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Teaching and Learning Resources as a Predictor of Students' Motivation to Learn Mathematics among Secondary School Students in Laikipia County, Kenya

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Abstract:

The purpose of this study was to examine the influence of teachers' use of resources on students' motivation to learn secondary school mathematics in Laikipia County, Kenya. The study was guided by Keller's ARCS model of motivation. Descriptive research design was employed in the study. The target population consisted of 8357 Form Four students and their mathematics teachers from 113 secondary schools in Laikipia County. A sample of 412 respondents comprising of 392 students and 20 mathematics teachers from sample classes were selected for the study. Simple random sampling was used to select sample schools, sample classes, and respondents. A self-administered questionnaire was used for data collection. Cronbach's alpha was used to determine the reliability of research instruments. Data was analyzed using Pearson's correlation coefficient and simple regression analysis. The finding revealed that teachers' use of resources significantly contributed to students' motivation to learn mathematics. The study concluded that use of teaching and learning resources plays a significant part in the development of motivation to learn mathematics and should be encouraged among secondary school students.

Keywords: Motivation to learn, secondary school, teaching and learning resources

1. Introduction

In Kenya, great emphasis has been placed on industrial and technological development, and mathematics is seen as vehicle of development and improvement of a country's economic development (KICD, 2020). By learning mathematics, learners develop an understanding of numbers, logical thinking and problem-solving skills. Furthermore, those students who understand and can-do mathematics will have a significantly enhanced opportunities and options for shaping their future (Bandura et al., 2001).

In the move towards scientific and technological advancement, Kenya needs nothing short of good performance in mathematics at all levels of schooling. However, the mathematics performance of students in the Kenya Certificate of Secondary Examinations (KSCE) has not improved in the past decade. A report of Kenya National Examinations Council (KNEC, 2020) indicates that the national mean performance in KSCE from 2009 to 2019 has always been less than 4points (33%) where the maximum mean score is 12 points. Indeed, Middleton and Spanias (1999) pointed that many children tend to enjoy mathematics in the primary grades, but this enjoyment tend to fall drastically when children progress into and through secondary schools. In Laikipia County, Kenya the poor performance in mathematics is not an exemption. The KSCE mean performance in mathematics from 2016 to 2019 were 2.779, 3.236, 3.441 and 3.599 respectively where maximum mean performance is 12 points (KNEC,2020). These mean points are below a mean index of 4 points (33%) which is a clear evidence of poor performance of mathematics in the County. This is of great concern.

Several factors have been suggested for poor performance in mathematics such as negative attitude toward the subject, lack of subject mastery, use of unsuitable teaching methods, lack of motivation to learn amongst others. However, in an effort to improve students' cognition and affective outcomes in mathematics, educational psychologists and mathematics educators have continued to search for variables that could be manipulated in favour of academic gains, and motivation to learn in one of the leading variables (Tella, 2007).

Motivation to learn can either be intrinsic or extrinsic (Biehler & Snowman, 1997; Reeve & Smith, 2008; Huitt, 2001; Lefrancois,1997; Ormrod, 2006; Stipek, 1998). According to Brophy (2004), individuals with an intrinsic motivation undertakes an activity for its own sake, for the enjoyment in provides, the learning it permits or the feelings of accomplishment it evokes. However, those with an extrinsic motivation performs an activity in order to obtain some reward such as grades, approval or privileges or to avoid some punishment external to the activity.

It is believed that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn (Brophy, 2004; Stipek, 1998). A motivated learner strives to understand the subject matter, seek challenges and persist on tasks even in the face of difficulties (Meece et al., 2006; Pajares & Schunk, 2001). Moreover, Bandura (1997) argued that motivation can manifest itself in various form such as effort expended, persistence, and choice of activities. Therefore, motivation is a necessary ingredient in learning (Biehler & Snowman; 1997; Brophy, 2004; Ormrod, 2006; Stipek, 1998).

