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EDITORIAL

“Whosoever wishes to know about the world must learn about it in its particular details. Knowledge is not intelligence. In searching for the truth be ready for the unexpected. Change alone is unchanging. The same road goes both up and down. The beginning of a circle is also its end. Not I, but the world says it: all is one. And yet everything comes in season.”
[Heraclietos of Ephesos]

This edition of the Educational Bulletin brings together an interesting range of articles on various aspects of education, such as pedagogy in particular curricular fields, tertiary students’ lifestyles, evaluation of new upgrading programmes in teacher development and critical reflection on the research process.

Research “on the ground” is sometimes neglected, given the current emphasis on policy, governance and curriculum. It is therefore good to include two papers on research on university students. The article, Phenomenological research in ODL teacher education contexts : A South African experience is an erudite expose of academic and intellectual challenges in the development of students’ academic literacy, and the other, Selected Morphological and Lifestyle profiles of a cohort of University Students, gives important information on student lifestyles in terms of personal habits and choices.

The teaching of Mathematics offers grave challenges in post-apartheid South Africa. Focussing on the specifics of pedagogy in Mathematics are the articles, Teachers’ perceptions of practical work in the teaching of fractions and Mathematical modeling using the Sketchpad.

The paper, Negotiating Access to Teachers’ Classrooms, is an important contribution to understanding the dynamics of the research process. Located in a larger study of Teaching Economic Management Sciences [TEMS] the article focuses on the micro dynamics of negotiating access in research. It skillfully and critically integrates reflections from international research methodology, the peculiarities of the South African education context, and the challenges of developing competences in a particular curricular field.

The importance of on-going evaluation of new teacher upgrading programmes cannot be underestimated. The recently instituted programme, The National Professional Diploma in Education [NPDE] is a necessary intervention, given the bleak scenario of teacher under-qualification in South Africa. The collaborative paper, Do Teacher upgrading programmes make a difference in teacher development in a rural context – a tracer study of NPDE graduates provides initial, but necessary, steps in a process of evaluation.

An important feature of the articles is the collaboration of novice researchers - students
at the Masters and Doctoral levels. We encourage more of our post-graduate students to produce articles from their research and to use the Bulletin as a channel to share their work in progress more widely.

Taken together, the papers offer a facet of the way transformation in education is taking place in South Africa. More importantly, they show the emphasis given to research, and the different research orientations, methodologies and approaches resorted to in order to sharpen critical reflection, improve educational practice and enhance the culture of learning at different levels of the educational spectrum.

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Faculty of Education: November 2006
Teaching of Fractions

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Abstract

Teachers’ perceptions of practical work and their classroom practices were investigated to confirm or refute existing assumptions and literature claims. The teachers were from two primary schools in a rural area of the Hammersdale Circuit in KwaZulu-Natal (South Africa). Questionnaires in which teachers expressed their views on practical work and fraction teaching were administered to teachers. Lessons on the division of fractions were observed to determine teachers’ practices in relation to the researcher’s assumptions and claims by literature. Data yielded by these research instruments confirmed certain assumptions and literature claims. Also, a number of crucial revelations with important pedagogical implications were unveiled by these research instruments.

Introduction

Informal observation of practices by mathematics teachers, coupled with informal interactions at experience-sharing forums, suggested teachers seldom include practical work when teaching fractions. This led to the formulation of the following research questions: (1) What are the perceptions of teachers on practical work and the teaching of fractions in relation to their practices? (2) What factors contribute to the development of these perceptions? The study was conducted in two South African township schools.

Learners’ knowledge of working with whole numbers is a valuable reservoir to the learning of multiplication and division of fractions (Murray, Olivier & Human, 1996). Flores (2002) suggested that a thorough understanding of the operations division and multiplication with whole numbers, is a prerequisite for understanding division of fractions. The strong emphasis that the literature puts on the knowledge of whole numbers as a prerequisite for meaningful understanding of operations on fractions, including fraction division, made it necessary for this study to investigate the teachers’ practices in developing this vital understanding. This was especially in relation to their practices when they introduce and teach fraction division. There are different perceptions of fractions. Witherspoon (1993) citing Kennedy and Tipps, viewed fractions as part-wholes, subsets, ratios, quotients and rational numbers. Instruction by most teachers still overemphasizes the part-region perspective of the fraction concept (Sinicrope & Mick, 1992; Witherspoon, 1993). Flores (2002) asserted that children go through several stages to develop the idea of the fraction in the context of subdividing areas. He advised that teachers need to make sure learners have developed a fairly complete understanding of fractions before discussing division of fractions.

Teachers who understand a topic make connections with other mathematical concepts and procedures (Flores, 2002). Flores (ibid.) suggested that some of the connections needed in the division of fractions are fractions and quotients, fractions and ratios,
division as multiplicative comparison, reciprocals (inverse elements) and operators. Therefore teachers need to understand how the concepts of the fraction $\frac{3}{4}$, a quotient $3 \div 4$ and the ratio $3:4$ are related and different to each other. Limited exposure of learners to a single representation of the fraction concept has been identified to seriously impair learners’ full development and understanding of the concepts of the fraction, and operations on fractions (Witherspoon, 1993). This includes the division of fractions. Subdivided regions for shading to indicate some fractional part of a real-life pizza, or a chocolate bar, are among some of the widely used examples for the fraction concept (Moskal & Magone, 2002; Witherspoon, 1993). This singular part-region representation of the fraction concept (Witherspoon, ibid.) prevails, although there are many representations and interpretations which could improve the understanding of the fraction concept. To gain a complete understanding of the fraction concept, learners need to be exposed to a variety of concept representations. Witherspoon (1993) suggested the following five representations identified by Lesh et al in 1987: (a) symbols, (b) concrete models, (c) real-life situations, (d) pictures and (e) spoken language.

A meaningful conceptual understanding of fractions and operations on them, as clearly distinct from the ability to successfully manipulate algorithms, is a necessary prerequisite if learners are expected to draw any meanings from their learning about fractions. However, Flores (2002) argued that the division of fractions has been traditionally taught by emphasizing the algorithm procedure ‘invert the second fraction and multiply’, with little effort to provide learners with an understanding of why it works. Witherspoon (1993) warned against assuming an understanding of fractions by learners merely because they are able to carry out an algorithm or recite a definition.

Among key principles that guide the development and implementation of Curriculum 2005 (C2005) and the follow-up RNCS, the education department’s Policy Document listed: (a) participation and ownership, and (b) learner oriented approach (DoE, 1997). The wording of these principles and other related ideals of Outcomes Based Education (OBE) suggest serious engagement of the learner in the learning process. Engaging learners with practical activities in learning fraction division provides more than ample opportunity for practical implementation of the ideals of OBE. Practical teaching of fractions by use of concrete models has been observed to be a challenging experience for teachers. Ott, Snook and Gibson (1991) argued that concrete experiences related to the division of fractions are much more difficult for teachers to devise and for learners to follow.

**Research methodology**

The nature and quality of data generated by the questionnaires and observation of lessons in response to certain research questions in the introduction, characterized the study as qualitative. Assumptions were made about the practices of teachers when teaching fractions and fraction division, and some of the underlying beliefs that inform these practices. The assumptions on which the study was based were: (a) Minimal use of practical work by teachers is a source of impoverished development of concepts on fractions and operations on them, including division. (b) There is a limited visual representation of the fraction concept with pictures of part-regions. (c) An overemphasis
of the algorithm as a goal of instruction leads to poor understanding. Lessons on fraction division were observed to ascertain the approach used by teachers. To find out more about the factors behind teachers’ views on practical work in the teaching of fractions and fraction division, a questionnaire was designed for administration among teachers. Targeting only one teacher for both observation and questionnaire completion would have been insufficient for purposes of generating sufficiently credible data. Schools that granted access permitted only three to four weeks within which to conduct the study. Therefore, this called for a compromise arrangement to generate reasonably credible data on teachers’ perceptions of practical work, and the teaching of fractions and fraction division in relation to their practices. It was decided to administer the questionnaire to all mathematics teachers in the two schools, but to observe only the lessons of one grade 7 group per school. Given the time constraints, administering the questionnaire to several teachers and observing only one teacher per school seemed the only and most practicable way to obtain data of any credible value.

Observation

Patton (2002) explicitly listed observations among research instruments used in qualitative inquiries. To capture unfolding events in depth, a semi-structured type of observation was deemed as suitable. According to Cohen et al (2000), a semi-structured observation has an agenda of issues of interest but gathers data in a far less predetermined and systematic manner. This semi-structured character of the observation suited the qualitative nature of this study. The role of the researcher was made clear to the teacher and his learners before the observation of lessons. The most appropriate role of an observer was observer-as-participant. A definition of this role states that “The ‘observer-as-participant’, like the participant-as-observer, is known as a researcher to the group, and maybe has less extensive contact with the group” (Cohen, Manion & Morris, 2000, p.310). Such a role allowed for the capture of events as they unfolded, with a special focus on what teachers did in relation to their assumed practices. This implied that while the observer had specific issues of interest, the observation process itself was open to events as they unfolded.

Questionnaires

Though questionnaires are predominantly associated with quantitative studies (Cohen, Manion & Morrison, 2000), if they make provisions for open-ended responses, such questionnaires are capable of generating in-depth data on respondents’ feelings, opinions, views, attitudes and perceptions about the phenomenon (the learning of fractions and fraction division by practical means). A questionnaire was designed with the above mentioned attributes and can therefore be seen as a research instrument for a qualitative study. It made provision for open-ended responses where respondents could express their feelings and opinions on the use of practical work in the teaching of fractions. Questionnaires were administered to four teachers to find out their perceptions on practical work and fraction learning. This called for the inclusion of questionnaire items directly linked to perceptions of practical work by teachers. Although the questionnaire mostly consisted of closed items, eight items allowed for open-ended responses for teachers to express their opinions. This immediately rendered the questionnaire less structured. However, its use was justified by the suggestion that “If a site-specific case study is required, then qualitative, less structured, word-based and open-ended questionnaires may be more appropriate as they can capture the specificity of a particular
situation” (Cohen et al., 2002, p.247). The questionnaire, however, tried to find a balance between a highly structured questionnaire (with closed items only) and an unstructured questionnaire (open-ended items) to serve the purpose of the study, i.e. finding in-depth information about the role of practical work in learning fractions and subsequent fraction division. Prior to the actual fieldwork, the questionnaire was designed, piloted and refined. Inclusion of open-ended items was the product of these efforts. Teachers were given a week to complete the questionnaire. In line with ethical requirements, terms and conditions for their participation were fully explained to them in the company of the procedural letter of consent, which they signed and returned with completed questionnaires.

Results
Here we briefly present the responses organised under the main issues focussed on in the questions, and the observations of classroom practice.

Teachers’ Perceptions
The following are discussed: practical work and the teaching of fractions, teacher claims on their practices, and teacher training for practical work.

Practical work and the teaching of fractions
Four respondents answered the questionnaire. Data from questionnaires indicated that teachers attached a strong value to the role of practical work in teaching fractions and fraction division. All four respondents agreed that fractions offer enough opportunities for the learning of mathematics through practical means. The most preferred materials in teaching fractions and operations on them were: (a) groups of objects – sets, (b) pictures/diagrams, and (c) worksheets. Two respondents preferred each of these materials. Paper-folding and the graded ruler were each preferred by only one respondent. All four respondents strongly agreed that practical work has a place in the teaching of fractions.

Teacher claims on their practices
While one respondent claimed to always include practical work in his lessons (including fractions), one said he does it often and the remaining two said they only did it sometimes. All respondents indicated they would definitely recommend the use of practical work in the teaching of fractions. Respondents gave different reasons for their preferences. The graded ruler, groups of similar objects (sets) and paper-folding were preferred because of their easy accessibility by learners. Sets and pictures/diagrams were chosen for their ease of use by learners. These teachers considered worksheets to be easy for learners to understand and answer. Other approaches were the number line (one respondent) and physical objects that learners can handle (three respondents). Respondents gave different reasons why practical work seldom features in most teachers’ lessons. Two respondents claimed it (practical work) is time consuming – both during preparation and actual teaching. Another respondent cited lack of passion for the subject as a factor. Lack of resources and adequate training were suggested by one respondent. One respondent blamed overcrowded classrooms as another factor behind omission of practical activities from lessons.
Teacher training for practical work

All four respondents claimed to have received formal pre-service training in practical work and the teaching of mathematics in general. Except for one respondent, all others agreed to materials development having been part of their pre-service training in practical work. The same respondent denied having ever received any form of training in the use of practical work for teaching fractions in particular. Two of the four respondents acknowledged having previously attended in-service courses on practical work in the teaching of fractions. The other two declared such opportunities were absent.

A description of two teachers’ practices

In school A, the teacher’s approach to the teaching of fraction division embraced the use of practical work, although he did most of the work himself and did not allow learners enough opportunities to explore practical work to find solutions to given problems. Also, the teacher’s final solutions contained errors, or the example used did not relate to division of fractions, which was the intended outcome of the lesson. After giving two definitions of division i.e. sharing and grouping, the teacher wrote a fraction division problem $2 \div \frac{1}{3}$ on the board and demonstrated the solution. The out-of-context problem was not related to any real life situation. Only later did the teacher attempt to contextualize the problem, equating 2 to two cakes divided by $\frac{1}{3}$, although there was no explanation of what $\frac{1}{3}$ might represent. The following is an illustration of the teacher’s solution:

![Figure 1: Teacher’s Circle Solution of $2 \div \frac{1}{3}$](image)

After depicting his solution, the teacher then asked learners how many pieces of $\frac{1}{3}$ were found in the 2 circles representing his two cakes. Learners correctly responded with 6. Erroneously, the teacher concluded and then wrote $\frac{6}{3} = 2$. This is equivalent to $6 \times \frac{1}{3} = 2$.

The correct solution to the given problem would have been $2 \div \frac{1}{3} = 6$. The following is an illustration of how the same teacher used the number line as an alternative approach to the solution:
Again, the teacher erroneously concluded that the final solution was $\frac{6}{3}=2$. In his two attempts at the solution, the teacher never explained how his final solution was related to the original problem. As his last example, the teacher demonstrated the solution to the problem ‘find $\frac{1}{5}$ of $\frac{1}{2}$’. The following is an illustration of the teacher’s solution:

![Figure 3: Teacher’s Circle solution to $\frac{1}{5}$ of $\frac{1}{2}$](image)

After asking learners a number of leading questions, conclusion was finally reached that there are 10 fractions of $\frac{1}{5}$ in the two $\frac{1}{2}$’s, each of which is $\frac{1}{10}$ of the entire circle. Hence the conclusion that $\frac{1}{5}$ of $\frac{1}{2}=\frac{1}{10}$. This is not an example of a fraction division problem and was thus irrelevant to the intended outcome of the lesson. The only visible involvement of learners during the lesson was their responses to the teacher’s questions which probed desired cues towards final solution.

In school B, the lesson on fraction division focussed on revision of terminology and application of the algorithm. Learners did not play any part in developing the algorithm, and no attempt was made to enable them to understand the algorithm. To demonstrate application of the division algorithm, the teacher wrote the following out-of-context fraction division problems on the board: (1) $6 ÷ \frac{1}{2}$, (2) $4 ÷ \frac{1}{2}$, (3) $\frac{2}{3} ÷ \frac{1}{6}$, (4) $2 \frac{1}{2} ÷ 5$, (5) $1 \frac{1}{2} ÷ \frac{1}{4}$. Using $\frac{1}{2}$ as a referent, the teacher revised the definitions of: (a) numerator and (b) denominator. To revise reciprocals, the teacher asked learners to give reciprocals of $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{5}{6}$, for which he wrote $\frac{1}{2} \leftrightarrow \frac{2}{1}$, $\frac{3}{4} \leftrightarrow \frac{4}{3}$ and $\frac{5}{6} \leftrightarrow \frac{6}{5}$ on the board. Although this expression of learners’ oral responses may be understandable, the language of the symbols used suggests a different, incorrect and misleading story. In demonstrating the
solution to problem (1), the teacher suggested awareness of his learners’ prior knowledge of the fraction division algorithm, with the statement:

*We all know that when we divide with a fraction we change the divisor into its reciprocal and multiply the dividend with the reciprocal instead of dividing with the original fraction.*

Through leading questions, the teacher demonstrated the application of the division algorithm to the solution of problem (1). When learners demonstrated solutions to subsequent problems, emphasis was also on reciprocals and accuracy in multiplication. The next lesson dealt mainly with the division of mixed numbers. Here too, focus was mainly on accurate reciprocals, conversion from mixed numbers and correct products. All these distinctive features of rote learning evident in this teacher’s lessons are reminiscent of Siebert’s (2002) parallels between operations involving fractions and seemingly nonsensical algorithms.

