teacher sets routine problems which have a specific method that is followed in order to solve them.	2 ✓	Teacher occasionally emphasises independent problem solving but this is mainly with routine problems. Teacher tends not to push pupils' thinking.	3	Teacher emphasises independent problem solving and reasoning by asking questions which push pupils' thinking. teacher sets non-routine problems so pupils need to think about how they will work them out but assists pupils by asking them to explain their reasoning.
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Comment
T. applies concepts to different situations which are related to pupils' lives, but pupils are not asked to apply - T. does not push their thinking. Asks pupils to explain occasionally. Some pupils very responsive / active.

CONCEPTUAL UNDERSTANDING:

1	Teacher focuses on teaching pupils business facts. Teacher trains pupils to get a particular answer rather than teaching them to gain conceptual understanding.	2 ✓	Teacher occasionally focuses on developing conceptual understanding for business economics by explaining and showing connections, e.g. formal business, informal business, economic principle, tax.	3	Teacher teaches pupils how to think in more abstract ways. Teacher focuses on the process of solving problems by designing activities which encourage pupils to hypothesise, use their prior knowledge, predict, investigate, estimate, discover and recognise patterns.
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Comment
T. uses prior knowledge extensively in explaining concepts. T. Shows connections - pupils not active enough. T. does not encourage pupils to hypothesise. He does it. They see him do it. They don't do it.

DEVELOPING THINKING SKILLS:

1	Teacher does not comment on or evaluate pupils' responses but tells pupils whether their responses are right or wrong.	2 ✓	Teacher comments on pupils' responses but does not use the responses as a means to develop pupils.	3	Teacher listens carefully to pupils' explanations so that she can understand how they are thinking and push their thinking further.
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Comment
T. listens carefully to the few individual responses which he gets. Listens to the way they think and comments, almost always positively, on the way they respond. Uses their prior knowledge extensively.

TEXT 8 : COMPLETED QUESTIONNAIRE : TEACHER A

RESEARCH QUESTIONNAIRE

Thanks for letting me observe you teach. Will you kindly fill in the following questionnaire and return it to me as soon as you have completed it. Your effort and time ^{are} highly appreciated. Thanks again. [If you should require more space than is allocated, please feel free to continue on another sheet.]

A. GENERAL:

1. How long have you been teaching?

25 years

2. How would you describe your teaching style?

I taught in a primary school for the first 12 years. I still tend to have a REPETITIVE style.

I always start a new lesson with a very basic previous knowledge introduction and kick off from there.

Initially I still do most of the work and guide pupil participation.

The new approach emphasises "discovery" so I'll have to adapt a little.

3. Which of the two classes that I observed do you prefer teaching? Please explain and clarify with reasons.

I enjoy teaching both classes - but as far as attitude towards the subject goes - I prefer 8E, 8E is a big class of 37 but the majority of them are eager and participate freely.

8E4 is a smaller class (27) - but the majority of them give me the impression that they don't really enjoy the subject. Boys as well as girls in this class just cruise and couldn't care. Sometimes it does affect my zest as well. If they are given exercises to work at in class, very few of them do so.

They just have this nonchalant attitude

4. Does your approach to these two classes differ? If so, how and why does it differ?

My prep for both classes is the same - but sometimes I have to probe more in $8E_4$. I try to use the same approach but there are times when I take longer to reach a certain point in $8E_4$ than with $8E_1$.

I have discovered that if they have to recall something $8E_4$ takes much longer to do so - this then slows down my pace.

5. How do you check to see if your pupils have understood the content/concepts taught in the lesson?

I will give them an exercise based on the lesson. They then bring their books to me to check. I allow them to work in pairs but emphasise that it is important for them to understand what they are doing.

I usually mark one example at a time so that they and I can check if they understand what has been taught.

6. Are you aware of or involved in current trends and developments in Mathematics / Geography / Business Economics education? If you are, kindly elaborate.

Yes. I attend MEP (Maths Education Project) workshops at UCT and am on the MEP and AMESA (Assoc. of Mathematics Education in S. Africa) mailing lists.

I have also presented 'new approaches' to the teaching of Geometry in stds. 6 and 8 at the Maths + Science Conventions at the Bloemfontein University in 1993 and Wits University in 1994 respectively.

7) How do the number of pupils in your class impact on your teaching style (if at all)?

The no. of pupils does not really impact on my teaching style.

I allow pupils to work in pairs right from the start and always encourage peer teaching. I find that Maths lends itself to this and the results have always been positive. There are, however, pupils who take advantage of this and ride on the backs of others - but they soon discover that it doesn't work in the long run.

8) How does the syllabus/prescribed curriculum affect your teaching style (if at all)?

With the interim syllabus and the fact that the std. 8's write an internal examination there is no pressure to finish the syllabus.

These are some areas we have identified together with the std. 9 teachers that we can omit and instead stress the required basics.

e.g. The std. 8's are supposed to be introduced to the four types of graphs viz. str. line, parabola, hyperbole and circle graphs. We only teach the str. line and parabola in std. 8 and try to let them understand and interpret it thoroughly. The std. 9 teacher then introduces the other two.

9) How do you view the role of your pupils in the teaching - learning process?

Today's teaching method is more discovery-based - esp. in Maths. So the pupils play a vital role in the teaching-learning process. The old method where the teacher does all the talking is out.

What children hear they forget - what they see they remember and what they do they understand. I believe this and therefore always try to let them 'see' and 'do' in the lesson.

End of Section A

B. SPECIFIC : [Questions based on observation : Mrs F]

1. What factors influence how fast or how slowly you teach ?

The main factor that influences how fast or slow I teach is whether the class understands the lesson.

If I see that most of them are lost — I will slow down and repeat. This will affect my pace.

2. Please explain the motivation for reading the dictionary definition of the word **quadratic** to the class.

When I taught QUADRILATERALS (four-sided figures) earlier this year I ~~used~~ referred to the prefix 'quad' meaning four. eg. Quadruplets. In the quadratic equation I wanted to emphasise the 2nd degree (exponent 2) — so I used the dictionary to avoid unnecessary confusion.

3. Explain the reasoning behind instructing the pupils to work in pairs.

I find that in bigger classes this idea of working in pairs works quite well. The pupils are more confident, fewer worksheets are needed and the class control is sort of halved.

When they get exercises they are still allowed to work and discuss in pairs — but the exercises are done individually in their books.

4. Please feel free to comment here on any aspect/s of the lessons which I observed.

I don't really have any comment. If you have please inform me. One tends to overlook one's errors.

1/11/96

Thanks so much for your time and effort.