In Laikipia County, Kenya despite the poor performance in mathematics in secondary schools there is lack of information on the influence of use of teaching and learning resources on motivation to learn mathematics. The Kenya Institute of Education (KIE, 2010) defined teaching and learning resources as materials used by both the teacher and learners to enhance teaching and learning. There are various types of teaching and learning materials. They include: written materials, pictures and photographs, maps, charts, and diagrams, real objects (realia) or specimens, textbooks, environmental materials, electronic resources, computers, models, display, boards and so on (KIE, 2010). According to DFID (2007), adequacy of instructional materials such a textbook is the most cost-effective input affecting students' performance.

Teaching and learning resources (TLR) comprises basically of three components: material resources, physical facilities and human resources (DFID, 2007). Studies done in the past with regard to availability of TLR in education reveals that TLR are not always available in schools (World Bank, 2013). According to Lyons (2012), learning is a complex activity that involves interplay between students' motivation to learn, physical facilities, teaching resources, skills of teaching and the curriculum. Therefore, availability of resources enhances the effectiveness of learning as they are the basic tools that partly help to bring about good performance among the students.

In a study by Adeogun (2001), it was found that there is a strong and positive significant relationship between instructional resources and academic performance. According to Adeogun, schools endowed with more materials performed better than schools that are not endowed. Mwiria (1985) also support the idea that students' performance is affected by the use of quality and quantity of teaching and learning resources. Mwiria noted that schools with adequate facilities such as textbooks stand a better chance of performing well in examinations than the poorly equipped ones. Therefore, as seen in the mentioned literature poor performance of students can be attributed to inadequate teaching and learning resources. In the current study, it is hypothesized that use of teaching and learning resources has no influence on students' motivation to learn mathematics. The four dimensions of motivation to learn that are the focus of this study are: (i) attention(A), (ii) relevance(R), (iii) confidence (C) or expectancy for success, and (iv) satisfaction (S) in the learning process (Brophy, 2004; Driscoll, 2005; Keller, 1999, 2006). The effect of use of teaching and learning resources in the learning process can be more visible if the relationship between students' motivation to learn and teaching and learning resources is established. In Laikipia County, such empirical evidence is lacking and hence the need for this study.

1.1. Objective of the Study

The objective of this study is to determine the influence of teachers' use of teaching and learning resources on motivation to learn mathematics among secondary school students in Laikipia County, Kenya.

1.2. Null Hypothesis

(To be tested at .05 level of significance)

- H_{01} : There is no statistically significant influence of teachers' use of teaching and learning resources on motivation to learn among mathematics secondary school students in Laikipia County, Kenya

2. Methodology

This study employed the descriptive research design. The target population was all 8357 secondary school Form Four students and their mathematics teachers from 113 secondary schools in Laikipia County. The respondents for the study were drawn from twenty (20) randomly selected public secondary schools in Laikipia County. Simple random sampling was used in selected of schools, sample classes and students. The sample consisted of 412 respondents comprising of 392 students and 20 mathematics teachers from the sample classes. The sample size was determined by using the Krejcie and Morgan's (1970) table of sample sizes.

3. Instrumentation

In carrying out the study, the students' motivation to learn (MTL) scale (Keller, 2006), and teachers' use of resources (TUR) scale developed by the researcher were used. The MTL consisted of 34 twenty-five items which were scored on a five-point scale from strongly disagree (1) to strongly agree (5). Keller (2006) reported an alpha reliability of 0.95 for the scale. The TUR scale had 10 items presented in form of positive statements and the responses were scored on a five-point scale from 0 (the lowest) to 4 (the highest). The reliability for the TUR scale was 0.71 which was determined by the researcher using the split-half technique.

4. Data Analysis

The Pearson's correlation coefficient(r), and simple regression analysis were used for data analysis.