**Factors behind teachers’ perceptions**

Teachers’ favorable disposition towards practical work was influenced by their belief that practical work made the teaching of mathematics in general, and fractions in particular more learner-centred. A number of external factors also had a negative bearing on teachers’ perceptions. We focus on four factors in this discussion: understanding mathematical concepts, large classes, the syllabus, and training.

**Understanding mathematical concepts**

All respondents strongly agreed that the main objective of any teaching session should be the understanding of mathematical concepts by learners rather than completion of the syllabus. Respondents: (a) disagreed that learning activities requiring learners to engage in practical activities are a waste of valuable teaching time, (b) agreed that practical work fitted well with C2005 requirements for a learner-centred approach, (c) acknowledged the contribution of practical work to better understanding of fractions by learners, and (d) agreed that learners can learn fractions better by handling physical objects (three of them strongly agreed). However, The observed practices of the two teachers proved contradictory. These practices were discussed in the preceding section. Although the teacher observed in school A showed a measure of commitment to practical work, his approach afforded learners little opportunity to explore practical work for their own benefit in the acquisition of concepts involved in fraction division. Complete devotion to rote learning by the teacher from school B was also discussed. All these practices showed little or no evidence of espousing C2005 principles of: (a) participation and ownership, and (b) the learner-oriented approach.

**External factors**

External factors included: (1) large numbers in classes, (2) pressure to finish the syllabus and (3) training in practical work.

Large numbers in classes

_In response to why teachers seldom include practical work in their lessons, one respondent cited: Huge numbers in the classroom to work with. In school A, the study was conducted with a class of 63 learners which was split up into two groups for the purposes of research._
Pressure to finish the syllabus

Asking to choose the ideal primary objective of any teaching programme, one respondent indicated that finishing the syllabus and understanding of mathematical concepts by learners, should both be objectives when teaching fractions. The respondent was the teacher from school B, whose observed lessons did not feature any practical work. This was the same teacher who thought that they (practical activities) were time consuming.

Training in practical work

Except for one respondent, the other respondents had some training in the use of practical work in the teaching of fractions. This should be a strong factor behind the participants’ favourable disposition to practical work (in theory). This is despite evidence to the contrary in teachers’ observed practices.

Discussion

This focuses on two broad headings: teachers perceptions, and factors influencing these perceptions.

Teacher Perceptions’

Here the focus is on: real practices against teachers’ claims, teachers’ plea for help, teachers’ difficulties in constructing practical fraction division activities, the relevance of practical fraction division to OBE, minimal use of practical work by teachers, limited visual representation of the fraction concept, and overemphasis of the algorithm as a goal of instruction.

Real practices against teachers’ claims

While the teacher from school A displayed a degree of commitment to the use of practical work in fraction division problems, the value of his efforts was seriously compromised by the erroneous conclusions he always arrived at. However, data from this observation confirmed a number of claims made in the questionnaire. The teacher had claimed to often include practical work in his lessons and he used it in his demonstrations. The number line and pictures/diagrams, which he used in his demonstrations, were included among his preferred aids in the teaching of fractions and operations on them. Others were sets, the ruler, worksheets and physical objects that learners could handle. The restriction of the aids used to the number line and diagrams, when his range of preferences had been so wide, could perhaps be associated with his justification for limited inclusion of practical work in mathematics lessons: Lack of resources and training. The erroneous conclusions reached by the same teacher in his solution of fraction division problems were also cause for concern. Although he had agreed to having received training in using practical work in mathematics (including materials development), he denied ever attending an in-service course on practical work in the teaching of fractions. Practices observed from the teacher in school B contradicted all claims made in the questionnaire. The teacher claimed having received pre-service and in-service training on practical work in the teaching of fractions. The ruler, sets, pictures/diagrams and physical objects learners could handle were among his preferred materials. Easy accessibility was why he preferred most materials. Yet in spite of all these positive responses in favour of practical work, only evidence of rote learning of the algorithm by learners emerged from the observation of his lessons on fraction division. Perhaps an explanation for all these contradictions is summed up in his justification of the
exclusion of practical work from mathematics lessons: They are time consuming. They refer to practical activities.

Teachers’ plea for help
All respondents were unanimous that engaging learners in practical activities fitted well with OBE requirements for a learner-centred approach and therefore felt OBE workshops in mathematics education should put more emphasis on practical work. Respondents wished to see more practical work workshops on the teaching of fractions. Suggestions on areas such workshops should cover included:

a) Development of materials because educators think it’s expensive to find materials for practical work and it wastes a lot of time. Teacher observed in school A.

b) The workshop on practical work and teaching of fractions must include development of materials, easily accessible materials, learner activities, teacher’s role during the lesson, assessment of practical work and lesson preparation to equip us (educators) with new developments. Teacher observed in school B.

This perhaps sums up the whole spectrum of developmental needs for a teacher whose lesson on fraction division begins and ends with memorization of the algorithm.

c) Teachers need to be developed all the time since there are new things each day. Teachers should be developed on how to be innovative, competitive and also be life-long learners because they acquire new skills. Another respondent from school A.

The emphasis on developing teachers to be innovative and to be life-long learners supports some of the values that the new C2005 dispensation intends to inculcate in the new breed of teachers that it envisages. It also encapsulates the motive for the common desire in all respondents for C2005 workshops in mathematics to put special emphasis on practical work. Perhaps, if these workshops were to evoke in teachers qualities of innovation and being life-long learners, teachers would cease to think that it’s expensive to find material for practical work [response a) above]. Such workshops would perhaps also go a long way in equipping us (educators) with new developments [response b) above].

Teachers’ difficulties in constructing practical fraction division activities
The following were some of the reasons advanced for teachers’ reluctance to include practical activities in their lessons: (a) They are time consuming. (b) Maybe educators do not have love for mathematics. If they do have love they will be able to move from the abstract world of mathematics to the concrete world of mathematics. (c) Lack of resources and training. (d) Requires a lot of planning and preparation.

The common message is that preparation of practical activities is a laborious exercise. With specific reference to the measurement and partitive/sharing interpretations of division, Ott, Snook & Gibson (1991) argued:

Such concrete experiences are easy to devise and are relatively easy for students to follow as long as the numbers are whole numbers. However, meaningful concrete experiences related to division of fractions are much more difficult for teachers to devise and for learners to follow (p.8).
Although teachers’ responses were related to general inclusion of practical work in their mathematics lessons, within the context of fraction division their justification of their reluctance to include practical activities in their lessons supports the argument of Ott et al (1991). While failure of teaching to relate abstract concepts to learners’ concrete experience is interpreted in response b) as lack of passion for mathematics, it is insinuated in responses a), c) and d) that practical fraction teaching is a difficult task. These insinuations support the argument of Ott et al (1991).

The relevance of practical fraction division to OBE
One of this study’s motives was to emphasise the relevance of practical work to OBE requirements for a learner-centred approach to teaching and learning. All respondents agreed that engaging learners in practical fraction division fitted well with OBE requirements for a learner-centred approach. Subsequently all respondents agreed that OBE workshops in mathematics should put more emphasis on practical work. In view of serious difficulties encountered by the implementation of OBE in schools, it is imperative for these workshops to pay attention to details that are informed by the genuine needs of teachers. It has been observed that “Workshops in OBE have not shed any light on educators because OBE facilitators have been unable to address educators’ concerns” (Langa, 2003, p.65). It is such concerns that attention to detail by practical work workshops in fraction teaching should seek to address.

Minimal use of practical work by teachers
Although Ott et al (1991) suggested that familiar concrete experience should be the first step in the development of new abstract concepts and their symbolisation, they also acknowledged that this was hardly the case in the division of fractions. Their claims were confirmed by the observation of teachers’ practices. In school A, while the teacher gave his learners severely limited experience with practical work, and his efforts did not carry much weight as learners were not afforded any meaningful opportunities based on their own experiences in practical fraction division. This, coupled with erroneous conclusions the teacher always arrived at in his demonstrated examples, resulted in learners not benefiting much from their experiences. In school B, all lessons in fraction division were characterised by a complete absence of any practical activity in favour of sole devotion to rote application of the fraction division algorithm.

Limited visual representation of the fraction concept
One of this study’s assumptions was that there was limited visual representation of the fraction concept with pictures of part-regions. The standard sub-divided regions for shading to indicate some required fractional part of a real life pizza have been cited and used by Witherspoon (1993) and Moskal & Magone (2002), respectively. The teacher from school A replaced the pizza with circles representing cakes (see Figure 1). His alternative, the number line, was still another representation of the part-region perspective of the fraction. These examples of the fraction perspective supported assumptions and claims of the restriction of the fraction concept to the part-region perspective. Dangers of the narrow view of the fraction as a part-region were highlighted by Witherspoon (1993) as: (a) the geometry of unmarked region models, and (b) application of knowledge of regions to other fraction interpretations. The negative effects
of limited visual representation of the fraction concept on learners were evident in school A, even though learners had been exposed to demonstrations using drawings. One of the factors behind this overemphasis on the part-region perspective of the fraction concept is the over-concentrated focus of textbooks on this fraction perspective. It has been observed that “When it comes to fractions, it is not unusual for textbooks to emphasize the part-whole representations and fraction symbols, to the exclusion of other forms of expression” (Empson, 2002, p.35).

Overemphasis of the algorithm as a goal of instruction
Devotion to the algorithm by the teacher in school B was consistent with laments by Flores (2002) on overemphasising the algorithm procedure, ‘invert the second fraction and multiply’, with little effort to provide learners with an understanding of why it works. This also supported Siebert’s (2002) assertion that children often lack a ready understanding for operations involving fractions because these operations are often equated with seemingly nonsensical algorithms, such as the fraction division algorithm. Practices in school B also supported observations by Sharp et al (2002) that procedural knowledge such as algorithms for operations is often taught without context or concept, implying that algorithms are an ungrounded code only mastered through memorization. Cramer & Bezuk (1991) and Witherspoon (1993) warned against assuming an understanding of fractions by learners merely on the basis of successful application of the algorithm.

Factors influencing teachers’ perceptions
In this section we present three key factors identified by the study.

Teachers’ beliefs
The underlying belief by all respondents to the questionnaire that learners’ understanding of mathematical concepts should be the primary objective of instruction informed further beliefs that: (a) practical work fitted well with OBE requirements for a learner-centred approach to teaching, (b) learning activities that require learners to engage in practical work are not a waste of time, (c) practical work contributes to learners’ better understanding of fractions, and (d) learners can learn fractions better by handling physical objects. Belief (a) has been discussed. Beliefs (b) to (d) support the assertions on the value of practical work in aiding learners’ better understanding of fraction division (Flores, 2002; Siebert, 2002; Sinicrope et al; 2002). Sinicrope et al (2002) offered advice on examples for concrete experiences for learners by suggesting instrumental models, like pattern blocks, can be used for the measurement interpretation of fraction division. Siebert (2002) gave examples of how diagrams can be used to find solutions to fraction division problems.

Convenience, efficacy and expediency
The convenience of practical activities to peculiar conditions they may be faced with, was another determining factor behind teachers’ perceptions on practical work in fraction teaching. Large numbers in classes and pressure to complete the prescribed syllabus were cited among some of the conditions facing teachers, which determine the convenience and suitability of practical work in fraction teaching. The efficacy and expediency of various instruments of practical work were other factors behind teachers’ positive
disposition towards practical work. However, there is evidence of serious difficulties that teachers encounter when they consider implementation of practical work. These difficulties were manifestations of claims by Ott et al (1991) on difficulties teachers encounter in their attempts to construct practical activities for learners. These were discussed in the previous section. Whitworth & Edwards (1969) offered a range of suggestions on instruments and activities for practical work in fraction teaching that teachers could find useful to address their difficulties.

Teachers’ level of training
Their level of training was another driving factor behind teachers’ favourable disposition towards practical work. Yet in spite of their claims of adequate training in practical work in fraction teaching, teachers’ observed fraction teaching practices revealed half-measures and errors, or complete omission of practical work from their lessons on fraction division. These shortcomings in use of practical methods in fraction teaching, together with glaring errors made by the teacher in school A, call for the design of training programmes to assist teachers with their difficulties.

Concluding remarks
Pre-service training
It has been observed that “Pre-service mathematics teachers regard personal or formal theories of teaching and learning mathematics and classroom practice as separate areas of study” (Hobden, 1999:76). In this study, the observed contradiction between teachers’ classroom practices and their self-declared positive attitudes towards practical fraction teaching looks like a continuation of Hobden’s observed pre-service tendencies of trainee teachers to regard theory and practice as two separate entities. Pre-service teacher training needs to take into account the teachers’ reasons for excluding practical work and implementing teaching strategies that are not centred on practical work. Therefore, teacher training needs to provide programmes that directly address these concerns, especially issues of overcrowded classrooms and perceptions that practical activities take up a lot of time, both during preparation and implementation. The issue of overcrowded classrooms is still a thorn in the side of our public education system. Yet the approach of our teacher training programmes continues to tailor the training of teachers along methods that are suitable for normal-sized classes. The notion that practical activities are time consuming suggests a lack of clear understanding, and thus appreciation of the nature, scope and functional potential of practical work by teachers, the origins of which are summed up by the suggestion that teachers ‘lack proper training’ in practical work. Therefore, pre-service teacher training on practical fraction teaching needs to be revisited with an eye to addressing these and many other concerns which further research should help bring to the fore.

In-service training
Teachers’ concerns, their observed practices and their acknowledgement that practical fraction division is relevant to OBE requirements for a learner-centred approach, call for a demand to look at how in-service training can assist in addressing teachers’ needs. The restriction of instruction to rote application of the algorithm by teachers is a serious impediment to understanding. As practising teachers, in-service training seems to be the
most immediately accessible remedy to their deficiencies. Flores (2002) advises that teachers who understand a topic should be able to make connections with other mathematical concepts and procedures. Recommended and approved in-service training programmes should be informed by teachers’ perceptions of their needs directly solicited from them through relevant and appropriate research strategies. Teachers’ embracing attitude towards the relevance of practical fraction teaching to OBE is an encouraging point of departure. The views of the teacher from school B on aspects of practical fraction teaching that OBE workshops should address emphasises the needs of teachers in this regard. Such workshops should also ground teachers in more profound aspects of the concepts of fractions and fraction division (e.g. other fraction perspectives and fraction division situations).

**Teaching implications**

Learners should be assisted with understanding various perspectives of the fraction concept and other meanings of division, e.g. sharing/partitive interpretations, using practical representations of fractions. That this is not an easy task is supported by the view that “…a review of literature indicates that the partitive meaning for division has almost been totally ignored… The partitive meaning of division of fractions has been very resistant to clear concrete explanations” (Ott, Snook & Gibson, 1991:8). This calls for a commitment from teachers to seek and design effective strategies to help learners with the understanding of partitive and other meanings of fraction division. For them to be successful, teachers’ efforts in this regard need to be promoted, with teacher training initiatives both at pre-service and in-service levels working actively in this direction.

**REFERENCES**


Mathematical modelling using Sketchpad
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In this paper, I discuss an experiment conducted with grade 10 (15 year old) learners in a small suburb in South Africa. The experiment, described below, showed that as a result of the modeling process, which was framed by Ausubel's Subsumptive Theory, the learners developed a good understanding of the concept of concurrency. Furthermore, the experiment was fully conducted using Sketchpad as a mediating tool. This in itself was a difficult task because our learners have not been really exposed to dynamic geometry environments.

Introduction

Educators in South African schools are beginning to go beyond the idea of passive teaching and learning, to active teaching and learning. This is mainly due to the introduction of the new Outcomes Based Education (OBE). OBE in its conception encouraged educators to allow learners to become involved in the learning process using a hands-on approach to their learning. Despite the initial resistance to OBE, educators have accepted the fact that learning cannot be reduced to a spectator sport, with the children just sitting in class, imbibing and memorizing the information the educator presents and then regurgitating this information in tests and other assessment activities.

This kind of active participation takes place in various ways, namely, group activities, games, discussions and individual tasks that allow for active interaction between the learner and the learning material. A more important aspect of the OBE curriculum is that educators and learners are expected to relate the material being taught and learned to real, everyday activities and experiences. This is becoming a difficult task because, in general, educators are not inclined to nor are they trained to link school mathematics to the real world. But this problem will soon be eradicated when more school textbooks become available for educators to extract examples which relate to their, and the learners, specific contexts.

In the light of this preamble, this paper reports on an experiment conducted in one such South African school, where learners had not previously been exposed to the solving of real-world problems. The modelling experiment involved two key components which are summarized in figure 1.
Gained experience by doing

Reinforced their learning by engaging in a dialogue with the researcher.

