

# Student Teachers' Motives of Becoming Mathematics Teachers: An Exploratory Study

Mapula Gertrude Ngoepe

*Department of Further Education, University of South Africa, P.O. Box 392, 0003 South Africa  
E-mail: ngoepmg@unisa.ac.za*

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**ABSTRACT** Recruiting and retaining mathematics teachers is a matter of concern in many countries especially in South Africa. So far distance education in South Africa has been identified as the system that could assist in training more mathematics teachers. This paper therefore explores student teachers motives of becoming future mathematics teachers. A qualitative research design was employed to investigate what motivates students to choose mathematics as an area of teaching. The findings revealed that most students choose to teach mathematics because of the passion, enjoyment of teaching mathematics and the fulfilling love of mathematics that they have which in turn they want to pass to their learners. These teachers value the potential contribution of mathematics and appreciate the nature of mathematics from their school career. Suggestions are formulated to provide insights which could assist in recruiting motivated mathematics teachers to the now seemingly dwindling profession.

## INTRODUCTION

Recruitment to teacher-training programmes and university courses in mathematics education is gradually lessening. Considerable evidence of this decline in the number of candidates entering the teaching profession in most countries, especially in a specialised subject such as mathematics, has been reported widely (UNESCO 2001; DOE 2006). Thunberg (2009) maintains that in Sweden, as in many other countries, there is a reduced interest in mathematics, science and technology among the youth. A similar opinion was shared in the context of Australia (Stokes 2007). In South Africa, shortages in scarce skills areas such as mathematics, science and technology, languages and the arts were reported in 2006 and it was predicted that there would be a shortfall of around 15 000 teachers by 2008 (Department of Education 2006). Azman (2013), alleges that while the education system of any country must ensure that enough teachers enter the teaching profession, it must also strive to attract the most capable and appropriate, high quality applicants into the profession. However, it is what motivates a young person to go into teaching that is really significant. The wrong motives for going into teaching may result in an earlier than expected exit. With regard to pre-service teacher training, research suggests that the demand for education courses is shaped by the interests of the applicants (Kyriacou and Coulthard 2000; Wang 2004). Among

students entering teacher training, it is noteworthy that social interest (that is, intrinsic reasons) is the predominant motivation, working with children being the foremost of these intrinsic reasons (Bastik 2000; Moran et al. 2001). However, the challenge phasing teacher training institutions is how to attract motivated teachers. The rationale for studying motivations to become mathematics teacher is because of its effect on student achievement (Hayden 2011).

The South African government has identified distance institutions to provide training large numbers of teachers. Although many studies have reported on the problem of decline and teacher shortage, few have looked at what motivates a person to choose a particular career. The purpose of this paper is to explore what motivates student teachers to choose to teach mathematics. One reason for the focus on prospective teachers' motivation in the open and distance learning (ODL) context is the difficulty of attracting new recruits to initial teacher education programmes and the teaching profession in mathematics.

## Motivation

The word motivation stems from the Latin word *movere*, which means to move or to carry. Therefore, it is only natural to define motivation as a force, one that makes us constantly move, act or do things (Kiziltepe 2008). Sinclair (2008) defines motivation as a motive (for example, a

wish, intention, or drive) to engage in a specific activity. Motivation also plays a part in interest and enjoyment. Research suggests that motivations determine:

- ♦ What activities people do or do not engage in (attraction);
- ♦ How long they engage in these activities (retention) and;
- ♦ The depth of engagement in these activities (concentration).

In terms of teaching and teacher education, motivations may, therefore, determine what attracts individuals to teaching, how long they remain in their initial teacher education courses and subsequently the teaching profession, and the extent to which they engage with their courses and the profession. As a result, determining student teachers' motivations to teach could inform teacher recruitment and retention (Dawson and McInerney 2003, cited in Sinclair 2008)

In addition, Johnson and Birkeland (2002, cited in Sinclair 2008) asserted that “[e]ntry motivation to become a teacher is just the first step in becoming a teacher” (pp. 6-7).

Motivation is an important factor in determining the recruitment of mathematics teachers in an ODL context.