5. Results

The results of data analysis are presented in the following tables (i.e., Tables 1 and 2):

Variables	r	r-square	Adjusted r-Square	Std. Error of Estimate	r-square Change	Sig.
MTL and TUR	.235	.055	.053	13.552	.055	.000

Table 1: Pearson's Correlation Coefficient between Motivations to Learn (MTL) and Teachers' Use of Resources (TUR)

The results in Table 1 indicate a statistically significant correlation between students' motivation to learn (MTL) and teachers' use of resources (TUR) ($r=.235$, $p=.000$). Therefore, MTL and TUR are not independent. Teachers' use of resources accounted for 5.5% of the variability in students' motivation to learn mathematics. The results for simple regression analysis are presented in Table 2.

Source	Sum of Square	df.	Mean Square	F	Sig.
Regression	4181.284	1	4181.284	22.764	.000
Residual	71633.999	390	183.677		
Total	75815.283	391			

Table 2: Simple Regression of Teachers' Use of Resources on Students' Motivation to Learn Mathematics

a. Dependent Variable: Motivation to Learn

b. Predictor: Teachers' Use of Resources

The results in Table 2 show that the F-value is statistically significant ($F(1,390) = 22.764$, $p=.000$). The interpretation is that teachers' use of resources makes a significant contribution in the prediction of motivation to learn mathematics among secondary school students in Laikipia County, Kenya. Therefore, H_{01} is rejected.

6. Discussion

From the analysis of data, it was found that students' motivation to learn was moderate (i.e., total mean score=132.390 out of a possible maximum of 170), and teachers' use of resources was also moderate (mean score=27.724 out of a possible maximum of 40) and their correlation was significant. Further, it was found that teachers' use of resources makes a significant contribution toward students' motivation to learn mathematics. This finding is an agreement with studies by Adeogun (2001), DFID (2007), Lyons (2012) and Mwiria (1985) that teaching and learning resources are necessary in the learning process. Indeed, before the rapid development of technology, the teaching process was reduced to teachers' verbal presentation of content and using chalk to write on the blackboard. Moreover, although speech remains the most important asset in the classroom, today's teaching process is difficult to imagine without the use of different modern teaching and learning resources (Busljeta, 2013).

In the context of classes as an institutionalized form of teaching and learning, resources could be defined as the instruments of presentation and transmission of the prescribed educational content (Busljeta, 2013). These resources include: images, maps, photographs, sketches, diagrams, films, written materials such as textbooks amongst others (KIE, 2010). Therefore, the purpose of utilizing teaching and learning materials in classes is to assist the teacher with the presentation and transmission of educational content and the achievement of instructional objectives (KIE, 2010). The use of teaching and learning resources attempts to achieve several goals which includes: (i) enhancing students' motivation, (ii) developing creativity, (iii) evoking prior knowledge, (iv) encouraging the process of understanding, decoding, organizing and synthesizing the educational content, logical thinking and reasoning, communication and interaction, and (v) contributing to the development of different skills and the acquisition of values of students as well as the retention of desirable knowledge, skills and attitudes (Adeogun, 2001; Busljeta, 2013; DFID, 2007; KIE, 2010; Lyons, 2012; &Mwiria, 1985). Hence, as mathematics teachers seek to improve the level of motivation for secondary school students, special attention should be given to the use of resources which is significantly related to students' motivation to learn.

Busljeta (2013) suggested that a quality teaching process is not determined by the usage of numerous modern teaching and learning resources only, but by a teachers' success in using the resources to encourage students to gain knowledge, skills, and adopt positive values, attitudes and motivation. Therefore, as seen in this study when resources are used appropriately, they can help to improve students' level of motivation to learn especially in mathematics.

7. Conclusion

It is difficult to imagine today's instructional process without the use of various teaching and learning resources. However, the purpose and role of teaching and learning resources do not consist of making the instructional process more attractive and interesting but also to encourage active learning, the development of knowledge, skills, and the development of desirable values, attitudes and motivation of students. As seen in this study, teachers' use of resources plays an important role in the development of motivation to learn mathematics among secondary school students.

8. References

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