Figure 1

In the “doing” aspect the learners were expected to model a pseudo-real world problem using the dynamic software package, Sketchpad. A detailed discussion of this activity will be related later. Despite the guidance offered by the researcher, the learners had actually worked on the computer themselves. As could be expected, the learners initially found the idea of working with a real world problem different and therefore difficult. This problem was compounded by the use of Sketchpad. The experiment actually involved interviews with these learners. The researcher engaged the learners in a modelling exercise by directing them into certain activities and asking probing questions. Perhaps in a few years when learners become au fait with these types of exercises, the role of the educator may become more administrative and less interactive under these settings. But it is exactly this dialectic between the experiences and the dialogue that produces the potential for learners to construct their own meanings and insights of real world situations.

The theory behind the experiment

This experiment was informed by various theories, namely, Constructivism, Realistic Mathematics Education, the Problem Centred Approach and the Subsumption theory. I will briefly relate each of these theories to the research conducted.

- According to Constructivism learners change and develop the meaning of that which they experience. This modelling activity, using the dynamic geometry software, Sketchpad, offered learners the experience of working with many examples within a few minutes. Learners could "see" the results as they interacted with the software. This enabled the learners to go from their level of understanding to, either a related level of understanding or a completely new level of understanding. The software provide the learners with immediate feedback as they tested their ideas. According to Ranson and Martin (1996 : 9), "reasoning and testing ideas in this way reveals the indispensabile mutuality or sociability of learning". Learners easily determined a correspondence between what they knew and the new knowledge they 'saw' unfolding as they worked through the exercise. Often there were conflicts with old knowledge and the new knowledge they discovered. Cognitive restructuring of knowledge took place, where the new knowledge was assimilated using existing schemas that were already established.

- Closely linked to the socio-constructivist theory is the Problem-centered learning (PCL) approach, developed in South Africa in the mid 1980’s by researchers at the University of Stellenbosch. The PCL approach is based on a socio-constructivist theory of the nature of knowledge and learning and hinges on the following (Olivier, Murray and Human, 1992 : 33): The learner is active in the process of acquiring knowledge and in acquiring this knowledge, the learner
makes use of past experiences and existing knowledge. Learning is a social process and the learner acquires new knowledge through interaction with other learners and educators.

- The Hans Freudenthal Institute has since 1971, developed the theory of **Realistic Mathematics Education (RME)**, which was strongly influenced by Hans Freudenthal's concept of mathematics being a human activity. It takes into consideration what mathematics really is, how it should be taught and how learners should actually learn. Realistic Mathematics Education moved away from the idea that the learner is a passive learner and challenged educators to design learning situations and environments that would guide learners to reinvent mathematics, to some extent, in the way it was discovered. The RME theory is closely related to mathematical modeling in that it propounds the notion that mathematics must be directly related to reality, and mathematics must be seen to be a human activity.

- The order of the tasks was conceived with **Ausubel's Subsumptive learning** in mind, where general ideas are presented and developed first before moving towards incorporating or developing more specific ideas. Subsumption is the process whereby all new information is assimilated into a larger, already existing (more general) body of knowledge (Thompson, 1999 : 2). It refers to the placing of new items of knowledge into a larger, more comprehensive category. Ausubel propounds the theory that all new information is linked to that which already exists, and argues that often meaningful learning is enhanced when the general, more inclusive ideas and concepts are developed first.

**The research methodology**

I chose to work with learners from Glenover Secondary School due to the convenience of having easy access to the learners themselves and arrangements could easily be made to interview the learners. Two learners were initially chosen for the trial run. Thereafter eight learners, between the ages of 15 and 16 years, were interviewed from Grade 10. Their computer studies class educator selected these learners randomly. They were selected from a group of 60 learners in Grade 10 in March 2000. At this stage, the learners had not written any examinations for the year and therefore their individual academic performances could not be commented on. But based on their previous years mathematics results, the group comprised of 2 learners who had attained between 60 and 70 percent, and the rest of them had marks ranging between 32 and 53 percent. These learners were ideal for this study because the questions were suited to their level, and they had not yet done any theorems based on quadrilaterals and concurrency.

A brief synopsis of the interviewing process is necessary in order to place the responses obtained in perspective. Although the learners did not know exactly what to expect, some of them initially displayed an unwillingness to participate in this experiment. They feared failure and felt that they were incapable of working with mathematics in a computer environment because they never experienced any such thing before. The interviews were conducted in the classroom in the school over a period of two months. The interviews
were subject to the availability of the learners, because the school only allowed the use of its classroom during school hours and the time for these interviews had to be negotiated with the class educators. The classroom was adequately equipped for the purposes of the interviews, because all that was necessary was a computer. All learners involved were brought together for a short period in order to familiarize them with the general use and application of the computer software – Sketchpad. This period of training was inadequate and did not equip them with the skills required to manipulate the program.

The task that the learners had to work through was based on a relevant real-world topic. All learners were exposed to the different media in South Africa and from prior questioning it was established that all learners were aware of the seriousness of the water born illness called Cholera. Learners were also aware that Cholera was mainly concentrated in rural areas; in particular, the areas where no fresh water was available. So, the identification with the problem was not new and difficult.

All the Sketchpad sketches were presented as ready-made models to the learners due mainly to their lack of technical expertise, and to save time.

The problem given to the learners was:

In a developing country like South Africa, there are many remote villages where people do not have access to safe, clean water and are dependent on nearby streams or rivers for their water supply. With the recent outbreak of cholera in these areas, untreated water from these streams and rivers has become dangerous for human consumption. Suppose you were asked to determine the site for a water reservoir and purification plant so that it would be the same distance away from four remote villages. Where would you recommend the building of this plant?

The diagram attached to this problem was also given (see FIGURE 2).

![FIGURE 2](image)

The students were then asked to find the ideal position for the reservoir within the given quadrilateral. Most students simply ‘guessed’ that the position should be towards the middle of the quadrilateral. This is an obvious repercussion of the commonly held notion that anything in the middle is always equidistant from certain points. By insisting that...
they find a mathematical solution the students became uneasy and felt that the only way to conceive the exact point would be to construct a point within the quadrilateral, measure the distances from the point to the vertices and then move the point around until they found the point at which the distances were the same. Given the opportunity to find such a point the students took a long period and were only able to closely approximate the ideal position.

I then suggested that they work with a simpler problem (see FIGURE 3). They were asked to work with just two villages. This seemed to be too easy for them because they quickly (after some constructions) concluded that there are many points which would be equidistant from two points and that all of these points lay on the perpendicular bisector of the segment joining the two points. They exhibited tremendous joy at this ‘discovery’.

![FIGURE 3](image-url)

Instead of then working with three points I asked the learners to return to the quadrilateral. Now the students were quick to conclude that perpendicular bisectors should be the method of resolving the problem FIGURE 4). Bearing in mind that the intention of the exercise was to teach the students the concepts of equidistance, concurrency and cyclic quadrilateral, the students discovered that the perpendicular bisectors of the diagram were indeed concurrent.

**ROXANNE**

It will be hard, because you have four points…

**RESEARCHER**

Is it really that difficult?

**ROXANNE**

It looks difficult...but I think we should draw their perpendicular lines…no perpendicular bisectors.

**RESEARCHER**

Why do you want to draw the perpendicular bisectors?

**ROXANNE**

It worked nicely for the two villages…I don’t know…maybe it will work for these villages too.

**RESEARCHER**

Would you want to see what would happen if we constructed the perpendicular bisectors?

**ROXANNE**

Yes sir.

**RESEARCHER**

Then click on that button there (after a while) There we have it...what do you observe?

**ROXANNE**

All the lines go to one point…
The learners showed no particular emotion when they discovered that the four perpendicular bisectors met at a common point. It was as if they had expected it to happen and it was taken for granted that these lines would meet. None of them stated that this result really surprised them; in fact, most of them conveyed the idea that this was expected. This is perhaps also indicative of the social context within which learners construct meaning for problems given to them. Learners intuitively sense that the problem would not have been asked if there was no precise solution already “pre-existing”, and this kind of (unrealistic) anticipation is likely to become a determinant force in their behaviour, unless they are given sufficient experiences to counter it.

RESEARCHER Does this surprise you?
PRAVANIE Why should it? They are supposed to meet.

SCHOFIELD They meet at a point.
RESEARCHER Does this surprise you?
SCHOFIELD Not really… they had to meet somewhere…this was the best point.

RESEARCHER Does it surprise you that these lines are meeting at one point?
ROXANNE mmm… I don't know… it must meet there…where else can it meet?

RESEARCHER Does this surprise you?
NIGEL Just a little bit…but I knew that the lines will meet.

RESEARCHER Does this surprise you?
FAEEZA Not really…. It was kind of obvious.

RESEARCHER Does this surprise you?
CHRISTINA They have to meet I think.

Despite the fact that the learners felt that the perpendicular bisectors will meet, some of them found the fact that they did not meet at the middle somewhat strange. It is clear that Faeeza did not find the fact that they were concurrent strange, but it was the fact that they met at a point away from her initially perceived "middle" of the quadrilateral. It did manage to increase her interest in the problem.

RESEARCHER Remember what you said initially. You said that the point should be at the centre? Is it different now?
FAEEZA Yes…it is strange ……..

Another point that arose from the interview, which might be of interest, is the fact that the computer package *Sketchpad* allowed the learners to become extremely confident about their work. Roxanne, for example, began to communicate with the researcher in a way, which indicated her happiness at knowing something to be true. She was elated when she
found that the distances to the four vertices were the same - "I knew it ... I was right" and
"Please measure it, I know it must be the point" (her emphasis in bold). Although the
transcript does not adequately carry the emotion that she displayed, the researcher was
quite taken aback by her enthusiasm. This kind of behaviour is often very difficult to
achieve from learners using traditional non-investigative teaching approaches.

RESEARCHER       How will we know for certain that this is the correct point?
ROXANNE           We can measure it, I know it must be the point.
RESEARCHER       All right measure each distance...that is 3.8...again we have 3.8.
                 What do you think the next two distances will be?
ROXANNE           The same...3.8 and 3.8.
RESEARCHER       Go on and check it out ...this is 3.8 and...this is also 3.8.
ROXANNE           I knew it...I was right.

Next the researcher informally introduced the learners to the circumcircle, but no formal
definitions of circumcentre and circumcircle were given. A circle was constructed from
the point of concurrency (the circumcentre) as center with the circumference passing
through one of the vertices of the cyclic quadrilateral. The learners showed surprise in
their facial expressions and the way in which they responded when they saw that the
circle now passed through all the vertices of the quadrilateral.

The following are typical responses.
RESEARCHER       Now can you construct a circle here, using this point of concurrency
                 as the centre, and let us see what happens. (after the circle was
                 constructed) Now what can you say about the circle?
FAEEZA            The four sided figure lies on the boundary of the circle.........
RESEARCHER       Boundary? What is the boundary of a circle called?
FAEEZA            Sorry circumference.

FIGURE 4 below is an example of what the learners saw on the computer screen as they
worked through with the circumcircle.
The learners could see that the circle passed through the vertices of the quadrilateral. Perhaps the researcher at this point should have probed further by asking the learners why the circumference of the circle passed through the vertices of the quadrilateral. The fact that the radius represents equal distances from the center to any other point on the circumference might have made it easy for them to see the connection with the point being equidistant from the vertices.

The intention of the next aspect was mainly to see if learners would realize that the perpendicular bisectors of a quadrilateral were not necessarily always concurrent, that is, that for a quadrilateral it was not always possible to find an equidistant point. The dynamic facility of Sketchpad not only facilitated this finding quite easily, but assisted some learners to realize that an equidistant point would only exist when the circle passed through the four vertices (that is, the quadrilateral is cyclic).

With Sketchpad it was easy to change the size and shape of the given quadrilateral, so that the learners could observe whether the perpendicular bisectors were concurrent and whether the circumference of the circle still passed through the vertices of the quadrilateral.

Roxanne was taken aback by what she observed but understood exactly the implications of what she observed. In fact when she was asked whether she wanted to see more examples she was emphatic about the fact that that was not necessary.

RESEARCHER  Let us see what would happen if we drew a circle from this point of concurrency. Use the circle function there and draw a circle up to this point here. (after a while) Describe what you observe.

ROXANNE  All the points go around…

RESEARCHER  What do you mean by that Roxanne?

ROXANNE  The circle goes around the points of the quadrilateral.

RESEARCHER  Circle goes around the points…?

ROXANNE  See these vertices of the quadrilateral…the circle passes through them.

RESEARCHER  All right…I see what you mean. Do you think that this will always be the same for any quadrilateral?

ROXANNE  Yes.

RESEARCHER  So no matter how big it is, no matter how small it is, what shape it is, it will…

ROXANNE  Always be the same as before.

RESEARCHER  So if I make this a larger or a smaller quadrilateral, will it always work in the same way?

ROXANNE  Yes…it will always be the same.

RESEARCHER  When we say that it will always be the same what are we referring to?
ROXANNE: The lines will meet at the same point … and the circle will go through these points here (pointing).

RESEARCHER: Can you check? Grab this point here and change the quadrilateral. Now what do you observe? Is this still a quadrilateral?

ROXANNE: Yes it is still a quadrilateral…but something is not working.

RESEARCHER: What is not working?

ROXANNE: They are not meeting.

RESEARCHER: What is not meeting?

ROXANNE: These perpendicular lines and the circle…

RESEARCHER: Yes go on.

ROXANNE: The circle is not touching here and here and here…

RESEARCHER: Maybe there is a problem with this quadrilateral…let us try another one.

ROXANNE: Yeah…(uncertain)

RESEARCHER: Drag this vertex like this. (after a while) Are the points concurrent now?

ROXANNE: Yes.

RESEARCHER: Let us try another one… drag this again. What is happening now?

ROXANNE: It’s just like the other one.

RESEARCHER: What do you mean?

ROXANNE: They are not meeting again…and the circle…

RESEARCHER: What about the circle?

ROXANNE: These lines are not concurrent and the circle does not pass through these vertices

RESEARCHER: When do you think that the circle will pass through the vertices?

ROXANNE: When the perpendicular bisectors are concurrent.

RESEARCHER: Are you sure about that?

ROXANNE: Very.

RESEARCHER: Would you want me to try more examples of quadrilaterals?

ROXANNE: No…it is not necessary… I know what I’m saying.

She was initially confident that the perpendicular bisectors would be concurrent for all quadrilaterals and when the quadrilateral began to change some doubt was introduced. Her words “yes it is still a quadrilateral … but something is not working” was a turning point in her interview. Introducing doubt served to create a surprise factor that helped her to grasp an idea that might have otherwise taken much longer. She had clearly also made a connection between the circle passing through all four vertices and the concurrency of the perpendicular bisectors.

Eventually, these learners concluded that the perpendicular bisectors of the sides of a quadrilateral are concurrent only if the quadrilateral was cyclic. This became their general axiom through which they made mathematical judgments for the next part of the interview. They were now asked to consider the conditions that would apply if only three villages were to be supplied with water by the construction of the reservoir.
RESEARCHER  Let us now look at this case where we might have 3 villages, suppose we had three villages represented on this diagram by T, U and B. How do you think I would be able to locate the position within that triangle that will be equidistant from T, U and B?

The learners confidently responded that they would again use perpendicular bisectors to locate the required point. In fact, the level of their conviction was very high and this could be determined from the way they responded and the language they used. Consider the language used by Christina in the transcript below.

CHRISTINA  Use perpendicular bisectors.
RESEARCHER  Click on the button there and tell me what you observe.
CHRISTINA  They meet at a point - they are concurrent.
RESEARCHER  So are you saying that this is the most suitable point?
CHRISTINA  Yes, it must be.
RESEARCHER  How can we be sure?
CHRISTINA  Measure the distances.
RESEARCHER  Do you want to measure it?
CHRISTINA  It’s up to you sir…..because I’m sure.

When asked whether she wanted the distances measured, she replied, “it’s up to you sir…because I’m sure”. This is the language of a child who is beyond any doubt. She was convinced from the previous examples that this will always be true. But it was obvious that the conclusion drawn earlier was beginning to be used as a basis for new judgments. Perhaps Faeza’s response was quite interesting and would demonstrate this adequately. She initially stated that by constructing the perpendicular bisectors we could find the most suitable position. But she immediately changed her mind to include something that she had just learned for quadrilaterals – a qualification she felt was necessary. She felt that the perpendicular bisectors would only meet if a circle passed through the vertices of the triangle.

FAEEZA  Use perpendicular bisectors.
RESEARCHER  Do you think they will meet?
FAEEZA  They must meet .............. no....... they will only meet if the vertices of the triangle lies on a circle.
RESEARCHER  So the perpendicular bisectors will only be concurrent in certain triangles?
FAEEZA  Yes ...... only those for which the vertices of the triangle lie on a circle.
RESEARCHER  Oh ..... construct the perpendicular bisectors........ (after a while) What do you observe?
FAEEZA  The perpendicular bisectors are concurrent.
There were similar responses from the other learners.