### **Conceptualisation of the Self-determination Theory**

Although there are many theories regarding motivation, the theory that informed this study done in an ODL context is the self-determination theory (SDT). This theory was deemed to be suitable because it deals with the ‘innate or intrinsic needs’ of individuals. The self-determination theory is defined as a “macro theory of human motivation and personality, concerning people’s inherent growth tendencies and their innate psychological needs” (Deci and Ryan 2008). Of importance in the theory is the motivation behind the choices that people make without any external influences and interference. SDT focuses on the extent to which an individual’s behaviour is self-motivated and self-determined. DeCharms (1968, cited in Deci 2010: 30) calls this theory ‘personal causation’, which implies the need for people to feel that their behaviour is truly chosen by them rather than imposed by some external source and that the locus of initiation of their behaviour is within themselves rather than dependent on some external control.

The self-determination theory distinguishes one of two forms of motivation that individuals experience: *autonomous or controlled* (Ryan and Deci 2000; Vansteenkiste et al. 2006; Deci and Ryan 2008; Deci 2010). When people are *autonomously motivated*, they experience a profound sense of volition and choice or a self-endorsement of their actions. On the contrary, when people experience *controlled motivation*, they feel obliged and driven by forces that transcend the self. Their behaviour is not an expression of the self. According to Deci (2010), such people can reasonably be described as being alienated. When people are controlled, they experience pressure to think, feel, or behave in particular ways (Deci and Ryan 2008).

*Intrinsic motivation* refers to initiating an activity for its own sake because it is interesting and satisfying in itself. When individuals experience *intrinsic motivation*, they engage in behaviour they perceive as inherently interesting, satisfying, gratifying, enjoyable, fulfilling, and absorbing. Thus intrinsic motivation is driven by interest or enjoyment in the task itself, and exists in an individual rather than relying on any external pressure. It is based on taking pleasure in an activity rather than working towards an external reward. Students who are intrinsically motivated are more likely to engage in the task willingly and to work to improve their skills. This will increase their capabilities (Deci 1975; Vansteenkiste et al. 2006).

On the other hand, when individuals experience *extrinsic motivation*, they engage in behaviour merely because of the objective consequences or outcome they might attract, such as tangible rewards like money and grades, coercion and threat of punishment or praise (external goal). It comes from outside of the individual.

### **Studies on Motivations for Career Choices**

An overview of research on motivation to teach revealed that people would be attracted to teaching by one or more of 10 factors or motivators which include a ‘love’ of or desire to work with and benefit students; altruism or aiming to make a difference in communities and society; and the influence of others, including family members, past teachers and/or members of the wider community.

Other factors include the perceived benefits and/or convenience of teaching, such as work schedules, work hours, vacations, career security and salary; a 'calling' to teach; a love of teaching or a particular subject or a desire to impart knowledge; and the nature of teaching work, especially the opportunities teaching provides for creativity and satisfying interpersonal interaction with others. 'Immediate employment after graduation' was cited as the strongest reason by a sample of student teachers for choosing teaching as a career (Papanastasiou and Papanastasiou 1998 in Kyriacou et al. 2006).

One other important reason is that in some countries many students who are unable to gain a place at university to do a first degree in the subject of interest to them (such as English, mathematics and science) see a degree-based teacher's training course as offering an alternative access to higher education. Chuene et al. (1999) reported on a study of mathematics student teachers in South Africa and found that most of the student teachers in their study were motivated mainly by a desire to gain a diploma in mathematics rather than a desire to become a teacher of mathematics.

Another important factor that varied from country to country was found to be the perceived status of teaching as a career, and the extent to which wanting to do a high status job was an important motivating factor in people's choice of career. Palmer (1998) contends that teaching is, at its core, about identity, integrity and seeking connectedness, and that the call to teach emerges from the 'inwardness' of the self, or the 'heart', where intellect, emotion and spirit converge (Palmer 1998). Palmer (1998) also mentions a desire for a career change as a result of dissatisfaction with a previous career or a stressful life event such as divorce, unemployment or geographic relocation (more common in second career teachers); the perceived ease of entry into initial teacher education courses, or of the job of teaching; and the status teaching provides, including opportunities for career and or social advancement also attract people to teaching. According to Sinclair (2008), research reported students' altruism, the influence of others, and the perceived benefits of the job as the most common reasons for choosing a teaching career.

Pop and Turner (2009) reported on research investigating individuals' motivations for choos-

ing a teaching career which suggests that the reasons that student teachers provide for choosing teaching career fall into three main categories. These categories are altruistic reasons, intrinsic reasons, and extrinsic reasons for career motivation.

