

Motivation and Attitude of Grade Nine Learners Towards Mathematics in King Williams Town Education District, South Africa

Adom George

University of Fort Hare, Department of Education. East London Campus, South Africa
201509244@ufh.ac.za or eadu@ufh.ac.za
and

E. O Adu

University of Fort Hare, Department of Education. East London Campus, South Africa
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Abstract

Successive governments of post-apartheid South African have sought to address the problems of learners in Mathematics by introducing various pro-active measures. However, these efforts by governments have not yielded the desired results in Mathematics. King William's Town Education District is not immune to this poor performance of learners in Mathematics. This study therefore sought to find out the motivation and attitude of grade Nine learners towards Mathematics in the District. Three hundred and sixty grade Nine learners were selected for the study. A structured questionnaire was adopted as a research instrument in collecting data from the learners. The study showed that, learners lack motivation from their educators to study Mathematics and this adversely affects their attitude towards the subject. Mathematics educators were recommended to provide extrinsic motivations such as praises, gifts, to learners during Mathematics lessons. Scholarship to well performing students in Mathematics, feedback and Visitation of learners at home by their Mathematics educators should also be encouraged. On the other hand, learners must develop a positive attitude towards Mathematics. They must love the subject and make consistent efforts of studying Mathematics every day.

Keywords: Educators, King William's Town Education District, Learners, Mathematics, Motivation.

Introduction

Globally the performance of learners in Mathematics is a cause of worry to many. Through international cooperation and partnerships, the United Nations Organization for Education, Science and Culture (UNESCO, 2014) had designed programmes, especially in developing countries in Africa to help promote research and progressive training in Mathematics and Mathematics education and, in general, to improve community endorsement and appreciation of Mathematics in the nation building. UNESCO funds activities that enhance students understanding of Mathematics, and also upgrade teachers' knowledge of new trends of teaching Mathematics and its importance to the scientific world. Through these initiatives, partnerships have been established with countries with advanced technology, Regional Mathematical societies, universities, and research institutes to assist in developing Mathematics among learners (UNESCO, 2014).

Research has shown that North African countries are relatively progressive in Mathematics as a result of their governments' extensive commitment to research and education from primary to tertiary level. It is also acknowledged that continues support from Southern Europe motivates their Mathematical pedigree among other African countries (International Mathematical Union, 2009). South Africa's growth suffers a severe skills shortage, predominantly in the area of Science and Technology coupled with poor quality of the educational system (Ann, 2011). Researchers assert that, an overwhelming majority of South Africa learners' Mathematical knowledge is uncertain. It is further observed that South African learners encounter serious problems relating to Mathematics methodological terminology (Van der Walt, Maree & Ellis 2008:490). Trends in International Mathematics and Science Study (TIMSS, 2003) conducted a test in Mathematics and Science to evaluate the performance of learners in grade Eight among some selected Africa countries (Tunisia, Egypt, Ghana, South Africa, Morocco and Botswana). At the end of the competition, South Africa recorded the lowest mark in Science and Mathematics even though grade Nine learners participated for South Africa with the excuse that the questions were too tough for their grade Eight learners (TIMSS, 2003).

The Centre for Development and Enterprise (CDE, 2011) observed that an overwhelming majority of teachers teaching grade Six learners in South Africa could not answer grade Six questions based on the grade Six curriculum which are supposed to be answered by grade Six learners. Teaching of Mathematics in South Africa schools is one of the poorest in the universe as indicated by CDE report. South Africa learners were rated 30.0% in numeracy and had an average score of 48.1% in literacy (UNICEF, 2005).

Successive governments of post-apartheid South Africa have sought to address the backlog of learners' difficulties in Mathematics by introducing various motivational measures to both educators and learners. The government has organized series of training and workshops for educators handling Mathematics in order to sharpen their skills and tap into modern learners' natural affinity for all things technological. In parallel to the teacher training, Govan Mbeki Mathematical Development Unit (GMMDU) is also running incubator schools for more than 400 selected learners from under-resourced schools. Learners receive Android tablets which they are trained to use as a "personal tutor" after school hours (GMMDU, 2015). The government also introduced the Annual National Assessment (ANA) to measure progress in learners' achievement in literacy and numeracy and also to provide valuable feedback to schools, teachers, learners, parents, and Department of Education (DoE, 2011). With all these measures put in place by government to improve the performance of learners' Mathematics, only little improvements have been documented.