**RESEARCHER** Did you think that they will meet for all triangles?
**SCHOFIELD** No.
**RESEARCHER** Why?
**SCHOFIELD** It must be the same for the four-sided figures.
**RESEARCHER** What do you mean?
**SCHOFIELD** For the quadrilateral it only worked for some... when the circle touched the four corners... it might be the same for the triangle.

Roxanne’s responses were of particular interest. She showed a lot of confidence initially in her extrapolation from quadrilaterals to triangles, and she was therefore quite taken aback by what she later observed. It was clear that her observation differed from her expectation and this created a high level of surprise at finding out that the perpendicular bisectors of all triangles are concurrent. Special note must be taken when reading the transcript by her sudden silence and the doubt that followed. It was at this point that she realized that something different had happened. Her exact words were “…**but this is different... it sort of is strange...**”. What made this strange? Perhaps it was the immediate recognition that what she observed challenged her belief. This entire process took no more than a few minutes. Although she stated that she was only 99 % convinced, it was clear that she was being extremely cautious and did not want to commit herself to saying that she was a 100 % convinced. This could have been the result of the fact that her firm conviction was just proved incorrect and she was not prepared to make another “mistake”. But 99 % conviction was still very high. She felt that this was “strange” because she fashioned her initial hypothesis on what she observed with quadrilaterals. Refer to the transcript below in order to see Roxanne’s responses.

**RESEARCHER** So if we made this triangle bigger or smaller, or just changed the shape, what do you think would happen?
**ROXANNE** A circle wouldn’t pass through these points... vertices and the perpendicular lines will not be concurrent.
**RESEARCHER** Are you sure about that?
**ROXANNE** I already told you sir... it was like that for the quadrilateral.
**RESEARCHER** Should we check by changing the size or shape of the triangle?
**ROXANNE** Yeah...
**RESEARCHER** Drag one vertex and observe what happens ... what do you observe?
**ROXANNE** (silence)... it still is the same...
**RESEARCHER** What do you mean by it still is the same?
**ROXANNE** The lines are still concurrent... but let me move it this way and let me see.
**RESEARCHER** All right....
**ROXANNE** ... but... but... it still is the same... even the circle is passing through the vertexes.
**RESEARCHER** The word is vertices.
**ROXANNE** Vertices... **but this is different... it sort of is strange...**
RESEARCHER  Strange? Why?
ROXANNE  It is not what I expected…it’s like you think it’s going to be like the quadrilateral but suddenly it’s different.
RESEARCHER  You look surprised.
ROXANNE  I am…I was so sure that the lines will not be concurrent…
RESEARCHER  Which lines are you talking about?
ROXANNE  The bisectors.
RESEARCHER  Are they just bisectors?
ROXANNE  No, they are perpendicular as well.
RESEARCHER  Are you convinced that this will be true for all triangles?
ROXANNE  Yes…I saw it when I dragged that point around.
RESEARCHER  How many percent convinced are you?
ROXANNE  99%….
RESEARCHER  99%? You are still unsure because you did not say 100%. Why?
ROXANNE  No…sir I am quite convinced but what if there is one triangle somewhere for which it won’t work?
RESEARCHER  Do you want to move the triangles around some more?
ROXANNE  No. That is not necessary.
RESEARCHER  So how can you become 100% convinced that it will always work?
ROXANNE  I don’t know…I’m quite sure but just in case…I thought that it will be the same as for the quadrilaterals…but I was wrong.

This discovery of new information and the challenging of their existing knowledge created fertile ground for the acquisition of new, more profound knowledge.

CONCLUSION

As stated previously, the experiment only involved a few learners, and furthermore, it only allowed them to work individually and not in classroom environments. But it clearly can be seen from the evidence presented here that learners grasped the ideas of concurrency quickly and easily because of the way the new knowledge became subsumed into the older, more general knowledge. The order of the tasks was conceived with Ausubel’s Subsumptive learning in mind, where general ideas are presented and developed first before moving towards incorporating or developing more specific ideas.

It was conceived with the explicit idea of showing learners that one must be careful of making broad generalizations. Generalizations may hold for certain figures and shapes, but may not necessarily work for other shapes and figures. It is also true that children are often naïve and therefore draw conclusions very easily. It is important to ensure that we constantly draw attention to this when we teach.

References


Negotiating Access to Teachers’ Classrooms: A South African Experience

Murthi Maistry

Abstract
This paper is a reflection on the experience of working with teachers on the Teaching Economic and Management Sciences (TEMS) teacher development research project in South Africa. The TEMS project involved developing the competences of primary school teachers faced with the challenge of teaching Economic and Management Sciences (EMS) for which they were responsible, but not qualified. Unusually, the project arose in response to a request from the teachers themselves. Researching the programme hinged on developing long-term, mutually satisfying relationships with teachers. The paper examines issues of reciprocity and blockages in negotiating access to schools and teachers’ personal spaces.

Introduction

In recent years, research involving classroom observation has been on the increase, as is evidenced in the work of Adler and Reed (2002) and Taylor, Muller and Vinjevold (2003). At the same time, in South African education literature, there is an embarrassing difference between the rigour and elegance with which educational researchers have written about research involving classroom observations, and the extent to which they have focused on and written about the processes of gaining access to classrooms and developing the kinds of relationships conducive to yielding quality data.

In contrast with the paucity of South African accounts of researcher access to schools and classrooms, there is a significant body of international literature on this crucial aspect of initiating and carrying out fieldwork (see Delamont 2002, Homan 2002, Walford 2001). Using the principles outlined by these prominent international educational researchers, the present paper analyses a South African experience – the Teaching Economic and Management Sciences (TEMS) teacher development project operating in the Greater Durban region of KwaZulu-Natal.

Negotiating access is an integral part of the data collection process, and should be properly documented (Delamont 2002). Access is often fraught with break-throughs and blockages that shape the research process. There appears to be an idealised conception of how social and educational research is designed and executed: in such accounts, research is carefully planned in advance; predetermined methods and procedures are followed; and ‘results’ are presented as an inevitable conclusion. However, such reportage is in fact fraudulent (Walford 2001).
Access to classroom observation and to interview teachers and students is an ongoing process of negotiation rather than a once-off hurdle to be crossed (Delamont 2002). At its deeper level, access can be seen as a process of building relationships with people within an organization. The aim is that teachers and students learn to trust the researcher to the point at which they are prepared to be unselfconsciously open and honest about their practices, perceptions and beliefs. Access is thus never total, but might be seen as an incremental continuum, where the researcher is gradually able to move from initial permission to enter buildings to a series of developed and trusting relationships with some students and teachers. Access is always provisional, as permission can be withdrawn at any time by principals, teachers, parents, or students (Walford 2001).

The present paper describes the origins and conception of the TEMS study. It provides an account of how the researcher dealt with the issue of gaining access to teachers, their schools, and their classrooms. It addresses the issue of access – as entry into the field – and different levels of access. It also examines the role of principals as key gatekeepers.

**Background to the study**

Most school-based research projects conducted in KwaZulu-Natal have to be approved by the KwaZulu-Natal Department of Education. The research initiative must be seen to be beneficial to the education system as a whole. My approach to gaining access was somewhat different to the standard protocol. My initial contact with principals of schools occurred at the University of Natal Faculty of Education annual ‘Principals’ Day’ workshop in mid-2002. At this meeting, there was an overwhelming request from principals for workshops to assist Economic and Management Sciences (EMS) teachers in primary schools. This was followed by the exchange of exploratory ideas for teacher development in the field of EMS. Thus was the first seed of the TEMS teacher development project sown.

The background to the principals’ request was the new Revised National Curriculum Statement for grades R-9 (Schools) policy that made provision for the inclusion of EMS in the senior phase in the General Education and Training (GET) band. The previous primary school curriculum had not included any commerce-related subjects. Teachers in the senior phase now found themselves in the position of being required to ‘re-skill’ themselves and to develop the EMS curriculum for implementation with little or no help from the Education Department.

The introduction of EMS in the primary school had thus created a demand for EMS INSET in South Africa. As the local subject specialist lecturer in this field, I decided to meet this need, and the (TEMS) teacher development project was officially born and baptised towards the end of 2002. The research arm of TEMS was conceived currently with the development project.

In September 2002, the Commerce Education Curriculum Development team of the former University of Natal held a daylong Economic and Management Sciences workshop for teachers of EMS. This workshop was successfully conducted on a
Saturday, with twenty-two teachers attending. The programme for the day included a slot that outlined the initial ideas of the TEMS project. During this session I learnt that teachers in the Pinetown/ Shallcross/ Mariannhill areas had in fact already organised a structure (a cell group) where teachers in the different learning areas met regularly to discuss a whole range of curriculum issues and to share ideas and resources. A cell group for EMS had been recently formed. The coordinator highlighted some of the difficulties that the group was experiencing. EMS teachers needed help, as they were uncertain of the expectations of the learning area. Of significance was that this ‘community of practice’ was a structure that had been conceived and initiated by a dedicated group of teachers eager to support each other in the absence of support from the Department of Education. This presented an excellent research opportunity to study the nature of teacher learning in this context at the same time as being able to make a professional contribution to the work of this group. Opportunity sampling is the process of seizing the chances of a setting or respondent when the opportunity arises. Honesty and reflexivity is crucial in sampling, and that it is important to document how the sampling had taken place, and the effect on the data collected. A sensitive discussion of how a snowballed sample responded to certain questions is more important than anxiety about whether it represents the population Delamont (2002).

Although the work of Etienne Wenger on communities of practice (Wenger 1998) is central to this study, an in-depth discussion of the theoretical underpinning and thrust of the research is beyond the scope of this paper and will therefore not be pursued here. It is however important to clarify the use of the construct ‘communities of practice’. Wenger (1998) notes that people are constantly engaged in the pursuit of various enterprises. In defining and pursuing these enterprises, people interact with each other and the world and constantly refine their interactions with each other. This is how people ‘learn’ (ibid.). This sustained collective learning results in practices that become the ‘property’ of a kind of community created over time, by the “sustained pursuit of a shared enterprise” (ibid.,45). These kinds of communities are called communities of practice. Participation implies that for individuals, learning is an issue of engaging in and contributing to the practices of their communities.

In the discussion that follows I refer briefly to the qualitative nature of the research study because this is what invokes the importance of access to teacher learning and its translation into teacher practice in the context of radical curriculum change.

**Research methodology**

This research study adopted the tenets of qualitative research methodology. The issue of context is particularly important in South Africa, a country with complex social, economic and political peculiarities. Contextual factors have a particularly compelling diversity and power in South African schools. It was felt that a qualitative approach would be effective in capturing the process and developing a rich understanding of contextual factors (Walford, 2001, Anderson 1999). The study set out to explore phenomena in their natural settings. It used various methods to interpret, understand, explain and bring meaning to these phenomena. Critical elements of case study research
and ethnography were employed in the data collection process. The role of the researcher was central to this study, acting as the primary instrument for data collection and analysis. The choice of methods and instruments was informed by symbolic interactionist theory. Data collection methods included a researcher’s reflective journal, teacher interviews, classroom observations and field-notes over a seventeen-month period. Initial interviews were used to capture baseline information, including reasons for participation in the study, while the second interview entailed a mid-term review. The final interview would provide a summative view of teachers’ experiences.

The empirical field for this research study was the TEMS teacher development project, a teacher learning community. The TEMS grouping comprised approximately twenty teachers some of whom drifted in and out of the project. A core group of seven teachers were active participants in the research project. Of the original group of ten committed participants, three had dropped out of the research project for various reasons such as work pressures and personal commitments.

Gaining access to the schools

Gaining access to teachers’ lives and work has to be built on trust and mutual respect, and this I strove to achieve by developing a mutually satisfying relationship with each one of them. This proved to be crucial when it came to gaining access to teachers’ classrooms. “The principle of informed consent is a standard feature of ethical procedure in social research” Homan (2002, 24). Participants must be informed about the nature of the research, and need to be clear that participation is voluntary. Homan (ibid.) asserts that in educational research, these ethical principles are widely compromised. In this research study, I was careful to accord utmost respect to teachers and was mindful of violating their rights as participants in this teacher development project.

All of the participating teachers had been teaching for more than five years, with the two most senior teachers having taught for twenty-two and twenty-six years respectively. As these teachers had not had anyone observe them teach in more than two decades, it was understandable that they should find the prospect a threatening one. At least two teachers expressed reluctance to have their lessons observed. Delamont (2002,141) states, “… it is hard to recognise that as a researcher one is a nuisance (at best) and that many people … may actively resent, fear or resist one’s presence.” Negotiations around teachers’ anxieties are discussed presently.

In ethnography, the term gatekeeper is referred to as the person who is able to grant access to the research site. Once I had gained initial acceptance by the participating teachers, gaining access to the schools became an easier task. The principals of all five participating schools, having received positive feedback about the initial EMS workshop, were very receptive of me and were keen to learn more about the project.

Educational researchers must learn to ‘sell’ themselves and their research more effectively (Walford, 2001). To do this, a researcher needs to be clear about how the
research project can be ‘sold’ to those who can grant access, which means clarifying the process of research and the potential benefits to those granting access. The researcher must use the initial interview to quell any doubts that the principal may have about the research (Walford, 2001). Issues of confidentiality and anonymity must be discussed.

It is important to plan how one presents oneself at access meetings. It is crucial to make a good first impression with gatekeepers. Attention needs to be paid to dress and hairstyle and to what personal information one gives out (Delamont, 2002). I made a point of being formally dressed with a collared shirt. This proved to be important, as the principals in the participating schools were always formally dressed, presenting official and businesslike impressions and dispositions at the initial meetings. My introduction to the principal of Eden Primary School was a critical point in the project. At this meeting, this school was identified and agreed upon as the permanent base for the project. The principals of all participating schools were keen to be viewed as actively supporting their teachers’ professional development. They mentioned that if the research project were to be of benefit to the teachers and the pupils, then they would support and allow the research study to take place at their schools even though I had not acquired official permission from the Department of Education.

Careful thought must be given to how to interest school principals in the research (Walford, 2001). In preparation for the interview with a principal, it is important to work out what one wants to say and to also anticipate what the school principal might ask or want to say. Principals definitely like to talk. When an appointment is made by telephone, they are often careful to explain how busy they are and how little time they have to spare but, once in the office, all the principals I met seemed to have far more time than expected. Supposedly ‘busy’ principals were very keen to engage with me on a range of issues, from reminiscing about their early days as teachers, to their own current studies and community involvement, to detailed episodes of the incompetence of the Department of Education. It is not inconceivable that researchers could develop a feeling amongst schools and teachers that they should be privileged to take part in the study. If the researcher has generated a desire to take part in the research, it may be possible to use the ‘scarcity’ tactic by indicating to research participants that they had been especially selected to join a limited number of schools to take part in the project (Walford, 2001). All principals in this study appeared to be acutely aware of the need to be seen to be ‘progressive’ and supportive of their teachers’ professional development.

My regular visits to each school often necessitated a fifteen to twenty minute ‘compulsory’ chat with the principal before I could get to the teachers. It became necessary for me to factor this ritual into my planning. In my interactions with principals, it became increasingly clear that my continued access to teachers and their classrooms depended on my maintaining cordial relationships with the principals of the schools. Establishing and maintaining rapport with key gatekeepers was crucial to the success of the research study. As a researcher and strategist, I soon learnt how to identify issues that principals enjoyed conversing about and used this to good advantage as and when the need arose.
About reciprocal relationships

Asking people to volunteer as participants raises major ethical problems (Anderson, 1999). People most likely to volunteer tend to be the more powerless in society. Individuals may feel obligated to participate because of peer pressure, or may volunteer with the expectation that they may be ‘helped’ in some way. In developing the relationships with principals and schools, I was mindful of the need to develop reciprocal relationships. Lather (1986) explains reciprocity as a process of give and take. It is a process that will ensure that the goals and outcomes of the research process will meet the needs and interests of both the researcher and the research participants (Graven, 2002).

The principal of Eden Primary, the base for the project, received personal recognition and recognition for his school by having all project correspondence such as invitations and workshop notices printed on his school’s letterhead, with him as co-signatory.

The lengthy timeframe of this project required a sustained cordial relationship with teachers and principals. Access is not negotiated once, and settled. It is a process, not a simple decision (Delamont, 2002). Four of the five schools participating in the project were schools with developing libraries. Another way of reciprocating was to secure the donation of three hundred library books to each school. This gesture further strengthened my relationship with the principals, the participating teachers and other powerful teachers at the school. During the course of the data collection period, I was invited to several school functions, introduced to members of the schools’ governing bodies, and subtly requested to support the schools’ fundraising programmes through the purchase of various concert and raffle tickets. I had to be strategic and selective in deciding how to respond to such overtures. I learnt that as a fieldworker one has to devise gentle, tactful ways of communicating one’s inability to accede to certain requests.