Emanating from the latter with regard to *altruistic reasons*, students see teaching as a socially important and worthwhile job. Their desire is to help and support children to understand, succeed, and enjoy mathematics. *Intrinsic reasons* for teaching focus on positive aspects of job activities. Furthermore, these students profess a love for teaching or a passion for their specific subject expertise, for example, mathematics, rather than focusing on positive aspects of teaching-related activities (Kyriacou et al. 2006; Pop and Turner 2009). Pop and Turner (2009) suggest that students who hold *extrinsic reasons* for teaching focus on aspects of the job that are not inherent in the work itself.

Using a sample of first-year student teachers in three universities, Richardson and Watt (2006) found that the main factors that motivated students to become teachers were their perceived ability to be teachers, the intrinsic value of teaching and the desire to make a social contribution to shape the future and work with children or adolescents. Reasons cited by Espinet et al. (1992) include the opportunity to fulfil childhood ambitions of moulding students' minds. Working in industry was perceived as being impersonal; they preferred to work with people. Others were influenced by the vacations associated with teaching. Robertson et al. (1983) reported the positive influence of former teachers on career choice. Also, many teachers made career decisions about teaching during high school. The 'desire to help others' came as a strong reason in Stokes's (2007) study. The subjects that teachers taught were an important consideration in their level of job satisfaction.

In the study by Manuel and Hughes (2006) it was found that a majority of participants made the decision to teach based on reasons that reflected personal aspirations to work with young people to make a difference in their lives; to maintain a meaningful engagement with the subject area they were drawn to; and to attain personal fulfilment and meaning. A study conducted by Nyaumwe et al. (2004) on the motives of student teachers to train as mathematics and science teachers revealed four distinct factors, namely

intrinsic motivation, condition of service, external factors, and social and development factors. Among these, enjoyment of teaching, love for teaching, inborn talent for teaching, enjoyment of school environment and interest in subject matter were found to be some of the most influential factors that attracted students to train as teachers.

While some of the factors that influenced choices and motivations in careers have been identified by previous research, the contribution of the present study is to extend the research findings to a new population, the open and distance learning (ODL) context. It is suggested that more research studies should be carried out on what motivates prospective ODL teachers to become mathematics teachers.

### Objectives

The objective of this study is to explore distance learning student teachers motives of becoming future Mathematics teachers.

## METHODS

### Context of the Study

The inquiry took place in an institute of higher learning in South Africa. For students who wished to become mathematics teachers, the college of education offered a variety of qualifications ranging from certificate courses to undergraduate courses and postgraduate courses. For the purposes of this study, only the Bachelor of Education (BEd) and Postgraduate Certificate in Education (PGCE) in mathematics students were selected.

### Research Design

An exploratory study based on a qualitative research approach was employed to investigate student teachers' motivations of becoming future mathematics teachers. This approach was used because of 'fitness of purpose' to understand student teachers' underlying motives to teach mathematics at school level (Cohen et al. 2007).

### Sample

The participants consisted of students who were at different year levels in the BEd Founda-

tion, Intermediate and Senior phase, Further Education and Training (FET) and Postgraduate Certificate in Education (PGCE) programmes. All these students were enrolled to study mathematics as a teaching major, which would qualify them to teach mathematics from Grades R to 9 and Grades 10 to 12 respectively. The sample was purposive. The sample size was 100 and the response rate was 56%. The response rate can be attributed to the fact that the open-ended question was administered by post.

### Data Collection

Data was collected from BEd and PGCE students from year one to year four. An open-ended question that solicited the reasons why they wanted/chose to become mathematics teachers was the data-gathering tool. This question focused on a single idea (Creswell 2010). The documented text (words) had an advantage of being in the language and words of the respondents as expressed in their own language. It is assumed that these documented words were given thoughtful attention by the respondents. The words as expressed by the respondents were ready for analysis without being transcribed (Cohen et al. 2007). The documented text had the disadvantage of being incomplete, inauthentic or inaccurate and hard to read, thus making it difficult to decipher the information. Data were presented as quotations of participants' actual language or participants' expressive language (Macmillan and Schumacher 2010).