Reddy (2004:1) explains that, South Africa learners' poor performance in Mathematics could be attributed to a lot of factors. Some of these factors include: poverty, poor school infrastructure, lack of motivation of teachers and learners, unqualified teachers, and poor attitude of learners towards Mathematics. Other researchers argue that South African learners' poor performance in Mathematics can be likened to lack of appropriate learner support materials, poor socio-economic background of learners, medium of instruction, lack of motivation, poor quality of teachers and inadequate study orientation (Van der Walt et al., 2008). Research has shown that even the best teacher cannot force a learner to learn if the learner is completely unmotivated.

Objective of the Study

The study aims at finding out the motivation and attitude of grade Nine learners towards Mathematics in King Williams Town Education District, South Africa.

Research Questions

1. What is the level of motivation (verbal praises and feedback) given by Mathematics educators to their learners in the studying of Mathematics?
2. What is the attitude of learners towards the subject Mathematics?

Literature Review

According to Creswell (2009), literature review provides a framework for establishing the importance of the study as well as a benchmark for comparing results with other findings. The study reviewed literature on motivation and attitude of learners and educators towards Mathematics. Gilman and Anderman (2006:375-391) assert that, motivation plays a very vital role in social functioning and psychological influence of learners and educators towards positive academic achievement. Psychologists observe that motivation enables learners to initiate, guide and maintain goal-oriented behaviors. According to Guay, Chanal, Ratelle, Marsh, Larose and Boivin (2010), motivation is “the reasons underlying behavior”. Guay et. al. (2010) asserts that extrinsic motivation deals with “engaging in an activity for instrumental reasons rather than for the intrinsic qualities of the activity” whilst intrinsic motivation refers “to engaging in an activity for its own sake, for the pleasure and satisfaction derived from participating in it”. Self-regulation theory postulates that individuals can fortify their own motivation by engaging in a number of self-regulatory strategies such as setting appropriate and achievable goals, applying learning strategies, and monitoring and evaluating progress toward goals (Schunk & Zimmerman, 2007). Studies show that the learning environment is an important element in explaining students’ motivation for school and their learning outcomes (Eccles & Roeser, 2011). It is highly recognized that, educators play a very important role in the learning environment which enhances and sustains learners’ motivation and engages learners in learning (Eccles & Roeser, 2011).

The Program for International Student Assessment (PISA, 2012) assert that, the achievement gap between East and West Asian remains the best ever in Mathematics. Learners in Singapore, Hong Kong, Shanghai and South Korea outperformed their American, British, and Australian counterparts (TIMSS, 2012). This success story of learners in the Asian countries can be attributed to the following motivating factors; the great importance government placed on selecting and training of educators cannot be over emphasized. The government’s main priority is to invest in teachers’ quality, not classroom sizes (Organization for Economic Co-operation and Development (OECD, 2013). The teaching methods adopted by educators contribute greatly to the motivation and positive attitude of the learners (Leung, 2006). Extensive out-of-school teaching provided to learners by both parents and educators greatly affects the output of learners in general (Bray & Kwok, 2003). Good parenting and motivation provided by parents to their wards towards learning impacts positively to the academic performance of the learners (Fu & Markus, 2014). Mathematics achievement is enhanced through

well motivated learners and educators because it involves solving Mathematical problems, making interpretations and reasoning. Motivation of Mathematics learners and educators includes the following:

The School Environment

Aside brain development and training, the environment in which Mathematics is learned also affects the performance of learners and the delivery of the Mathematics educator. The environment in which Mathematics is taught is very crucial to the performance of the learners. A good learning environment is a source of motivation to learners and educators teaching Mathematics. The mastering of the subject content is better enhanced in an enabling Mathematical environment (Kaplan & Maehr, 2007). The level to which learners are motivated to study Mathematics seems to have a correlation to educators' interest in the subject and the enforcement of discipline in class. The more learners are allowed to exhibit their cognitive skills in class, the more they develop the interest to study the subject (Vedder-Weiss & Fortus, 2012). Every school environment must be creative enough to motivate learners to exhibit their Mathematical talents. Research has shown that there have been reported cases of violence at some schools in South Africa and this makes learners feel unsafe and so absent themselves from school (DoE, 2002).

