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Influence of Language Skills on Students' Learning and Achievement in Mathematics in Secondary Education in Kenya

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ABSTRACT

The study was informed by the need to contribute in mitigating the persistent poor achievement in mathematics by a majority of learners transiting secondary education in Kenya. It sought to assess the contributions of learners' language skills to their learning and achievement in mathematics. Data were obtained from 126 out of 715 grade 11 students drawn from 4 public secondary schools in Mombasa County. The sample was composed exclusively of male students in order to control for gender as an intervening variable. They completed 3 tests items: Proficiency in the Language of Instruction (PLI), Proficiency in the Language of Mathematics (PLM) and Students' Mathematics Achievement Test (SMAT) (α=.630, .699 and .660 respectively). Results showed that language of instruction predicts learner proficiency in language of mathematics, learners' language of instruction and language of mathematics predicts their achievement in mathematics and language of mathematics mediates learners' achievement in mathematics and language of instruction. Based on the findings, the study recommends a structured focus on learners' language of instruction to improve their achievement in mathematics.

Key Words: Achievement, Language of Instruction, Language of mathematics, Language proficiency

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INTRODUCTION

Despite its importance in enabling the country meet its development targets as well as the conception of science and technology related subjects, achievement of most learners in mathematics in the Kenya Certificate of Secondary Education (KCSE) continue to be poor over the years (KNEC, 2015; Wanjiru et al., 2015). With reports from Kenya National Examination Council (KNEC) showing consistently below average mean achievement for a majority of students in the subject (KNEC, 2016), attainment of both the learner's career prospects and the country's development targets appears jeopardized. The poor achievement of a majority of the students in the subject has been attributed to a number of reasons, some of which revolve around their poor mastery of concepts in the subject (Wanjiru et al., 2015). It could be due to lack of conceptualization and mastery of key concepts in the subject. Specifically, empirical data link students' poor achievement in mathematics to lack of understanding of the language of instruction that includes English as a language of instruction as well as mathematics language and its vocabulary (Garcia, 2008; Howie, 2003). This observation is corroborated by Chen (2005); Kotsopoulos (2007); Kranda (2008); Leibowitz (2005). Within the country, however, limited data exist that specifically connect students' poor achievement in mathematics to their mastery and achievement in the language of instruction. This study sought to investigate the contributions of students' proficiency in English language and language of mathematics on their learning and achievement in mathematics in an attempt to contribute to the ongoing debate.

The study is based on Cummins (1979) theory of language proficiency and Ausubel's (1963) theory of meaningful verbal learning. Cummins theory holds that, by using the first language as the medium of instruction, Bilinguals can easily learn and acquire academic skills

(Cummins, 2006). The theory emphasizes the purpose of language proficiency assessment in bilingual education and advocates for placement of students in classes taught through the language which will best promote learning. This theory supports the idea that with the use of the instructional medium, students can easily learn and there is a high possibility they understand better, resulting in better performance. Ausubel's Theory of Meaningful Verbal Learning holds that effective instruction occurs when new information is associated with prior learning at every step in a process. Taken together, the theories advance the concept that a learner's background, especially as regards language skills determines their interaction with the teaching and learning environment and ultimately achievement. Since English is used as the language of instruction, learners' proficiency in the subject ultimately determine the acquisition of concepts during the teaching and learning process and ultimately achievement.

Evidence shows that language as a medium of communication plays a key role in disseminating ideas and concepts, and no idea or message can be passed from one person to the other without the use of language (Udofia and Etuk, 2014). Nowhere else is this component of communication as important as the classroom where much of critical information is shared in the course of classroom instruction. In countries such as Kenya, instruction of most subjects including mathematics takes place in English (Mbugua et al., 2012). As such, students' mastery of the language could be perceived to contribute to their mastery of the subject content and ultimately achievement in the subject. Also referred to as the language of instruction, English as the language in which classroom teaching and learning is based on therefore predicts students' conception of the subject content. For learners within the country, English is conceived as a second language since learners have as a first language their native language which they use exclusively before they join formal school (Dhillon and Wanjiru, 2013). As a matter of fact, records show the existence of more than 40 native languages within the country used by a majority of the young learners especially in rural settings (Kioko, 2015). According to the researcher, these languages also referred to as 'mother tongue' forms the basis on which learners are introduced to schooling in early grade years ahead of a late primary transition stage. In essence, basic literacy skills including reading, writing, and arithmetic are first introduced to learners in their native languages. Learners are then expected to automatically transfer the knowledge acquired in their native language to the second language as soon as they have acquired sufficient vocabulary in the new language.