Ethical considerations were observed by requesting the participants' consent to complete the open-ended question. It was explained that the information would be used for research. They were also not asked to provide their names or to reveal their identity. The anonymity of the respondents was further protected by assigning numbers to returned questionnaires (Creswell 2010). To reduce bias and ensure reliability of results the questionnaire did not have names of lecturers but had an indication that it was from the mathematics department and not a particular staff member. In addition, the researcher was aware of a potential source of bias in responses that participants could construct to aim at presenting a socially acceptable answer (Babbie and Mouton 2011) which could be done for example to impress the researcher or lecturer. However, the researcher was cognisant of this

potential source of bias. They had no way of identifying a particular lecturer.

### Data Analysis Procedures

The data analysis procedure entailed capturing, coding and analysis into themes. An inductive approach to analysing the responses was undertaken to allow patterns, themes, and categories to emerge rather than being imposed prior to data collection and analysis (Patton 2000). Similar responses were grouped together into categories. The themes were verified by other research experts. This identification of themes provided depth to the insights about understanding the individual views of the student teachers. Similar codes were aggregated together to form a major idea from the data (Cresswell 2010: 256). Eight themes emerged from the data. These were: (1) Passion for mathematics, (2) Love of and teaching mathematics, (3) Understanding and liking mathematics, (4) Enjoying teaching mathematics, (5) Liking mathematics since school days, (6) The nature of mathematics, (7) To obtain a qualification and (8) The value of mathematics. These were the things that the participants mentioned frequently or had the most evidence to support them. The themes were included as separate sections in the discussion.

## RESULTS

The following themes emerged from the data analysis process.

### Demographic Information

Most student teachers in the sample were 25–29 (24) and 35–39 (14) years of age. There was almost an equal number as far as gender is concerned: 28 females and 26 male student teachers. This finding defies the stereotyping of mathematics as a male domain which was identified as a factor contributing to females' decisions not to persist with higher-level mathematics courses (Leder and Forgasz 2003). The majority of the participants passed Grade 12 with scores ranging from 60% to 80%.

### Results of Open-ended Question

The open-ended question namely "State the reasons why you want to become a mathematics teacher" provided some useful insights into students' perceptions and selection. The re-

sponses are socially acceptable (Babble and Mouton 2011). Some of the common reasons given for choosing to become mathematics teachers were passion, to instil the love of mathematics in their learners, love and enjoyment of teaching mathematics, aesthetic value of mathematics, and appreciation of the nature of mathematics since their school days. These factors resonate with intrinsic or internal motives. These reasons, according to McDaniel (2012), are person-centred. They come from within an individual. In their study, Nyaumwe et al. (2004) found that the most influential factors that attracted undergraduate and diploma students to train as science and mathematics teachers were intrinsic factors such as enjoyment of teaching, love of teaching and interest in the subject matter.

The following themes emerged from the data analysis:

### Theme 1: Passion for Mathematics

A passion for mathematics as expressed by the student teachers is shown in the following statements (quoted verbatim).

*I have a passion for the subject and would like to inculcate/instil the same value in learners. (Student teacher 9)*

*Because mathematics is the subject I am most passionate about and would like to inspire the learners. (Student teacher 55)*

*I have great passion for the subject and wish to instil the same to others. (Student teacher 33)*

As can be seen from the responses, the student teachers would like to instil, inculcate and inspire this passion in their learners. This reason is in line with the intrinsic reasons for entering teacher education programmes. According to Pop and Turner (2009), such students profess a passion for their specific subject expertise. Similar results were voiced in Dawson's (2007) study on factors influencing student teachers' decisions to become secondary science and mathematics teachers. The most common reason cited by more than 70% of the students was love or passion for science or mathematics. They wanted to make a difference in the lives of young people.

### Theme 2: For the Love of and Teaching Mathematics

The love of mathematics was the most common reason cited by 63% of the students in Daw-

son's (2007) study. A sample of 150 students was asked why they were studying to become mathematics or science teachers.

In the study that informed this paper the love for the subject is shown by the following responses:

*I love teaching. I love mathematics very much. It's fun. (Student teacher 52)*

*I have a love for teaching mathematics and hope to carry this into the mathematics classroom and my current job does not allow this. (Student teacher 54)*

The above statements clearly show that the student teachers were attracted to teaching because they love mathematics and teaching mathematics in particular. They expressed positive emotions using phrases such as 'love most' and 'love teaching', 'love mathematics'. This tallies with intrinsic reasons in the study of Pop and Turner (2009), who contend that students who hold intrinsic reasons for teaching profess 'love for teaching' which is a focus on positive aspects of the job activities. This is in contrast to focusing on positive aspects of teaching-related activities for students who have extrinsic reasons that tend to focus on external aspects associated with the career, such as having long holidays, the pay level or a desire for other job-related benefits. Similar results were revealed in the study of Stokes (2007) on factors influencing the decisions of university students to become high school teachers. Those who intended to become teachers had different values with regard to the factors they considered most important in pursuing a career compared with those who were unsure and those who had no intention to teach. Those who intended to become teachers ranked 'the desire to help others' much more highly than the other two groups.