The Language used in Teaching Mathematics

Language also plays a major role in motivating and developing learners' Mathematical concept. In South Africa, Mathematics is taught in the second language which serves as an impediment to the learners who cannot read and write English or Afrikaans. This affects the performance of the learners because they find it difficult to understand and express their Mathematical knowledge in the second language (Education White Paper 6:19). UNESCO (2008) observed that over 50 percent of students dropped out of school due to the inability to speak in the language they are being taught. According to Munkacsy (2007), students' problem in learning Mathematics is as a result of lack of communication skills and social skills. The development of everyday communication skills is an important part of Mathematics learning (Munkacsy, 2007).

The Classroom Environment

Learners' Mathematical achievement is highly attributed to the classroom environment (Rumberger & Palardy, 2004). In a similar vein, Van, Fraine, Opdenakker, Landeghem and Onghena, (2000) assert that the classroom

composition plays a very positive role to learners' performance in mathematics. Research has shown that few learners in a well-ventilated classroom tend to do better than learners in an overcrowded classroom. It has been observed that associating with high-ability learners in class helps to boost learners' performance in mathematics whilst associating with low ability learners in class leads to low performance of Mathematics (Burke and Sass, 2011). Rajoo (2013) observed that, classroom learning environment is an important factor of motivating students' Mathematics achievement. Formative assessment is also one of the most important factors relating to success at all levels (Creemers & Kyriakides, 2008). Stears and Gopal (2010) argues that informative and collaborative methods are the best way of evaluating learners.

The Educators' Assessment

Research shows that the assessment methods used by the educator to assess learners' plays a very important role in motivating the learners. The learner academic performance is enhanced if the educator provides feedback on tasks, gives clear evaluation criteria and assists learners to do their corrections (Morais, 2002). Ramnarain (2013) observed that cumulative assessment method enhances learners' motivation to study the subject and facilitates outward learning, as opposed to the bottomless learning requirement for studying Science and Mathematics. Lack of motivation on the part of Mathematics educators and learners adversely affects learners' performance in Mathematics. Educators lack motivation from government and the society in which they reside. They lack teaching and learning materials to enhance effective teaching and learning. Mathematics educators are still sticking to the orthodox method of teaching whilst Mathematics has reached its scientific and technological age. No innovation or creativity is brought to the Mathematics classroom to motivate the learners. Adu, Adelabu, and Adjogri, (2014) assert that most educators lack the knowledge of using ICT in teaching and learning in Mathematics lessons.

Parental and Societal Contribution

Researchers have agreed that the society and caregivers have a very great positive impact on their children's Mathematics achievement in school (Wamala, Kizito & Jjemba, 2013). Studies have shown that parents and the society where learners reside greatly affect learners' Mathematics performance. Other study argues that supportive and attentive parenting practices positively affect the academic performance of learners (Eamon, 2005). In a similar vein, (Domina, 2005) asserts that while parental involvement may not help academic scores, it does help prevent behavioral problems. Parental involvement in school has been linked to

both positive and negative influences on academic achievement (Domina, 2005). Wamala, Kizito and Jjemba (2013) argue that, parents and the society can exert a positive influence on their children's Mathematical achievement.

Government's Contribution towards Learning of Mathematics

The Department of Education had put in place a lot of measures to address learners' performance in Mathematics. Research has shown that the government has developed a strategy for employing, motivating, and choosing learners who have excelled in Science and Mathematics to be trained as educators to teach the critical subjects at different level of grades (DoE, 2001). An upgrading program had been introduced to focus on improving unqualified educators and under qualified educators to increase their Mathematical knowledge and skills (DoE, 2001).

Teachers handling Mathematics have undergone a series of training and workshops in order to equip them with skills and tap into modern learners' natural affinity for all things technological. Learners and educators have received laptops and tablets loaded with GMMDU's innovative curriculum-aligned classroom support package for grades 10 to 12. (GMMDU, 2015).