As stated earlier, the success of this study hinged on developing strong reciprocal relationships with the research participants (teachers). If researchers cannot find convincing benefits for participants in a research study, then the study ought not to be conducted (Walford, 2001). The direct benefit of this study to teachers was of course my role as co-ordinator of the TEMS project that enabled me to make a professional contribution to teachers’ learning. My professional input took the form of workshop presentations on a range of subject content topics, making available resource material, and the collection and dissemination of material developed at workshops. Research participants regularly requested individual assistance at their school sites and often sought telephonic clarity on EMS issues they were unclear about. I seized these opportunities to cement relationships with teachers and schools.

Dealing with blockages

If the principal is of the opinion that teachers stand to gain professionally from research activity, then they expect teachers to participate in the research project. Teachers’ rights to decline are compromised by the power relation between themselves and the principal.
The principle of informed consent constitutes four elements. Firstly, all pertinent aspects of what is to occur and what might occur are disclosed to the participant. Secondly, participants should be able to comprehend this information. Thirdly, participants should be competent to make a mature and rational judgement. Finally, the agreement to participate should be voluntary, free from coercion and undue influence (Homan, 2002, Cohen & Manion, 1997). Anderson (1999) posits two further elements, namely, that participants should be made aware of the foreseeable risks as well benefits that may accrue to them. In this study, I made a concerted effort to provide full disclosure of the role that the research participants would play in the research process. This was done both verbally and in a detailed letter to the participants. While it was easy for me to identify the benefits that teachers could derive from participating in the project and convince them thereof, understanding the risks that teachers would have exposed themselves to was a lot more complex, as will be seen in the discussion that follows.

In developing relationships with teachers and principals, I had to be mindful of the power relations that existed between principals and their teachers. Walford (2001) warns that there is a need to be careful about the agendas of those who have power. It is far from unknown for principals to suggest that researchers observe certain teachers about whom they want information. The teacher may not be able to refuse a request, but the researcher should be very clear that observations and interviews are confidential and would not be fed back to the principal. The problem of feeding back information to the principal would compromise the research and lead to severe ethical problems.

Anderson (1999) warns that

Confidentiality involves a clear understanding between the researcher and participant concerning how the data provided will be used. Confidential information implies that the identity of the individual will remain anonymous … and that the reader of the research will not be able to deduce the identity of the individual (20).

Confidentiality is intended to reassure participants that they can reveal what they otherwise might not, in order to help the researcher to understand their perspectives more fully, and with particular sensitivity to their feelings.

It was clear that the principals of the participating schools had their own ‘agendas’. In three of the participating schools, the principals were eager to receive regular feedback on the progress of the project, and would often ask questions relating to the progress and development of the teachers. One of the principals initially requested a quarterly written report on the project. I had to diplomatically explain that such a report was not possible, as it would compromise my relationship with the research participants.

At this school, while the principal gave me free access to the school and teachers, some teachers were initially unwilling to allow me into their classes. While they were content to attend the workshops, they were uncomfortable to have me ‘sit in’ on their lessons. When the ‘rules’ originally negotiated do not turn out to be less stringent than expected, or more rigid and restrictive, access may still have to be negotiated (Delamont, 2002).
became apparent that the level of access was not what I initially thought I had secured, and that I needed to develop and strengthen my relationship with these teachers. Although I had been at pains to explain that the lesson observations were strictly for research purposes and that teachers’ anonymity, privacy and confidentiality would be respected, it was clear that I had to earn teachers’ trust and that I had to be mindful not to be overzealous in my attempts to observe teachers’ lessons. On several occasions these observer-shy participants’ appointments had to be rescheduled for a variety of reasons, which included personal commitments and plain failure to remember appointment dates and times. Delamont (2002) warns that a participant’s rescheduling of appointments may be a way of gently testing the researcher’s keenness to obtain the data. It was also clear that my research study was not on their list of priorities.

A break-through with this group of teachers came when I was requested to provide assistance in developing a term plan for teaching EMS at their school. I successfully facilitated a brainstorming session with these teachers in which a tentative EMS curriculum was framed. Teachers began to realise and understand that although I was engaged in a research project, I was also genuinely and sincerely interested in their development as EMS teachers. On one occasion, one of the research participants was particularly moved when I ‘sought her out’ to give her material she was desperately looking for. She remarked, “I can see that you are really into EMS … thanks for thinking of me.” This was a critical incident in our relationship as I felt that I had made a significant breakthrough with this research participant. Critical incidents of this nature have a common characteristic, which can be referred to as ‘genuine feelings’. Establishing rapport with participants is hard work (Delamont, 2002). Personal attributes or actions can work to ease the process. These actions certainly helped strengthen my relationships with the teachers and facilitated access into schools and classrooms.

While the work of international researchers is useful in analysing challenges of gaining access, its usefulness in analysing contexts peculiarly characteristic of South Africa is somewhat limited. South African schools are diverse in terms infrastructure, financial resources, teaching personnel, pupils and geographical dispersion. Delamont (2002) does, however, note that there is always a … structural tension between teachers and researchers, and additional problems may occur when there are differences of race, religion, gender … or political views… (149).

I initially experienced some difficulty in establishing rapport with the Black African teachers in the study. This was attributed to the fact that I was a non-Isizulu speaking Indian male, conducting research in a semi-rural Black African school in KwaZulu-Natal. The fact that I did not speak the mother tongue of both the teachers at this school certainly affected rapport and access. In discussions, teachers would sometimes switch into isiZulu to clarify an issue between them, and then turn to me with a suggestion. This was particularly apparent when I was negotiating times for appointments and observations, and when they wished to lobby ideas in a way that excluded me. On other occasions they deferred to my lack of understanding of isiZulu, and deliberately spoke English in my presence. It became evident that while the official medium of instruction
was English, most teaching took place in isiZulu, including normal conversations between teachers. Gaining access to the finer nuances of teachers’ conversations and lessons certainly presented a challenge to the endeavour to obtain quality data.

School secretaries are well worth being good to. They are able to help or halt the research approach according to how they are dealt with (Walford, 2001). Establishing a cordial relationship with the secretary of the base school was crucial. I was particularly conscious of the need to be polite, courteous and patient when dealing with this school secretary. This proved to be significant. In the absence of the school principal, the school secretary appeared to be the second tier of authority, and often acted as a conduit of information between me and the teachers or the principal. She also willingly took on the responsibility of administrative aspects of the project. The exercise of power does not always correspond with the formal hierarchy of office.

**Exiting the field –terminating fieldwork**

While there may be no ideal or normal length of time to be in any field setting, it is important to stay long enough to appreciate the ‘historical rhythm’ of the institution one is studying (Delamont, 2002). In this research study, I spent seventeen months in the research field gathering data. Researchers could decide to stop collecting data when they have exhausted their resources, and when they have spoken with the ‘necessary’ people, and have recorded sufficient data to complete the study (Anderson 1999). When a researcher has saturated her categories and is receiving only peripheral fragments of new information, or when regularities have emerged, that is, when the researcher begins to observe consistency or regularity in her themes, categories or constructs, then it is time to terminate the fieldwork.

Finance is nearly always a major constraint that necessitates some compromise to be made between what the researcher would ideally wish to do, and what is possible (Walford, 2001). Time is a fundamental constraint that also impinges on all research. This includes time in the field, time for analysis, and time for the development of theory and the writing and publication of research reports. In this study, financial resources determined the frequency of the TEMS workshops, materials development and duration of the fieldwork.

In a qualitative research study that entails long-term relationships between researcher and participants, exiting the field elegantly can be a challenging experience. There are few accounts of this process in the education literature, but the nature of what is an ethical dilemma is clear in a non-education participant observation study such as Schurink (1988). In building up an autobiographical sketch of a lesbian, the researcher built up an empathetic relationship with the subject. Abruptly terminating contact because the sketch was complete was not easy (ibid.). At the time of writing this paper, the TEMS research study was still in progress, and the delicacies of exiting the field had not yet been confronted. In framing the TEMS teacher development project, however, care had been taken to build into the process a system whereby research participants would ultimately take full control of the teacher development aspect of the project. The extent to which this
outcome will be achieved is cause for anxiety especially if, as is the case with most research, carefully designed research plans do not entirely work out as expected. The paucity of literature on the issue of exiting the field is certainly an area that requires address, especially in a situation in which participant dependency on the researcher may have developed.

**Conclusion**

In an era of radical curriculum transformation in South Africa, school based research is likely to increase significantly. The degree of access to a research site and its participants depends on a range of issues, which may include the participants’ perceptions of direct benefits of the study, the researcher’s ability to convince key gatekeepers of the merits of the study, and the researcher’s ability to ‘tune into’ an appropriate disposition. Researchers have to be mindful that access, once negotiated, is never settled. It has to be constantly re-negotiated and strengthened, and is often subject to individual interpretation and whim. Exiting the field once fieldwork is completed, presents challenges for both the researcher and the researched, and requires due attention. From a South African perspective, the diversity of the school education scenario makes gaining access a complex task that requires considered thought.

**References**


Do teacher upgrading programmes make a difference in teacher development in a rural context: A tracer study of NPDE graduates.

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Introduction
The National Professional Diploma in Education (NPDE) was conceptualized as a national intervention for upgrading under-qualified teachers within the schooling system of South Africa. This programme had been offered by higher education institutions in South Africa since 2002, and several thousand of graduates of this programme have been produced. While there have been evaluative studies by funders and employers (the major employer being the Department of Education) during the implementation of the programme (Ngidi, 2005; Volbrecht and Tisani, 2005), no impact analysis of the programme has been done on schooling and on the graduates of the NPDE. This paper reports on a tracer study of the NPDE graduates in a rural district of KwaZulu-Natal with a focus on exploring how the NPDE programme impacted on the lives as teachers. The tracer study found that the NPDE programme has made significant changes to their personal and professional lives in this rural context and this resonates with the intentions of the NPDE programme. The paper presents a context for the introduction of the NPDE in South Africa, a brief description of the qualification, followed by a presentation of the findings and associated analysis within a theoretical framework of change theory.

Contextualising the introduction of the National Professional Diploma in Education
We all know that the past South Africa education system was racially based and unequal and that our new democracy sought, amongst other values, social justice, equity and redress. These constitutional values are perhaps found in the preambles to almost every education policy document that you may have come across. How are these values expected to be realized within our society and in our education system?

In education, a body called The Committee on Teacher Education Policy (COTEP) was formed in late 1993 to inform the first democratically elected Minister of Education on issues of teacher education in the country. One of their aims was to do a situational analysis of education within the country. The result of this situational analysis – and which was translated into the National Teacher Education Audit (Department of Education, 1995) – was phenomenal. Two of the striking findings of this Audit suggested that there was, in general, an oversupply of teachers in the country. And secondly, almost one third of the teaching force was un- or under-qualified. The intervention that followed was a diversion of focus from producing new teachers in South Africa to developing quality amongst the existing teachers. This was evident in the closure of colleges of education, changes to the employment process of new teachers, a moratorium on employment of teachers, rationalization and redeployment of teachers and severance packages offered to teachers.
This refocus to the quality of educational provisioning was located within the constitutional changes of access, redress, quality and social justice, fueled by the Education for All (EFA) global agendas and world literacy studies wherein South Africa ranked amongst the lowest. Hence the quality of teaching and learning became the focus of attention.

One way of addressing the quality of teaching is to strive towards having a well qualified teaching force. Within this genre, the second aim of COTEP manifested itself (through reviews and refinements) in the Norms and Standards for Educators (Department of Education, 2000), a national legislative framework that guided the quality required of teachers. This framework, together with other legislations like the Educator Employment Act (Department of Education 1998) provided a guideline for improving the quality of teachers to be employed within the school education system. The Norms and Standards for Educators framed the competencies and roles and responsibilities expected of teachers, while the Educator Employment Act provided the benchmark indicating the minimum qualification a teacher needs in order to be regarded as a qualified teacher and therefore employed as such.

While these frameworks paved the way for training and employing of new teachers into the school education system, the inequalities of past apartheid system remained. Un- and under-qualified teachers formed almost one third of the teachers employed in public schools. Most notably, schools in provincial peripheries, informal settlements and rural area were largely the sites of prevailing inequalities plagued by poverty, high drop out and repetition rates, rising levels of HIV and AIDS and related illness, were the schools that had the most number of un- or under-qualified teachers (Volbrecht & Tisani, 2005). How were these un- and under-qualified teachers expected to achieve qualified teacher status as envisaged by the new legislation. The Norms and Standards for Educators framework was clearly inappropriate to address the needs of the experienced teachers because it would have meant that teacher would need to take up to four years of full-time study in order to achieve an initial qualification in teaching through a Bachelor of Education. An alternate route of qualifying un- and under-qualified teachers were then conceptualized. The National Professional Diploma in Education (NPDE) was conceptualized as this alternate route to qualifying practicing un- and under-qualified teachers.

The NPDE was thus conceptualized as a national mechanism to upgrade the one third teachers that were un- or under-qualified to a qualified teacher status which was pegged at Relative Equivalent Qualification Value (REQV) 13 as per the Educator Employment Act of 1998 (Department of Education, 1998). The NPDE was initially designed and registered as a formal qualification within the National Qualification Framework (NQF) for upgrading teachers that were under-qualified. This qualification was offered initially to targeted teachers first as a pilot project and then through a national intervention as a collaborative effort between the Education Labour Relations Council (ELRC), Department of Education and higher education institutions.
The NPDE programme

The NPDE programme is a 240 credit points programme registered on the NQF at level five. It is an upgrading programme targeting practising under-qualified teachers who have teaching experience and at least two years full time studies in education (e.g. a two year primary teachers certificate) after either completing standard 8 (grade 10) or matric (grade 12). The purposes of the programme include upgrading under-qualified teachers to a qualified teacher status (being at Relative Equivalent Qualification Value of 13) as per the Educators Employment Act of 1998 (Department of Education, 1998); providing access into qualifications registered on the new National Qualifications Framework as declared in the Norms and Standards for Educators (Department of Education, 2000); and developing caring and competent educators to respond to the new school curriculum and to perform the roles and responsibilities as indicated in the Norms and Standards for Educators.

The programme is also designed to recognize the experiential knowledge gained by the experienced teachers. Through its recognition of prior learning (RPL), teachers are awarded 120 credit points towards the NPDE upon registration. The RPL is based on credit transfer from a previously acquired teaching certificate as well as an appraisal of their competence either through a portfolio assessment or through integrated assessment of workplace practice or both. Hence, the under-qualified teachers are expected to engage with the qualification programme over a two year part-time study through a mixed mode delivery requiring materials-based learning and contact engagement with lecturers and tutors.

The NPDE programme targeted teachers within the General Education and Training (GET) phase (i.e. teachers from grade 0 to grade 9). Within the GET, three phases exists. They are the foundation phase (grade 0 to grade 3), intermediate phase (grade 4 to grade 6) and senior phase (grade 7 to 9). The NPDE programme was structured according to these phases as each of these phases required different school curriculum content. Based on the phases that the under-qualified teachers taught in schools, they were enrolled into the respective phases of the NPDE programme. This was done to provide appropriate and relevant training and development for the teachers being upgraded through the NPDE programme.

The NPDE programme was structured to include developing competence in generic understanding of teacher education and development, developing and understanding of the new education system and the profession, subject content knowledge, teaching and learning methods, assessment and the ability to respond to the diversity and changing context of teaching and learning within South Africa. While these expected competences of the NPDE resonate with the competences expected of newly qualified teachers through a Bachelor of Education (four year full-time study), it must be stressed that it (NPDE) was an interim qualification designed as an alternative route to qualifying under-qualified practicing teachers. The NPDE is not meant to produce new teachers.
Tracer study methodology
A tracer study methodology was used in this study. This was the most appropriate methodology as a tracer study usually follows completers of particular programmes (e.g. the NPDE programme) to examine subsequent careers and employment. Some are concerned with comparing the success of particular programmes (evaluation) while others are used for information gathering to ascertain, inter alia, whether participants in a particular programme obtain employment after training, the nature of employment obtained, how quickly they find employment, and labour market performance. (Psacharopoulos & Woodhall, 1986; Ziderman & Horn, 1993).

Tracer studies attempt to identify major trends. They begin with one path, follow individuals in that path to their destinations and estimate how frequently individuals end up in each of these destinations (Zederman & Horn, 1993:3-4). These studies attempt to provide information, in many cases, to policymakers which ultimately impacts (rightly or wrongly) on decisions to expand or contract/curtail major training programmes.

Hence tracer study was the most appropriate methodology to get a sense of the success of NPDE as a national intervention programme to contribute to the quality of school education.