### **Theme 3: Understanding Mathematics and Liking Mathematics**

Understanding can be defined as a measure of the quality and quantity of connections that an idea has with existing ideas. Understanding is not an all-or-nothing proposition. It depends on the appropriate ideas and on the creation of new connections, varying with each person. It exists along a continuum from relational understanding – knowing what to do and why – to an instrumental understanding – doing without understanding (Skemp 1978; Van de Walle et al. 2011).

The following statements show what influenced the student teachers to specialise in mathematics teaching:

*To make mathematics understandable to those that think it is difficult. (Student teacher 25)*

*I understand it and if I explain to someone he/she understands what I am saying. (Student teacher 2)*

A closer look at these statements shows that liking and understanding go hand in hand. The student teachers like mathematics because they understand it. They also expressed their liking of mathematics because it is practical and they would like to share their knowledge with the learners and encourage the learners love this subject. This emotional expression on the documented views of understanding and liking reveals levels of confidence about mathematics knowledge and about mathematics (Pop and Turner 2009). Research has shown that confidence in embarking on a new task is a necessary, but not sufficient, precursor to success (Elliot 1999, cited in Pop and Turner 2009). However, the quality of mathematics teaching depends on teachers' knowledge of the subject (Ball 2011).

### **Theme 4: Enjoy Teaching Mathematics**

The self-determination theory distinguishes enjoyment of teaching as intrinsic motivations as a factor (Vansteenkiste et al. 2006). Reyes (1984) maintains that high achievers are likely to enjoy mathematics more than poor achievers. According to Reyes (1984), a major reason for studying affective factors in mathematics education is to find ways to help more students to learn mathematics.

The statements in this theme are:

*I enjoy mathematics as a person and would like to instil logical and critical thinking to our learners. (Student teacher 26)*

*I enjoy mathematics and solving mathematics problems and want to let others know it. (Student teacher 45)*

Most student teachers explained that they chose to study mathematics in the teachers' training course because they enjoyed the subject more than the other subjects in the curriculum and that they liked to teach it. They enjoy solving mathematical problems and would like the learners to enjoy this subject too. Similar views were expressed in a comparative study in

England and Norway (Kyriacou et al. 1999). When the student teachers in each sample rated each of the 20 reasons as 'very important' in influencing their decision to become a teacher, enjoyment of the subject they would teach (84.5%) and helping children to succeed (92%) received the highest ratings (Kyriacou et al. 1999).

Student teacher 50, one of the students who had previously worked at a job that was different from teaching, said:

*It is regarded as a notoriously difficult subject, but I enjoy its challenges.*

This response concurs with what Nyaumwe et al. (2004) found, namely that the most influential factors that attracted undergraduate and diploma students to train as science and mathematics teachers were intrinsic factors such as enjoyment and love of teaching, inborn talent for teaching, and interest in subject matter.

#### **Theme 5: Appreciation of the Nature of Mathematics Since Their School Days**

Some of the student teachers thought that their previous experiences with mathematics had triggered positive emotions or views about the subject. Nancy Nelson was similarly inspired by one of her high school teachers (Cooney 2012). This implies that innovative and caring teachers can use the curriculum and the classroom environment to shape the career prospects of their students:

*I really liked maths even when I was still at school. It's my passion. Even though I failed to do well during my Grade 12 year. (Student teacher 22)*

*I loved mathematics since I was in the primary level. (Student teacher 32)*

Their encounter with mathematics from their school days is what triggered their appreciation for mathematics. It is often suggested that mathematics should be studied in order to develop powers of logical thinking, accuracy and spatial awareness. The extent to which studying mathematics can contribute to this end depends on the way in which mathematics is taught. Research has shown that by the end of primary years, learners' attitudes to mathematics have often become fixed and will determine the way in which students will approach mathematics in the preceding years. Once attitudes have been formed, they can be very persistent and difficult

to change. Positive attitudes assist the learning of mathematics; negative attitudes do not only inhibit learning but very often persist into adult life (Cockroft 1982). For some student teachers teaching provided the opportunity to fulfil their childhood ambitions of moulding students' minds (Berry and Hare 1985). Robertson et al. (1983) contend that many aspiring teachers were influenced in their career choices by their former teachers. Many teachers themselves made career decisions about teaching during high school.