The Attitude of the Mathematics Educator

The attitude of the Mathematics educator contributes significantly in influencing the learners' interest in the subject. An educator with a good attitude is welcoming, warm and has a sense of humour. A good Mathematics educator is innovative, competent and has the ability to teach to the understanding of the learners. Goulding, Rowland, and Barber (2002) observed that there is a correlation between a Mathematics Educator who has a mastery over the subject and his/her way of delivery in class. A good Mathematics Educator has a systematic way of teaching and also has comprehensive lesson plans for their learners, coupled with mobilizing effective teaching learning materials. Research has shown that, educators who do not have mastery over the subject struggle to deliver in class and also their learners do not perform well in the subject. This therefore seems to suggest that, educators' need to have sufficient knowledge about a particular subject and also know the strength and weakness of their learners (Bransford, Ann, & Rodney, 2000).

Goulding et al. (2002) asserts that educator knowledge about the subject has a link between his ability to plan teaching learning materials and also teach effectively. A student achievement in Mathematics necessitates that educators must have mastery over the subject and a firm discipline that guides Mathematics education. A good Mathematics Educator always provides a methodology and examples

that guides learners to maximize the Mathematical concept to reflect their Mathematical achievement (Ball, 1993).

It has been observed that most Mathematics educators are incompetent and also lack content knowledge of the subject. They find it difficult to create a positive Mathematical environment that best fits the development of the learner. Educators who lack Mathematical knowledge often suppress the interest learners have for the subject (Gatto, 2013). Learners often come to school with abstract knowledge and potential for learning Mathematics, but educators fail to identify, nurture and promote Mathematical abilities in them. However, the Department of Education has introduced a curriculum to cater for the learners' diversities in the classroom. This will set the parameters for administrators, educators, subject advisors, and principals (DoE, 2011a).

Methodology

A quantitative research approach was adopted for the study to elicit information from the participants. This approach made use of structured questionnaire. A 4-point likert scale which included options like: Very High, High, Low, and Very Low were used to indicate learners level of motivation received from their Mathematics educators and also a 5-point likert scale including: Excellent, Very Good, Good, Fair, and Poor to show learners attitude towards Mathematics. Participants selected one option each to indicate the level of motivation received from their Mathematics Educators and also their attitude towards Mathematics. In this research, the researcher adopted a quasi-experimental design for the study. The participants were put into a control group and an experimental group. The experimental group was exposed to different forms of motivation from their Mathematics Educator such as praises and gifts whilst the control group was not. Responses were then collected from the two groups and analysed.

The population for this study was made up of all grade Nine learners in King William's Town Education District. In this research, a sample of fifty-seven public Junior High Schools was sample for the study through purposive sampling method. Babbie (2004:183) described purposive sampling as a type of non-probability sampling where the respondents are selected on the basis of the researcher's own judgment regarding which respondents possess the attributes needed and who will add the best representation to the study. The researcher grouped the fifty-seven public Junior High Schools into five distinct strata through stratified sampling method with an average of eleven schools in each stratum. One school was selected from each stratum to participate in the study. The researcher selected

schools that performed poorly in the previous Matric Examination and the Annual National Assessment for the past three years for the study. Denscombe (2007:14) defines stratified sampling as one in which every member of the population has an equal chance of being selected in the relation to their proportion within the total population. A total sample of three hundred and sixty grade Nine learners was drawn from the population based on the ratio of the subgroup sizes to the total data population of one thousand, two hundred and twenty-one grade Nine learners. A sample of seventy-two grade Nine learners was chosen from each school. Learners were selected for the study based on their terminal school assessment in Mathematics, class assessment in Mathematics and their participation during Mathematics lessons. Dencombe, (2007:17) argues that, with purposive sampling, the sample is 'hand-picked' for the research.

A structured questionnaire was used as a research instrument in collecting data for the study. This was used to elicit information from grade Nine Mathematics learners. The validity of the instruments was ensured by availing the instrument to an expert in the field and supervisor's assertion on the instruments. Their inputs and suggestions helped the researcher to restructure the items in the questionnaire to collect data that improved the quality of reliability, validity and relevance to the study. Reliability of the questionnaire was ensured by conducting a pilot study. A pilot study is a pre-study conducted to ascertain a certain degree of facts before the full-scale study is conducted Van Teijlingen and Hundley (2001:1). The reliability and internal consistence of the questionnaire were determined using the Cronbach's alpha coefficient.

Data Analysis

Descriptive statistics of frequency distribution tables and graphs were used to analyze the quantitative data while inferential statistics was used to reach conclusions about the population of study based on a sample set of data.

Research question 1. What is the level of motivation, for example verbal praises, feedback given by mathematics educators to their learners in the studying of Mathematics?