Due to the limited scope of this study, the sample was purposively drawn from Masinga, a rural region of KwaZulu-Natal. All graduates of the NPDE programme (irrespective of the higher education institution they graduated from) in Masinga were targeted. Data collection involved the use of questionnaires completed by the NPDE graduate. Forty questionnaires were sent out to all schools in Masinga. Thirty two of these questionnaires were completed and returned, giving this data collection an 80% response rate. This response rate is unusually high within tracer studies. One of the major limitations of tracer studies is its response rates. The time lapse between the observed event in the tracer study and time of data collection negatively correlates with the response rate (Ramrathan, 1998, Ramrathan, 2005). The high rate of return in this study is perhaps due to the short time between students completing their NPDE programme and the data collection, yet further evidence to support the negative correlation between the time lapse since the event and the response rate in data collection.

In addition to the administering of questionnaires to graduates, a random sample of 10 NPDE graduates in this (Masinga) region were telephonically interviewed for two reasons, viz. (i) to get a deeper insights into some of the most common responses noted in the questionnaire analysis, and (ii) to verify the fidelity of the data.

The data presented through this methodology is self reported data by the graduates. The scope of the study did not allow for further triangulation of data from other sources like the school managers and fellow teachers.

Change theory and its rationale for exploring the impact of NPDE on teachers lives
This study sought to explore the impact of the NPDE programme on teachers’ personal and professional lives. Recalling that the intentions of the NPDE programme was to
change the qualification status of under-qualified teachers within a changing education system in a transforming country, and by doing this, it was hoped that the quality of teaching would improve. Through the NPDE programme, teachers were expected to engage with the transformational changes of the education system as well as improve their classroom practices. Hence, in order to track these changes within teachers, it was deemed most appropriate to view teacher change within a theoretical framework of change theories. In addition, the envisaged changes expected through the NPDE was transformational in nature and professional in practice. Change theories associated with transformation and professionalism were thus used to frame our thinking.

Scharmer’s “Theory of the U” (as cited in Rome, 2004) expresses change of a transformational nature in three stages of development which takes the form of a “U” skeleton (therefore the name “U” theory). While the “U” is a simple visual of the course of change envisaged within this model, the process of change within the “U” process is grounded within the complex inner state of the decision maker – hence the deeper downwards movement (called sensing) followed by a change in direction (called presencing) to an upward movement to something that is concretely realized (called realizing). The deep downwards movement (sensing) attempts to challenge and remake the identity of the change agent through a process of deep observation (sensing) through what Varela (as cited in Rome, 2004) calls “suspending”, “redirecting” and “letting go”, where suspending refers to the ability to pause one’s habitual flow of ideation and mental models built up in the past; redirecting refers to the ability to see from the whole to the part; while letting go refers to the capacity to surrender our perceived need to control.

The change in direction from the downward movement of the “U” to a new way of thinking/acting (or paradigm shift) is called the “presencing”. It is in this stage that the individual sense of who they are alters with who they ought to be and begin to experiment with this new being. This process of experimenting and refinement manifest itself at the end point of the “U” when innovation is internalized (or institutionalized).

This theoretical framework is useful to understand the changes experienced by the NPDE graduates because of the transformational nature of change expected of under-qualified teachers through this process. The NPDE was, in part, meant to introduce the practicing under-qualified teachers to a new paradigm of school curriculum that was introduced into the schooling system in order to transform it. These under-qualified teachers were expected to suspend their deeply entrenched practices, understand the new paradigm in teaching and their roles within this new system of education and then to actually teach in this new context with teaching methods and assessment appropriate to the new way of thinking about education. A process to enable this is usually a longer term engagement which the NPDE provided. And when they emerge from this NPDE programme, they would attain qualified teacher status certified as achieving the intended outcome of the NPDE programme relevant to the transformed school education system.

Findings
While the majority of graduates were level 1 teachers, amongst them were school managers (see Table 1). In this study almost one fifth of the graduates were school
managers, implying that our current schooling system have under-qualified managers who were expected to introduce transformation changes within their schools. What kinds of obstacles would these under-qualified managers experience in transforming their schools? And would their newly qualified teacher status make any difference to their roles as managers in a transforming school context?

Table 1: Employment ranks of NPDE graduates

<table>
<thead>
<tr>
<th>Rank</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>3</td>
</tr>
<tr>
<td>Deputy Principal</td>
<td>1</td>
</tr>
<tr>
<td>Head of Department</td>
<td>2</td>
</tr>
<tr>
<td>Level 1 teachers</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 2: Expectations from the NPDE programme

<table>
<thead>
<tr>
<th>Expectation</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement of their qualifications</td>
<td>28</td>
</tr>
<tr>
<td>To gain knowledge about changes in education</td>
<td>30</td>
</tr>
<tr>
<td>Improve teaching skills</td>
<td>25</td>
</tr>
<tr>
<td>More knowledge about teaching and learning</td>
<td>30</td>
</tr>
<tr>
<td>Obtaining higher salaries</td>
<td>17</td>
</tr>
</tbody>
</table>

Graduates were asked about their expectation in doing the NPDE programme. The programme was meant for and marketed as an upgrading qualification for under-qualified teachers to meet the needs of the new school education system. Hence it is not unexpected that their expectations would resonate with the programme’s objectives/intentions (see Table 2). In addition the graduates had largely positive feelings about the doing the NPDE programme.

Table 3: Personal gains by the NPDE graduates

<table>
<thead>
<tr>
<th>Personal gain</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>0</td>
</tr>
<tr>
<td>Promotion</td>
<td>13</td>
</tr>
<tr>
<td>Confidence in teaching</td>
<td>30</td>
</tr>
<tr>
<td>More status as a teacher</td>
<td>26</td>
</tr>
<tr>
<td>Recognition by peers (other teachers)</td>
<td>28</td>
</tr>
<tr>
<td>Recognition by your school managers</td>
<td>29</td>
</tr>
<tr>
<td>More knowledge about teaching and learning</td>
<td>31</td>
</tr>
<tr>
<td>More knowledge about the new education system</td>
<td>31</td>
</tr>
<tr>
<td>Better life style</td>
<td>18</td>
</tr>
</tbody>
</table>

Of significance here is that the personal gains by the graduates were largely in the professional domain of their lives (confidence in teaching, more subject knowledge, recognition by peers and managers) rather that on the personal lives (see Table 3). One teacher remarked during a telephonic interview, that she has now moved from the margins to the centre within her school – a feeling also described by other graduates.
expressed differently. This graduate (interviewee) indicated that while she was an under-qualified teacher, she did not participate in discussions and decision making due to fear of the kinds of contributions that she would be making and what her peers might think of her. But now, after completing the NPDE, she is confident and fully engaged in school matters, often taking leadership responsibilities.

Teacher confidence is another attribute graduates claim to have achieved through the NPDE programme. Several of the teachers interviewed indicated their feelings of doubt about their teaching as well as their fear of being appraised by their senior teachers in their schools prior to doing the NPDE. They are now more confident and able to engage with fellow teachers and learners at different levels, including being more confident of their teaching.

Table 4: Activities engaged in after completing the NPDE programme:

<table>
<thead>
<tr>
<th>Activity engage in:</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled for other programmes</td>
<td>17</td>
</tr>
<tr>
<td>Became active in teacher development in your school</td>
<td>21</td>
</tr>
<tr>
<td>Took leadership roles in your school</td>
<td>11</td>
</tr>
<tr>
<td>Taken on additional responsibilities at school</td>
<td>12</td>
</tr>
<tr>
<td>Nothing</td>
<td>0</td>
</tr>
</tbody>
</table>

A large number of graduates (17 out of the 32 graduates) enrolled in other programme, indicating a growing interest in their professional careers (see Table 4). One of the intentions of the NPDE upgrading programme was to afford under-qualified teachers access to higher studies. By enrolling in other programmes, like the Advanced Certificate in Education (ACE), student would be able to access mainstream academic studies in education (i.e. honours, masters and doctoral programmes in education) – an alternate access route to the higher level of study on the National Qualification Framework.

A higher number of graduates (21 out of the 32 graduates) became active in teacher development in their schools, signaling and triangulating their claim of being recognized by peers and managers in their schools for their competence and contribution.

In addition to laying claim of their recognition and contribution to teacher development in schools, all respondents agreed that all teachers should do the NPDE programme irrespective of their qualification status – an advocacy stance. Recognising the benefits of doing the NPDE programme, these graduates are now taking on an agency role of influencing other teachers to do the NPDE programme.

Table 5: Ratings on how the NPDE programme developed the graduates in their professional competence:

(1 = unable to tell; 2 = no development; 3 = some development; 4 = noticeable development; 5 = substantial development). The figures presented within the rating columns are a count of the number of respondents that rated themselves within each rating scale.
This self reported data suggests that the NPDE programme had made noticeable changes to their professional competence of being a teacher (see Table 5). This was further corroborated by the examples of different approaches to teaching and assessment the interviewees had used since commencing the NPDE programme. These include the making of and use of learning resources from their context rather than relying on and waiting for resources provided by the Department of Education, teaching methods using more exploratory processes rather than telling methods, and assessments that range from research activities to project work and portfolio development.

Table 6: The differences recorded in the graduates personal life outside of school as a result of doing the NPDE

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your engagement in the community</td>
<td>29</td>
</tr>
<tr>
<td>Your family life</td>
<td>30</td>
</tr>
<tr>
<td>Your interest/hobbies</td>
<td>29</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>4</td>
</tr>
</tbody>
</table>

While this category of analysis was not explored in any depth other than to record any changes to their lives outside of their professional lives as teachers, graduates have noted changes in their engagement with their community, their family life and their interest or hobbies (see Table 6). The reason for not exploring this category of analysis in any depth relates to both the scope of this study as well as difficulty in establishing how the NPDE programme would contribute to this change in the graduates’ personal lives outside their teaching career.

Conclusion and summary of analysis of the findings

Transformational change theory allowed us to conclude that the NPDE programme made a difference both in their professional and personal lives of the graduates in the Masinga area through the synthesis of the findings presented in the previous section of this paper. For example, the changes to the confidence levels of the graduates were remarkable and cannot happen without deep introspection, knowledge and practice by the teachers. The NPDE programme interrogated the under-qualified teacher past practice, provided opportunities and exposure to learn new content and pedagogical knowledge, and through integrated assessment strategies were able to put into practice these new learning with the
guidance and support of the lecturers, tutors and school based mentors. Through these extensive engagement over a period of two years, the graduates emerged confident in their teaching, their engagement in school, and their positive feelings about themselves – clearly transformational in nature. Table 7 presents a summary of the major changes experienced through the NPDE programme – most are transformational in nature.

**Table 7: What has changed in the graduates of the NPDE programme:**

<table>
<thead>
<tr>
<th>Change from</th>
<th>Change to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not being confident</td>
<td>Being confident</td>
</tr>
<tr>
<td>Being told</td>
<td>Telling</td>
</tr>
<tr>
<td>Externally driven</td>
<td>Self agency</td>
</tr>
<tr>
<td>Being on the margins</td>
<td>Becoming part of the central force</td>
</tr>
<tr>
<td>Teacher telling</td>
<td>Teacher exploring</td>
</tr>
<tr>
<td>Use of limited teaching methods</td>
<td>Exploring new teaching methods</td>
</tr>
<tr>
<td>Limited assessment strategies</td>
<td>Exploring different assessment strategies</td>
</tr>
<tr>
<td>Using no resources</td>
<td>Making and using resources developed from their context</td>
</tr>
</tbody>
</table>

**Bibliography**


Phenomenological research in ODL teacher education contexts: A South African experience

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Introduction

This paper aims to show that however ‘critically reflective’ one might consider oneself to be as an Open and Distance Learning (ODL) practitioner, there is always the potential to ‘see’ more – and that adopting a ‘phenomenological attitude’ and engaging in phenomenological research processes, is one way to do this. Speaking of how researchers make use of the phenomenological approach within, particularly, pedagogically orientated contexts, van Manen (1990:1-2) says that

when we raise questions, gather data, describe a phenomenon, and construct textual interpretations, we do so as researchers who stand in the world in a pedagogic way … pedagogy requires a phenomenological sensitivity to lived experience [that contributes] to one’s pedagogical thoughtfulness and tact.

How one might come to develop and own the phenomenological sensitivity of which van Manen speaks here, and the relevance of such a sensitivity for ODL contexts, form the focus of this paper.

The research on which this paper is based, works from the premise that in an ODL environment characterized by massification, change, conflicting interests and new market-driven imperatives, it is becoming increasingly easy to lose sight of students-as-people (and not mere ciphers and statistics). The paper draws on current Ph.D. research into students’ experience of the demands of a module (Reading and Writing Academic Texts (RWAT)), that specifically aims to develop students’ academic literacy competence. This module is a core, compulsory module in the mixed-mode Bachelor of Education Honours programme offered by the School of Education and Development at the University of Kwa-Zulu Natal, Pietermaritzburg, South Africa.

A phenomenological point of departure

While there is little scope in this paper to trace the history of phenomenology or to present the many forms of phenomenology that have arisen over the years, it is essentially the study of ‘essences’. As Merleau-Ponty (1962) says in his Preface to Phenomenology of Perception; “phenomenology ….puts essences back into existence, and does not expect to arrive at an understanding of man and the world from any starting
point other than that of their ‘facticity’. …It tries to give a direct description of our experience as it is”. It is, in other words, about going back ‘to the things themselves’.

There are many positions from which one can engage with phenomenology as both a philosophy and a research methodology - from the purely philosophical to the deeply interpretive, the latter most widely exemplified in the fields of psychology, education, nursing and anthropology. This study, contextualised as it is within an explicitly ‘applied’ discipline viz. teacher education, is orientated towards what van Manen (2002:np) terms a ‘Phenomenology of Practice’ i.e. it is characterized by a hermeneutic/ interpretive response, rather than, for example, an existential/ transcendental response. Thus the form of phenomenology which governs this study foregrounds ‘being-in-the-world’ - following Heidegger’s (1954) use of the term i.e. it emphasizes the “situatedness of human reality” (Walters, 1995:793), and all that that might imply. Ontologically, it admits to a reality that stands separate from consciousness, but that can only be ‘known’ through consciousness. It is thus, an approach that foregrounds self-reflexivity and self-knowing.

Methodologically, phenomenology is ‘discovery orientated’ i.e. it is concerned with revelation and disclosure – not explanation and prediction, with the particular and the ambiguous rather than with the replicable and the clearly defined i.e. one does not set out to prove an hypothesis. It also acknowledges the inevitability of the researcher’s subjective influence and does not seek to erase it, or to present ‘value-free’ claims about experience/ knowledge and so on. What it does do, however, is offer strategies for reducing the impact of this influence viz. through the processes of ‘reduction’ and ‘bracketing’ by which one attempts to render oneself as ‘noninfluential’ as possible during the process of research (Giorgi, 1985).

But to ‘do’ phenomenology requires much more than an intellectual grasp of the principles and concepts discussed above. Merleau-Ponty (1962:viii) says of phenomenology that it can be identified as “a manner or style of thinking” but that “the practice of phenomenology requires an experiential change in the phenomenological practitioner” (Priest, 1998:29), and because of this “cannot be wholly learned verbally and cannot be wholly learned second-hand or on authority” (ibid). To grow in and towards van Manen’s phenomenological sensitivity means finding a way to transform apparent abstractions into practice. And it really is only when one faces the demanding, confusing, illuminating process of trying to do so that the exactitude of phenomenology as both a philosophy and a methodology is experienced.

**From abstractions to the ‘real’**

In the remainder of this paper, and again because of constraints implicit in it, I selectively highlight two aspects of phenomenological research that relate directly to ‘practice’, in the hope that by demonstrating phenomenology-in-use, ODL readers’ interest will be piqued sufficiently for them to engage with the approach themselves.

The first aspect I wish to give attention to is how we ‘name’ the object of our reflections and/or research – the ‘it’ of our investigations. In phenomenological parlance, the ‘object’
of our reflections must of necessity be ‘a phenomenon’ and one that is ‘lived’, since phenomenology’s primary focus is on experience. Approaching an aspect of our practice (e.g. a ‘module’ or ‘course’ or ‘assignment’ etc.), and speaking about it in this way i.e. in a language quite different from our routinised descriptions of it, can work to subtly sharpen a lens of objectivity unexpectedly available despite an apparently overwhelming degree of ‘subjectivity’ embedded in the actual process of ‘uncovering’. From my own experience, the word ‘phenomenon’ has a ring of impartiality to it, an ‘unrelational’ potential as a term, that frees the mind from established perceptions of what it is one should be looking at, and how and why. Despite this phenomenologically legitimated space, however, it can be an extraordinarily difficult one to access. Let me give you an example.

I am intensely interested in knowing students’ ‘real’ experience of the Reading and Writing Academic Texts module, and the effect it has had on their post-graduate life. Broadly speaking then, that which is lived is central to this research. But what of ‘that which is lived’ constitutes the most relevant phenomenon in terms of my pursuit of a greater understanding of the impact of the RWAT module? As I struggled to get greater and greater clarity on what exactly the phenomenon under study should be, I engaged in more and more strenuous intellectual debate and questioning, pushing ‘reflective’ limits to an extraordinary level. What I needed to do was find a way to speak about the RWAT module in such a way that it could be ‘seen’ to be standing in its own space, despite its fundamentally non-autonomous nature. Doing this kind of intricate, multifaceted, illusive kind of thinking took time and energy, and was a far cry from my previous ‘reflective’ processes. As I pared away at the notion of ‘lived experience’, I uncovered a disconcertingly large tapestry of possibilities.