#### **Theme 6: The Nature of Mathematics**

Research by Stokes (2007) has shown that interest in the nature of subjects that teachers taught was a very important consideration in their decision to become teachers. If teachers are teaching outside their field of interest, this could reduce their levels of satisfaction and lead to resignations. The inherent interest in mathematics and the appeal which it has on people is another reason for choosing to pursue a study in mathematics education, as can be seen in the following responses:

*It is quite fascinating and challenging. (Student teacher 18)*

*Maths is an interesting subject, and I like to make learners be good problem solvers in real life. (Student teacher 39)*

Some teachers were explicitly attracted to teaching mathematics because of the nature of the subject itself, while others were intrigued by mathematical patterns and the orderliness of the subject (Cooney 2012).

#### **Theme 7: To Obtain a Qualification**

Possessing a qualification in the subject area in which people are teaching is regarded to be important (Stokes 2007). There is considerable evidence that teachers' knowledge and ability are associated with student learning in the classroom (Ogbonnaya and Osiki 2007; Ball 2011). A 1992 study in the USA used measures of teachers' subject matter knowledge and pupils' learning gains, and found a positive relationship between how much teachers knew about the subject and their students' learning gains in that subject (Monk 1994). In some countries, students who are unable to gain a place at university to do a first degree in the subject of interest to

them (such as English, mathematics or science) see a degree-based teachers' training course as offering an alternative access to higher education. For example, in a study of mathematics student teachers in South Africa, Chuene et al. (1999) reported that most of the student teachers in their study were motivated mainly by a desire to gain a diploma in mathematics rather than a desire to become a teacher of mathematics.

In this current study, some student teachers were practising teachers already but wished to specialise as mathematics teachers:

*I am a science teacher (Grades 10–12) and mathematics and science 'go together', I enjoy logical rational subjects.* (Student teacher 12)

*To be professionally qualified.* (Student teacher 42)

Espinete et al. (1992) found that most teachers decided to become mathematics or science teachers during college or after college while teaching other subjects or working at other jobs. The issue of teachers switching from other jobs to become specialist teachers is similar to what was found in the current study. The demographic data of this sample shows that the student teachers were teaching and also involved in other jobs.

### Theme 8: Value of Mathematics

According to the International Congress on Mathematics Education (2008), mathematics is a fundamental part of human thought and logic, and integral to attempts at understanding the world and ourselves. Mathematics provides an effective way of building mental discipline and encouraging logical reasoning and mental rigour. In addition, mathematical knowledge plays a crucial role in understanding the contents of other school subjects such as science, social studies, and even music and art. Eccles et al. (1983, cited in Watt and Richardson 2007), found that the usefulness or value of a task to an individual was the strongest predictor of intentions to keep taking a subject and the actual decision to do so. This was reflected in the utility value of their expectancy values theory. The utility value referred to how a task will be useful to an individual in future. Similarly, in the current study, student teachers took the opportunity to specialise in mathematics because of the value and usefulness of the subject in the economy and career options as indicated below:

*It's the currency of science and technology and provides critical role for service.* (Student teacher 21)

*I have realised that our economy needs engineers and doctors to develop.* (Student teacher 40)

These views are in line with the suggestion by Cockcroft (1982) that mathematics should be taught for its importance and usefulness in many other fields. None of the views expressed by the student teachers were associated with negative feelings about teaching and teaching mathematics. The reasons for becoming mathematics teachers in this study are not dissimilar from those found in the literature.

## DISCUSSION

Overall, findings from this study revealed that the students' motivations for teaching mathematics were intrinsic. They professed a love of teaching, of the subject mathematics, and of teaching mathematics. Similar results were found in the studies of Stokes (2007), Nyaumwe et al. (2004) and Kyriacou et al. (1999) which investigated factors that influenced students' decisions to become teachers. The results showed that interest in the subjects that teachers taught was a very important consideration on the level of job satisfaction. This could imply that if teachers are teaching outside their field of interest their level of satisfaction could be reduced and they would be likely to leave the profession. However, these reasons are dissimilar to those found in related studies about student teachers' reasons for becoming teachers (not subject-based) (Kyriacou et al. 1999; Kyriacou and Coulthard 2000). These findings supported the idea that the most powerful motivators for teaching are *altruistic*, for example the desire to help and support children, to understand, to succeed, and to enjoy mathematics (Kyriacou et al. 2006; Pop and Turner 2009).