Table 1: The level of motivation provided by educators to learners

Level of motivation	No. of learners	Percentage
Very high	18	5.5
High	34	10.4
Low	125	38.5
Very Low	147	45.3
Total	324	99.7

Source: Field study, August, 2016.

From Table 1, it can be observed that one hundred and forty-seven learners, representing 45.3% have “very low” motivation for learning Mathematics from their Mathematics Educators, one hundred and twenty-five learners (38.5%) have “low” motivation for learning Mathematics from their mathematics educators, thirty-four learners (10.4%) have “high” motivation and eighteen learners (5.5%) have “very high” motivation for learning Mathematics from their Mathematics Educators. Thirty-six respondents representing (10%) out of the three hundred and sixty participants did not write anything. It might be due to lack of understanding of the questions or they did not want to participate in the study.

From the above analysis it is obvious that the majority of the learners are not motivated by their Mathematics Educator. It could be due to lack of extrinsic motivation such as praises, rewards, gifts, feedback, home visitation the educators fail in providing the learners. Learners academic achievement improves if educators are able to motivate, give guidance, provide feedback to learners and instill discipline in class (Morais, 2002). Educators who adopt behaviorist ways of teaching believe that learners learn by controlling the stimuli, choosing the correct response and providing the appropriate reward (Macleod & Golby, 2003).

Research Question 2: What is the attitude of learners towards the subject Mathematics?

Table 2: The attitude of learners towards mathematics

Attitude	No. of learners	Percentage
Excellent	2	0.6
Very good	17	5.2
Good	56	17.2
Fair	209	64.5
Poor	40	12.3
Total	324	99.8

Source: Field study, August 2016

From Table 2, it can be observed that two-hundred and nine learners representing 64.5% have a fair attitude towards Mathematics, fifty-six learners translating to 17.2% have a good attitude towards Mathematics, forty learners translating to 12.3% have a poor attitude towards Mathematics, seventeen learners representing 5.2% have very good attitude towards Mathematics and two learners representing 0.6% have an excellent attitude towards Mathematics.

It is clear that majority of the learners do not have a positive attitude towards Mathematics. This might be as a result of the way and manner Mathematics is presented to them. Since they lack motivation in learning the subject, it is obvious their attitude to the subject will be poor. This is a clear indication that there are some factors affecting learners from learning Mathematics. It is therefore imperative to remove all impediments affecting learners' attitude towards Mathematics. Research has shown that, there is a positive correlation between learners who have positive attitudes towards Mathematics and their performance in Mathematics (Papanastasiou, 2002). Learners who have positive attitudes towards Mathematics perform well in the subject according to (Schreiber, 2000).

Conclusions

Learners lack motivation to study Mathematics because their Mathematics educators do not motivate them enough to study the subject. They see Mathematics as a boring subject and also because it deals with lots of formulas. Some of the learners are of the view that Mathematics is a subject for the gifted and not for every learner. These are wrong impressions by the learners which do not motivate them to study the subject. The study also revealed that learners have a very bad attitude towards Mathematics. Most learners do not study Mathematics on their own unless they are forced to do so. The attitude of the educator also plays a very vital role in imparting Mathematical knowledge into the learners. This observation

sought to suggest that lack of motivation on the part of the learners in learning Mathematics eventually lead to the poor attitude of the learners towards the subject.

Recommendations

Mathematics Educators should provide extrinsic motivations such as praises, gifts to well performing students in Mathematics. Feedback should also be provided to learners to motivate them. Special awards should be instituted by the educator through collaboration of the school to reward well performing students. Visitation of learners at home by their Mathematics educators should be encouraged. The Mathematics Educator should endeavor to make the mathematical concepts simple and interesting for the learners. The Mathematics Educator must develop a human feeling for the learners and also have a sense of humor during teaching to ease the tension in the class. This can be done by giving praises and asking the class to clap for a learner who does well. The Mathematics educator must be warm and welcoming to enable learners to approach him/her when faced with difficulties in mathematics.

On the other hand, learners must also develop a positive attitude towards Mathematics. They must love the subject and make consistent efforts of studying it every day. They must approach their educators and people who are good in Mathematics to help them when faced with difficulties in the subject. Learners who are weak in mathematics ought to spend more time on mathematics than the other subjects.

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