To start with, I could do no imagining beyond students’ lives, but constituting the phenomenon as ‘students’ lives’ rang shallow and inappropriate – and potentially a methodological nightmare. Which students? Where? Why them? What period of their lives? My doubts grew. But if ‘students’ lives’ was not the phenomenon, then what was? I then shifted my gaze to the purpose of the RWAT module, and its outcomes, and began to consider ‘the academic argument’ that we teach in the RWAT module (according to the model developed by the Sydney School of Systemic Functional Linguistics) as a possible phenomenon. If our main goal in the module is to teach this genre (in the very limited, formulaic way that we do), shouldn’t this be the ‘object’ of my enquiry? I drafted and re-drafted dozens of possible research questions but the words I needed to define a single, recognizable, researchable phenomenon eluded me. Coming to the point, therefore, when I could finally describe the phenomenon for this study as ‘RWAT as a lived module’, was a culmination of months of rigorous and disciplined thought, the full extent and rigour of which is possibly not conveyed here.

Finally, I was able to see that if we attempted to uncover the RWAT module as a lived module (as opposed to the module as thought about) we would be able to claim that “what we would learn about the module in this way could enable us to reach a far more profound insight into the module than we could ever have reached by thinking about it. Such an uncovering of the ‘lived module’ should make possible an insight which would
enable us to understand how it enhances the students’ powers: which would enable us to predict its effect on the students, which would enable us to develop it, to compare it to other modules, enhance its effectiveness etc. If we succeed then we will have shown that the ‘lived module’ is ‘more objective’ in Heidegger’s sense, than the module thought about” (Wait, 2004: personal correspondence).

**Eliciting ‘lived’ experience**

The second aspect on which I would like to focus is the phenomenological interview. As with all qualitative interviews, the “‘social relationship’, that is the conscious awareness of the intersubjective nature of the interviewing context, and existent or emerging power relations, is of critical importance” (Seidman, 1991:72). In the phenomenological interview, however, the researcher aims to provoke, through possibly only one or two governing questions and sporadic prompts and requests for clarification, a narrative-style response to the experience of the phenomenon under study. When asked to describe their experience of a phenomenon, an ideal phenomenological interviewee would then go onto describe, unselfconsciously and fluently, her/his experiences, inadvertently (because that is the nature of story telling) concretizing these descriptions in physical actions and behaviours. Such a goal in phenomenology works from the premise that normally what one expresses in speech is what one thinks. Merleau-Ponty (1968:126) puts it this way:

> But because he has experienced within himself the need to speak, the birth of speech as bubbling up at the bottom of his mute experience, the philosopher knows better than anyone that what is lived is lived-spoken, that, born at this depth, language is not a mask over being, but if one knows how to grasp it with all its roots and all its foliation – the most valuable witness to Being.

So the goal in phenomenological interviews, is to capture the experience of the phenomenon through that which is spontaneously and unwittingly given, rather than through a thoughtful, intellectualized response. Problems arise, however, when the language that would normally ‘bubble up at the bottom of his mute experience’, and which I take to be the mother tongue/primary language of a speaker, is not the language of the interview. When cultural, racial, social, economic and linguistic differences exist between a researcher and her/his participants (as is the case in this South African study), that ‘bubble of mute experience’ which the phenomenologist so badly wants to hear i.e. the ‘unedited’ lived-spoken, will inevitably take a more winding, self-conscious, uncertain, considered route to the surface. See Appendices A and B as examples of this. Both of these extracts are from one of the phenomenological interviews conducted in this study. In both these extracts it should become immediately apparent that I have not achieved the phenomenological interview goals outlined above. As much as I tried to diminish my ‘spoken input’, I found myself internally driven to fill the pauses Sipho left between and within his comments, simply to keep the interview moving, and I was not skilled enough to elicit any experience embedded in ‘the concrete’ of the RWAT module as ‘lived’ as he spoke about this aspect of the module. On the other hand, every so often,
one gets exactly what one was hoping for: not only evidence of understanding of the issue under discussion, but a voluntary transfer of meaning to another context, and ‘concretised’ in ‘real’ experience (See Appendix C: Interview with Thandi²).

But what should one do when one simply can’t seem to channel a participant into revealing experience in the way that one wants because ‘language’ intrudes? How does one validate irrelevant-to-the-phenomenon dialogue without jeopardizing the quality of the relationship between researcher and participant? What kinds of questions are ‘typically’ phenomenological, and which are not? What authentically can be understood to constitute ‘concrete’, ‘embodied’ experience of the phenomenon under study? And if there are so many questions needing to be asked of phenomenology-in-use, is it worth pursuing?

One option is clearly to jettison phenomenology and reorientate one’s research and pedagogy towards something simpler and more familiar. The other option is to say yes, we must go on, for several reasons. The first is that ODL teacher education is such a complex and contested enterprise, particularly in countries such as South Africa where there is a history of discrimination, educational inequity and social injustice, and so we should expect complexity when we research these contexts. The second reason resonates with the position taken at the very start of this paper in relation to the increasing impersonality of ODL teacher education programmes. Now, more than ever before, is the phenomenological sensitivity of which this paper speaks, so urgently needed, and grappling with the phenomenological process as described here can give rise to that. A final reason not to abandon the phenomenological approach when the going gets rough, is that the approach itself must continue to be challenged. Knowledge production is not a static enterprise and no established theories or ideologies, or their related research methodologies should be considered sacrosanct.

Conclusion

This paper has attempted to illustrate, through reference to personal experience, and data derived from phenomenological interviews, that hermeneutic phenomenology has much to contribute to ODL research and practice. Though the study on which this paper is based is far from over, and I would not yet make any claims to being an experienced phenomenologist, I do know that my research processes thus far have exercised a profound shift in my sense of ‘Being’ – both as an individual, and an ODL practitioner and researcher – and that I am close to acquiring the phenomenological sensitivity I believe so critical to the work we do. I also hope that by sharing this research experience with others in the field of ODL, that stimulating and challenging debates will emerge from it.

² A pseudonym

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References


APPENDIX A

[Int.= Interviewer; Res.= Respondent/ Participant.]

Extract 1 (Sipho)

Int Let’s talk about time in the RWAT module. To do what -
Res What we’re supposed to do …
Int …all that we are trying to do.
Res No, we needed at least maybe two terms.
Int Ok, ok.
Res Yes, two terms, yes. Because we couldn’t finish – do all this, but these were good actually.
Int Were they?
Res Yes, they were very good because we had time when we had to prepare for the exams. It’s only that sometimes we are low. So even if you can read then you find that I can’t get through and then you can’t phone now and again for each and every problem!
Int But now in terms of time, how could we – I know you said two semesters, how – what would be for you the best model for learning this stuff?
Res Ok, I can’t say, it’s only that this text, to me it looks like these are the examples, isn’t it?
Int Mmm.
Res So maybe having more examples sometimes looks like it’s work that you have to read, you have to do, and all that. So it adds on what you are expected to do.
Int Ok …
Res I don’t know whether maybe I make myself clear, but having more …
Int No, you make yourself very clear …
Res … more examples …
Int It means more reading?
Res That meant more reading for us.
Int And the more reading there is the more difficult it is to get through?
Sometimes confusing, yes, yes, because we have to relate – we had to relate this, but it is help, when you look at it later that, ok, when you are looking then, then you look at this, then you look at that, then you get through it. But I think you need experience, if you are a first-timer student then you have difficulty.

And everybody is a first-timer when they do RWAT!
APPENDIX B

Extract 2 (Sipho)

Int Ok. You said just now that it was difficult when I mentioned the political project. Are you able now to explain to me what Johnson\(^3\) meant when he said that the genre approach could be understood as a political project?

Res Well, the way he explained political – that is political er, in pedagogic. But it becomes difficult for me to get close to grasp it.

Int Because it – because it – all right, let’s try undo that one. Why was it so difficult for you, do you think? Because remember you are one of the top students.

Res What can I say – what can I say. I’m not sure what – but what I’ve realised is that whilst she was focusing on the pedagogy, that we – according to us, the language should is a school thing, …

Int Us being teachers?

Res Yes, is a school thing while maybe he also talked about adults – he did also mention about adults and all that, which also – which also has to do with the politically, trying some redresses and all that, redresses and all that, all those things.

Int But that’s still not very clear, even now, or is it clearer for you now, what we mean by – let’s change the words for that. Let’s just say that teaching writing is a – should be understood as a political project.

Res Yes.

Int How would you understand that if I said that? Don’t worry about Johnson?

Res Yes, I think it’s …

Int Why? Why “political”?

Res If you say teaching ….. can you rephrase that again?

Int Teaching writing in schools should be understood by educators as a political project.

Res So the argument is as a political …

Int I want to know what you make – what sense you make of what I’ve just said?

Res Mmm, I think maybe it should – it had to do with the politic – politic being involved, or maybe being taking part in as far as maybe directing – I don’t know …

Int So that’s still – the way I'm using that in English, is that proving a barrier for you?

Res: It doesn’t prove a barrier but it take the politic above the education so that it is politic then education.

Int: And is that a good or a bad thing?

Res: Well in reality it is something that is taking place, but sometimes you don’t want to look at it as a top-down approach all the time. Because it leaves us not having alternative -

Int: Mmm, mmm

Res: … on the ground, because you always think that things will come from above.

Int: You mean that’s …

Res: Because of the polity who have got powers.

Int: Ok, from our history, you mean?

Res: Yes, from our history.
APPENDIX C

Extract 3 (Thandi)

Int. So, your experience of RWAT? How did it relate to your personal sense of power? Was there a relationship at all? Did RWAT do anything for you?
Res. Yes, it did.
Int. Along those lines?
Res. Along those lines of power, yes. and it has made me to read more.
Int. Really?
Res. Ja, I’ve started reading – I wasn’t interesting in reading that much. Though maybe I like inspirational books, so – but it gives me that power because I could relate to social issues very well. So I would feel in some cases I am powerful with the other people, because of the information that I have.
Int. Why do you think you’re reading more though?
Res. Self empowerment, I would say, I’ve been through a lot in my social life. My self-esteem has been very very very down. So I wanted something to boost me.
Int. And how did RWAT …
Res. For the fact that now – for the fact that I can argue.
Int. OK.
Res. Really, it’s an achievement for me.
Int. So you really did come to grips with …
Res. Yes, I did …
Int. … trying to argue this stuff?
Res. Yes.
Int. Goodness, that’s really interesting. It really is. I think you’ve stated that the most – the most articulate way that I’ve heard of that being a consequence of this experience.
Res. Ja, …
Int. So to go back to how it means that you have learnt to argue, what does that mean in reality for you? You’ve learnt – we taught you how to write a very recipe-like – and you can argue, um, you say that it has actually taught you much more than that. It’s taught you about – what are the bits that match?
Res. Er – I’ll refer again to our SADTU\textsuperscript{4} meetings, when you got there they have three cards, yellow card, green card and a red card. The green card you raise when you want to make a point, yellow card if you want clarity, and the red card if

\textsuperscript{4} SADTU: South African Democratic Teachers’ Union

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somebody is saying something out of order. So you will just raise up your hand and say something, and just see that red card and it means, my goodness, or I'm not speaking on what – on anything that is relevant to what is being said now. So that issue of cohesion – it came up so it helped me a lot, because you’d say, ok, we’re talking about this point now. So I will go further to that one, because it doesn’t link to what is being discussed at the moment.

Int. Ok! Oh, that’s fantastic! So well explained, thank you.
SELECTED MORPHOLOGICAL AND LIFESTYLE PROFILES OF A COHORT OF SOUTH AFRICAN UNIVERSITY STUDENTS

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1. ABSTRACT

Context: Lifestyle factors such as cigarette smoking, drinking of alcohol beverages and poor dietary habits are inextricably linked to overweight and obesity. Overweight and obesity among students is an area of concern. Little is known about trends in smoking, drinking and dietary habits of university students.

Aim: To investigate the patterns of overweight, obesity and selected lifestyle habits among sport science students compared to the general student population.

Design: Self-administered survey using a questionnaire based on the American College of Sport Medicine’s questionnaire. Height and mass measurements were taken and waist and hip circumferences were measured. Body Mass Index (BMI) was calculated using height and mass.

Setting: Faculty of Education, Pinetown.

Subjects: A total of 259 students, made up of 116 sport science students (63 female and 53 male) and 143 (86 female and 57 male) from the general student group. Students were aged between 17-31 years, (mean age: males = 22.2 years and females = 20.9 years), and a mean height and weight of 1.8m and 72.7kg respectively for male students and a mean height and weight of 1.6m and 62 kg respectively for female students.

Main Outcome measures: Height, weight, waist and hip measurements were recorded. Self-reports of cigarette smoking, dietary habits, use of cellular phone, stress factors and physical activity patterns in the past 30 days, preceding the survey were recorded.

Results: Anthropometrical data showed a healthy range for all students. Sport science students showed a mean BMI of 23.2kg/m² and a waist-to-hip ratio of 0.77, and general students recorded a mean BMI of 23kg/m² and a waist-to-hip ratio of 0.76. Eight percent of sport science students and 7% of general students started smoking before the age of 15. Sixteen percent of sport science and 11% of the general student had their first cigarette after 18 years of age, by which time most were already at university. Eight percent of the total students quit smoking at age 18 and over. Generally most students reported poor dietary habits. Only 21% of the total students had breakfast regularly. Students generally experience more stress at campus than at home and the main reasons for being stressed are workload, including assignments, tests and examinations. There...
was no statistical difference in physical activity levels of sport science students and the general student body. Both groups were low.

Conclusions: Physical activity levels for most students do not meet the minimum guidelines. Responses from the health and physical activity questionnaire reflect undesirable lifestyle habits. Interventions should seek to increase physical activity levels and bring about desirable lifestyle habits. Further, there is no significant difference between the lifestyle of and physical activity levels between sport science and the general population group.

Key Words: physical activity, university students, lifestyle patterns, obesity, body mass index.

2. INTRODUCTION

The prevalence of overweight and obesity is increasing worldwide at an alarming rate in both under- and developed countries. Environmental and behavioral changes brought about by economic development, modernization and urbanization have been linked to the rise in global obesity. Body weight is a function of energy balance over an extended period of time. Positive energy balance over weeks and months results in weight gain, whereas negative energy balance has the opposite effect. The increase in the prevalence of overweight and obesity cases worldwide is occurring against a background of a progressive reduction in the energy expended for work and occupational activities as well as for the accomplishment of personal chores and daily necessities. The increase of the last decades in the prevalence of overweight and obesity is thought to result from the following circumstances (Bouchard & Blair, 1999):

- A large proportion of the population is consuming more calories than individuals of past generations with no change in habitual daily energy expenditure.
- For a large number of people, there is an abnormally low daily energy expenditure for a normal caloric intake.
- For others, caloric intake per capita is actually lower than expected in comparison with previous generations but daily energy expenditure is, on the average, lower.

The prevalence of obesity is extremely high in women in South Africa, and is rising especially among those living in adjacent countries, such as in Botswana, Namibia, and Zimbabwe (Walker, Adam, & Walker, 2001). In South Africa, a study by Puoane et al., (2002), showed that 29.2 % of men were overweight or obese and 9.2 % had abdominal obesity, whereas 56.6 % of women were overweight or obese and 42 % had abdominal obesity. It was found that obesity increased with age and higher levels of obesity were found in urban African women.

The main purpose of the study is to ascertain the levels of overweight and obesity among a selected student population in KwaZulu Natal. Furthermore certain lifestyle characteristics were surveyed in an attempt to develop a risk profile of the general student
body compared to sport science students. It was assumed that sport science students would have better profiles.

3. METHODOLOGY

The research participants in this study were undergraduate teacher education students drawn from different year cohorts in the Faculty of Education from the selected university. Ethical clearance was obtained from the university to conduct the research.

The recruitment and selection of subjects were undertaken in the following way:

- A letter was written to the Head of School for Social Science Education informing her of the nature of the study. Permission was subsequently granted.
- Students from the sports science groups were recruited to participate in the study.
- Students from the general student population were recruited by posting notices on notice boards at various parts of the university.

All subjects read and signed the informed consent document indicating their understanding of the test protocol. A total of 259 subjects responded to the call for volunteers to participate in the study, of which 143 were from the general student population and 116 were from the sport science group. The criteria for selection confirmed that the students were bona fide students at the University and that all the subjects had agreed to participate in the testing procedure.