From the research literature, the reasons for student teachers to choose to be mathematics teachers were varied: altruistic, intrinsic, and extrinsic. Also, in relation to Ginzberg theory of occupation choice, an individual reach their ultimate decision, not at any particular moment in time, but through a series of decisions over a period of numerous years. The collective result is the determining factor of the final decision (2012).



In this current study it was shown that even though the students were in other jobs they still felt a desire to train to become mathematics teachers. Passion was the force that drove the student teachers to become mathematics teachers. They wanted to inculcate this passion into their learners. By using words such as 'instil' and 'inspire', they expressed the extent of their passion. They loved teaching and loved to teach mathematics; they understood and enjoyed mathematics and found it to be fun.

The reasons given by the student teachers for choosing to teach mathematics are intrinsic factors which are defined as those factors that originate within the person – driven by interest or enjoyment in the task itself, and existing in an individual rather than relying on any external pressure (Espinet et al. 1992). The theory of self-determination supported these findings because the results show that the students themselves made the choice to teach mathematics; the decision was not imposed by any external forces. This is in line with the notion that the self-determination theory focuses on the extent to which an individual's behaviour is self-motivated and self-determined. It is a 'personal causation' theory, which implies the need for student teachers to feel that their behaviour (choice to become mathematics teachers) is truly their own and that it has not been imposed by some external source; the locus of initiation of their behaviour is within themselves rather than being some external control (DeCharms, cited in Deci 2010). Raffini (2010) claims that teachers can have a powerful influence over the intrinsic motivation of their students by arranging conditions in their classroom that help learners to meet their psycho-academic needs for autonomy, competence, relatedness, self-esteem and enjoyment.

The findings indicate that some students were involved in other professions and now they would like to be mathematics teachers. What is not known is whether they enrolled because of the shortage of mathematics teachers, or because of extrinsic reasons, since these were not expressed. Considering the specific aims of mathematics as indicated in the Curriculum and Assessment Policy Statement (CAPS) in South Africa, the teaching and learning of mathematics should develop in the learner a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations; of gaining confidence and competence

to deal with any mathematics situation without being hindered by fear of mathematics; of acquiring an appreciation for the beauty and elegance of mathematics; of achieving a spirit of curiosity and a love for mathematics, and deep conceptual understandings in order to make sense of mathematics (Department of Basic Education 2011). It is hoped that because the student teachers' motivations are intrinsic, they will become the kind of teachers envisaged in the CAPS.

## CONCLUSION

Previous studies on what attracted teachers to teach revealed varied reasons: altruistic, intrinsic or extrinsic. The results of the analysis suggest that the student teachers who enrolled in the institution of higher learning were attracted to teaching because of intrinsic reasons: a passion for mathematics, a love of mathematics and of teaching mathematics, understanding mathematics and liking mathematics, enjoyment of teaching mathematics, appreciation of mathematics since their school days, the nature of mathematics, wanting to obtain a qualification, and the value of mathematics. Whereas other people enter certain professions because they have no choice (non- psychological), in this study, career selection was found to be through freedom of choice (psychological) which is a rare phenomenon in mathematics teacher recruitment experience.

The contribution that this research has made to teacher education is that teacher attrition can be reduced if more intrinsically motivated students could be attracted to the teaching profession. This would also improve throughput. In view of ODL institutions' contribution to training large numbers of students, the challenge for recruitment is how to campaign for more self-determined students, in particular among the youth in the category of 20–24 years, to choose to teach mathematics. It is hoped that the student teachers will be more likely to be retained in the teaching profession, and more so in the teaching of mathematics. One of the insights from this study is that selection methods need to be carefully developed to take into cognizance the motivation of student teachers to enrol in teacher education programmes – particularly in ODL contexts – to maximise the recruitment of committed professionals. Based on the

findings of the study, it is recommended that institutions of teacher training should recruit candidates who were high achievers in mathematics at high school and also who opt to teach mathematics as a first choice teaching subject.

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