Testing procedures were carried out at the sport science complex and students union. All tests were standardized and all equipment was calibrated before tests were performed. The researchers ensured that the test procedures and administration were alike throughout the testing, to promote validity and reliability. The same measuring instruments were used throughout the testing programme.

A health and physical activity questionnaire was also completed by all the subjects, which consisted of 4 sections, namely, demographic data, physical activity pattern, smoking and drinking habits, dietary and selected lifestyle profiles. Height, mass, hip and waist measurements were taken by the authors. Body Mass Index (BMI) and Waist-to-Hip Ratios (WHR) were calculated, using standardised formulas. The physical activity profile required subjects to respond to frequency, duration and type of sport or physical activity participated in during and after campus hours. The section on smoking profile required subjects to respond to their cigarette smoking habits and drinking of alcohol beverages habit. The section on dietary profile required subjects to respond to their eating habits. The section on general lifestyle habits required subjects to respond to stress felt at home and on campus, personal safety, use of seatbelt and cellular phone usage.

Statistical analysis was undertaken by utilizing the Statistical Package for the Social Sciences (SPSS). Comparisons were made between the various year groups and between sport science and the general student group. Basic statistical modes such as means, standard deviations and frequencies were used to determine centrality of the data. T-tests
were employed to test the significance between groups. Chi Square was used to
determine if there were any significant differences between the two groups with respect
to their responses to the questionnaire. Percentages were calculated for certain data.

4. RESULTS AND DISCUSSION

The results and discussion will be presented under the following headings, namely,
morphological characteristics, physical activity profiles and lifestyle habits.

4.1 MORPHOLOGICAL CHARACTERISTICS

The results for morphology and anthropometry for the cohort showed significant
differences for height and weight only, at the 5% level. Sports science students are taller
(1.72m vs. 1.67m) and heavier (68.9kg. vs. 64.6kg.) than the general student group. Body
mass index scores show a healthy range for both groups, namely, sports science (mean,
23.22) and general students (mean, 23.02). This is pleasing because it represents a
desirable body weight among students. It was also pleasing to note that all the groups
presented with acceptable waist-to-hip ratios, which translates to no abdominal obesity
and lowered risk for chronic diseases.

A comparison across the gender line showed a significant difference (at the 5% level) for
age, height, weight and waist measurement. This represents a normal trend for this age
group, as males tend to be heavier and taller than females while female waist
measurements are smaller than males. Data from a study in the United States showed
similar results. In a study by Deusinger, (2005), of 764 college students (freshmen and
sophomore), he found that females showed a mean height of 1.63m, mean weight of
59.5kg, and body mass index of 22, and males showed a mean height of 1.78m, weight of
72.5kg and a body mass index of 23. These results concur with the current study.

The comparison between general and sport science year groups (first to fourth), show
little difference in terms of morphology and anthropometry. In fact, the only statistical
difference occurred in height between second year students at the 5% level. Mean BMI
scores for sports science students ranged from 22 in the first year to 23.8 in the fourth
year and 22.6 in the first year to 23.6 in the fourth year for the general students. This
indicates a weight gain from the first year to the fourth year, as was found in the
Deusinger study (2005). The BMI scores for both groups of students indicate a desirable
body weight. A study by Röttcher (1984) showed very little difference with regard to
BMI, when compared to the present study. The Röttcher (1984) study was confined to
White and Indian male physical education students. Results from this study showed a
mean BMI of 22. This indicates that the BMI of the students in the current study did not
vary from those of 1984.

A comparison between female, sport science students and female general students
showed a significant difference for height only, while all other parameters were not
statistically different. Students from both groups are maintaining desirable body weight.
The implication of this result is that female students from both sport science as well as
the general group maintain similar lifestyle habits. It is perceived that sport science
students should be leaner due to their increased physical activity. However, these results
do not support this perception.

A comparison of the data between male sport science students and male general students
showed a significant difference of 5% for age, height, mass and body mass index. Male
sports science students are taller and heavier than male students from the general student
population, resulting in a higher BMI for male, sport science students (24) than the male,
general students (22.8). This could be due to a greater muscle mass among male, sport
science students that contribute to their total body weight.

The researcher showed statistically that both groups of students show very little
difference in their morphology and anthropometry, and that their physical activity
patterns do not differ significantly. However, it is assumed that sport science students
would be more active, but this study does not support this perception.

4.2 PHYSICAL ACTIVITY PROFILES

Physical inactivity is a major risk factor for coronary heart disease (CHD), and is also
associated with increased risk for adult–onset diabetes, hypertension, colon cancer,
osteoporosis, anxiety, and depression (Blair, Cheng, & Holder, 2001). Physical inactivity
increases with age and the most rapid increase occurs in late adolescence and early
adulthood (Stephens, Jacobs, & White, 1985). Most young adults on college campuses
are not meeting current physical activity recommendations (Dinger, 1999) and substantial
proportions are leading a sedentary lifestyle (Pinto & Marcus, 1995). Therefore, the
results of this study concur with the studies of Blair et al. (2001), Dinger (1999), and
Stephens et al. (1985) that university students are not active enough and they are leading
sedentary lifestyles, thus making them prone to chronic diseases.

Soccer is the most favoured activity enjoyed by both groups while they differ with regard
to their participation in volleyball, weightlifting, jogging, swimming, tabletennis and
squash.
The frequency and duration of sport played by sport science students and the general
student body on campus did not differ significantly. Both groups of students participated
in jogging, swimming, soccer and weight training after campus. However, the sport
science students also participate in waterpolo, volleyball, tabletennis, squash and rugby
which forms part of their sport science curriculum.

In a study by Huddleston, Mertesdorf and Araki (2002) who investigated leisure time
physical activity behaviour and attitudes/ reasons for involvement among physical
education (n = 41), health (n = 44), and leisure services (n = 46) pre-professionals
indicated that physical education majors reported significantly higher exercise intensity
than did health and leisure services majors. For physical education majors, the highest
reported participation levels were for weight training (73.2%), running (63.4%),
basketball-game play (63.4%), walk for pleasure (58.5%), and racquetball (56.1%). The
current study did not show the same results as Huddleston et al., 2002. It is always
assumed that sport science students would be more physically active than the general student population. As a result of the current findings it is imperative that the curriculum outcomes of the sport science programmes be revisited.

4.3 LIFESTYLE HABITS

4.3.1 SMOKING AND ALCOHOL CONSUMPTION

Exercise and sports participation has traditionally been regarded as a means of encouraging development of healthy habits and deterring health risk behaviours (Pate, Heath, Dowda, & Trost, 1996). However, the literature to date has not always validated the perception that exercise/ athletic participation is a protective factor for risk behaviour (Dunn & Wang, 2003). Also only a few studies have investigated the relationship between physical activity and substance abuse among college students and these studies have looked at inter-collegiate athletics not recreational physical activity.

Smoking is a major risk factor for heart disease. Specifically, smoking causes atherosclerosis (narrowing of arteries), thrombosis (blood clots), cardiac arrhythmia (abnormal heartbeat) and other disorders that increase the risk of a myocardial infarction (heart attack). The results of this study indicate that a greater number of sports science students (45%) as compared to 37% of the general student group have a history of smoking, and that there is very little difference between sports science students (22%) and general students (25%) in terms of their present status of smoking. It seems plausible to conclude that individuals who value the benefits of regular exercise would be less likely to smoke because of the effects it has on one’s heart and lung functioning. (Dunn and Wang, 2003 and Pate et al., 1996). As such, smoking could limit one’s ability to engage in high-impact physical activity by limiting one’s oxygen intake which in-turn reduces cardiovascular endurance and stamina. These results may also indicate that the students’ knowledge and perception of the risks of smoking is not well understood. It is assumed that sport science students should be more aware of the risks of smoking and the resultant effects on their health and wellness. This study does not confirm this belief.

Cigarette smoking among students is a critical health problem. The trends in smoking show that majority of student tend to start smoking at high school. Thereafter, students begin to understand the dangers of smoking and try to stop. In the present study, it is of concern that 22% of sports science students are current smokers. These students will eventually become educators, thereby portraying poor role models for young learners.

The consumption of alcohol by students is also a major concern. Excessive alcohol consumption can be a risk factor in hypertension, liver damage, causing cirrhosis and digestive metabolic disorders (Breslow, 1978). Early drinking was associated with alcohol and sexual risks. Early drinkers were more likely to report subsequent alcohol problems, unprotected sexual intercourse, multiple partners, being drunk or high during sexual intercourse, and pregnancy (Stueve & O'Donnell, 2005). Among females, early drinking was also related to sexual initiation and recent sexual intercourse.
The present findings suggest that participation in physical activity does not provide much protection in terms of alcohol and cigarette use, in that those individuals who are sports science students were just as likely to use cigarettes as general students, and more likely to use alcohol. The results of this study show that 40% of sports science students as compared to 28% of the general students have consumed alcohol on at least 5 occasions during the previous month. Thirty seven percent sport science students reported drinking 5-6 alcoholic drinks at least 1-5 times in comparison with 25% of the general student group of the view that. It is possible that some students may workout for the sole reason of the outward signs of physical activity such as lean body and good looks. Also, the university years are usually a time of experimentation and freedom away from parental influence. It is once again assumed that sport science students would be more sensitized to the harmful effects of alcohol than the general student population. Alcohol and tobacco use is part of the sport science lifestyle change curriculum. Or the corollary is that sport science students believe that they are fitter and healthier, thus, engaging in the consumption of tobacco and alcohol use, will have no deleterious effect on their health and wellness

According to Dunn and Wang (2003), the relationship between physical activity and substance abuse is uncertain. It is uncertain if exercise/athletic participation is truly a protective factor for substance abuse. Dunn and Wang (2003) assessed the relationship between recreational physical activity and substance use among college students (ranging in age from 18 to 23). Substances included alcohol, cigarettes, and other drugs. They found that recreational physical activity was associated with increased levels of alcohol use and binge drinking, but lower rates of cigarette use among males and females. Other studies have also found that high levels of physical activity were associated with heavy alcohol use among college students (Kokotaila et al., 1996; Wechsler et al., 1995; Skolnick et al. 1992) as cited by Dunn and Wang (2003).

4.3.2 DIETARY PROFILE

Consuming a healthful diet and participating in physical activity can help to prevent and manage chronic diseases such as coronary heart disease, stroke, hypertension, non-insulin-dependant diabetes mellitus, osteoporosis, obesity, some types of cancer, and mental health problems (Promoting Health Preventing Disease: Year 2000 Objectives for the Nation, 1991). Several other studies have proved that poor diet contributes to the increased risks of chronic diseases and actual mortality (McGinnis & Foege, 1993, ; Panzer & Apovian, 2004). The majority of subjects in this study, from both the sports science and general student group, do not have regular meals. The implications are that students are constantly snacking, or are constantly on the move to lectures, and that some students are based in the residences and do not have time to prepare meals. This is in contrast to a study by Mbhenyane, Venter, Vorster, and Steyn (2005), which investigated the habitual diet and consumption of indigenous foods among college students in Limpopo province. In the latter study the majority of students (65%) consumed 3 meals daily.
Generally, most students eat 1-2 meals a day, with frequent snacking of junk food such as pies, cakes, potato chips, and most students do other activity while eating such as watching television. Most students (60%) eat fries and red meat at least twice a week. These findings appear to be the standard for students (Kaur, 2003, Troyer et al., 1990, Deusinger, 2005). University students, like other segments of the adult population, may not consume an adequate diet or exercise regularly. A study of the dietary habits of medical students by Troyer, Ullrich, Yeater and Hopewell (1990) showed that their total fat, cholesterol, fibre, and sodium intakes exceeded recommended levels, and more than 50% of these students reported no hard physical activity during the week or weekends.

The present study did not survey students on daily consumption of fruit and vegetables but the study does indicate that 19% of sports science students and 15 % of the general students consumed fruit one or more times per day. The South African Food Based Guidelines (FBDGs) makes provision for the eating of plenty of fruit and vegetables every day (Love et al., 2001). Although students in this study do not manifest overweight and obesity, their eating habits do not meet with dietary guidelines.

4.3.3 LIFESTYLE PATTERNS

University life can be very stressful. Sometimes parents, the faculty and others tend to idealise their experiences and remember it as that idyllic time when they had few worries or responsibilities. To students currently attending university, the experience is often stressful and frustrating. The competition for grades, the need to perform, relationships, fear of AIDS (Acquired Immune Deficiency Syndrome), career choice, and many other aspects of university life cause stress. In the present study, majority of sports science students (53%) and general students (62%) experience stress more on campus than at home. A great number of students find workload (41%) and assignments, test and examinations (22%) as the main reasons for being stressed. Eighty five percent of the general students and 76% of the sports science group do not stress about their personal safety and the main reason for being stressed about personal safety is the crime rate. Wilson & Pritchard (2005) compared sources of stress in college student athletes and non-athletes and found that there are differences in stressors for athletes and non-athletes. They found that student athletes reported more stress than did non-athletes in a wide variety of variables; specially those that dealt with conflicts with a boyfriend’s or girlfriend’s family, to having a lot of responsibilities, not getting enough time to sleep, and having heavy demands from extracurricular activities. On the other hand, non-athletes reported more stress in areas such as financial burdens, making important decisions about their education, getting ripped off, and social conflicts over smoking with a friend, social isolation and being disappointed in physical appearance. Other researchers, Abouserie (1994), Archer and Lammin (1985) and Britton and Tesser (1991), cited in Misra and McKean (2000) point to students experiencing academic stress at predictable times each semester with the greatest source of academic stress resulting from taking and studying for exams, grade competition and the large amount of content to master in a small amount of time.
It is important to understand that stress is only harmful when it is not well-managed. Much of the stress we all experience is helpful and stimulating. The researcher is of the opinion that the stress experienced by both sport science students and the general students seem normal for students at this age.

The fact that the majority of sport science students, (76%), and general students, (75%), wear seatbelts when driving is a positive sign. Other studies show similar results. The 1995 National College Risk Behaviour Survey shows that 89.9% of students wearing seatbelts when driving while a study by Paschall (2003) revealed that 76.1% of college students wear seatbelts while driving. The results of the present study indicate that a small percentage of students are guilty of risky behaviour.

The use of cellphones among students has grown tremendously over the years. It is unusual to see a student without a cellphone. In the present study the majority of students (92%) own a cellphone and much time is spent on the cellphone using short messaging system (SMS’s). One can conclude that the time spent on SMS’s will impinge on the amount of time spent on physical activity, thereby, causing an increase in sedentary lifestyle habits.

The majority of these lifestyle risk factors, which include smoking, drinking of alcoholic beverages, poor diet, and lack of physical activity, are modifiable and can be influenced in a positive way to bring about optimal health among the students. Balanced educational programmes on lifestyle changes and wise behavioural choices should be emphasised in various courses offered on campus.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The following conclusions can be drawn from the current study:

In general, height, mass, hip and waist measurements of sport science and the general students across gender and year groups were very similar. Furthermore, waist-to-hip ratios and body mass index were in the healthy range and was not a cause for concern. Sport science students did not indicate better anthropometric profiles.

A large percentage of the students do not exercise on a regular basis suggesting that many students did not meet the minimum goal of 30min/day of physical activity on most days.

Cigarette smoking among sport science and the general student group is of major concern. Cigarette use is increasing on campuses nationwide in all subgroups and types of colleges (Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). This is supported by a study by Peltzer & Phaswana (1999) at the University of the North, in which they found that lifetime prevalence for males, was 49% and 5% for females and past month prevalence for males was 26% and 0% for females.
The eating habit of students, in the current study, is also of concern. Although students do not show overweight or obese profiles, they do not follow recommended food consumption guidelines.

The selected lifestyle factors surveyed in this study, namely, stress, use of seatbelts and cellular phones, do not present a negative risk profile for the majority of the students. The stresses experienced by students appear to be normal and do not pose a health risk. However the usage of cellphones can impinge on other activity patterns and the financial status of students.

5.2 RECOMMENDATIONS

The following recommendations appear to be warranted, based on the results and conclusions of the current study:

- Greater awareness of food choices should be taught.
- More organised physical activity patterns should be encouraged on a more supervised basis at university
- That the sport science students should be made more aware of the risks involved with respect to poor lifestyle choices.
- The curriculum in sport science must be revisited considering the results.

6. BIBLIOGRAPHY


Bulletin for Staff and Students

Originally intended as an in-house publication for the Staff of the then Faculty of Education, this re-introduced Bulletin for Staff and Students by the School of Education Studies, Faculty of Education, UKZN, objectives are (1) to develop capacity of staff and students to publish academic writing on educational literature, methodology and research findings through a limited review publishing process; and (2) to generate a publication of current educational research trends and topics within higher education. It is envisaged that this journal will expand to provide a platform for graduate students and young academic staff within the University of KwaZulu Natal to publish seminal work in education.

For more details on this publication, please contact:

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