With records indicating poor mastery of English language skills among a majority of learners in late primary and early secondary stage (Tella et al., 2010), effective teaching seems jeopardized (Gathumbi, 2013). Poor mastery has been mainly attributed to negative attitude that a majority of the learners have towards English as a subject. Other causes include overloaded curriculum (Gathumbi, 2013; Kanga'hi, Indoshi et al., 2012), overcrowded classrooms (Glasson, 2009; Muchiri, 2009) and limited access to resources including textbooks (Muthwii, 2004). The overall net effect is limited competence in the language skills that hinder active learner participation in classroom activities (Tella et al., 2010; Usó Juan, 2006). Previously, findings by Hakuta et al. (2000) as well as Moore and Redd (2002) showed that limited English proficient (LEP) and English language learner (ELL) students have historically lagged behind their English proficient peers in all content areas in mathematics. Additionally, studies among bilingual Arab students (Yushau and Omar, 2015), Chinese (Han and Ellis, 1998), Filipino (Nillas, 2002) and Sesotho speaking natives in South Africa (Taole et al.,1995) have shown that learners proficiency levels in English are a factor affecting their performance in mathematics. Botes and Mji, (2010) pointed out that in order to master mathematics, a learner has to understand a commonly spoken everyday language, language of instruction and a subject-specific mathematics language. In each of the cases, a significant relationship between learners' self-concept of language and mathematics proficiency and their achievement was reported. Collectively, such observations point to the extent to which English as a means of classroom communication is perceived to influence content mastery and achievement in mathematics.

Mathematical language has also been shown to play a pivotal role in the learning and mastery of the subject content (Mbugua et al., 2012; Wanjiru et al., 2015). Seen as a body of knowledge, denoted and enacted in terms of a standardized language whose well developed fluency can be an aid to logical thinking, mathematical language is a system of communication with its own set of symbols, convections or special words (Mbugua et al., 2012). These signs, symbols, terminologies, numbers and mathematical expressions are peculiar to mathematics and their proper usage aids conceptualisation of the subject (Udofia & Etuk, 2014). In mathematics, information is sought for and transmitted in mathematical terms which include product, reflection, angle, determinant; symbols and mathematical structures. Misconceptions in the subject may, therefore, be attributed to the inability to communicate using the appropriate terms, symbols, and structures (Mbugua et al., 2012).

Kranda (2008) found that students who can speak in mathematical terms, with precision, can communicate effectively with the teacher, and that effective communication will be achieved between students only if each knows and understands the terms being used. Varughese and Fehring (2009) argue that writing about mathematics seems to go hand in hand with the understanding of mathematics and that student who is unable to write or solve problems using written language will many times have trouble fully understanding or solving the mathematical problems in the first place. Washington (2001) on the other hand noted that strong oral vocabulary skills, both expressive and receptive, are critical for general academic success.

Adler (2001) and Setati (2005) perceive learning to communicate mathematically as a central aspect of mathematics learning. This was also strongly supported by Szydlik et al. (2003) who revealed that students' performance in mathematics strongly depends on their understanding of mathematical terminologies. Ishaku (2005), in his study on the effects of understanding the language of mathematics on performance in mathematics among secondary school students in plateau state, found that understanding the language of mathematics has a significant effect on performance in mathematics. However, each of these studies is foreign-based and may or may not apply to the unique needs of learners in Kenya.

METHODOLOGY

A correlational study was adopted to test four hypotheses formulated. They include:

H_{01}: There are no significant differences in learners' achievement in language of instruction and language of mathematics.

H_{02}: Learners' proficiency in language of instruction has no significant influence on their achievement in mathematics.

H_{03}: Learners' proficiency in language of mathematics has no significant influence on their achievement in mathematics.

H_{04}: Learners' proficiency in language of mathematics has no mediating effect between their proficiency in language of instruction and achievement in mathematics.

Participants were a convenience sample of 126 form 3 students (equivalent to grade 11) drawn from 4 out of 8 public secondary boys-only schools in Mombasa County. From a target population 715, this sample constituted approximately 17.5% of the target population. It was composed exclusively of male students in order to control for gender as an intervening variable. Form 3 students were selected due to the fact that apart from form 4 students who were busy preparing for end of course exams, they were the best placed to provide a more credible data having stayed in school longer and interacted with teaching and learning environment more. Respondents were informed that the study aimed at assessing the impact of language skills on achievement in Mathematics. They completed 3 tests items: Proficiency in the Language of Instruction (PLI), Proficiency in the Language of Mathematics (PLM) and Students' Mathematics Achievement Test (SMAT). Each of the language test items tested four language domains: Reading, Writing, Listening and Speaking. The reading test in both PLM and PLI comprised of a short comprehensive passage followed by ten questions designed in multiple-choice format based on the passage with four preferable answers sourced from an intermediate reading with comprehension textbook written by Anker (2004). Specifically, each question on reading with comprehension carried a maximum score of 2 marks. The writing test required the students to write a paragraph of between two to five hundreds words on the application of mobile phones to mathematics instruction and was marked out of 20. The listening test on its part required the learners to answer ten questions after listening to a short passage read out to them. The questions were designed in multiple-choice formats on the same text and each question carried 2 marks. Speaking test entailed learners orally respond to question that required them to explain the applicability of ten mathematical concepts to daily life each within two minutes and meriting 2 marks. Respondents' score were manually recorded. Mathematics Achievement Test entailed respondents answering 10 mathematical questions testing proficiency in the subject. It was based on topics learners had been exposed to and was marked out of 20. Each of the test instruments were developed from previously validated instruments to ensure high internal validity of the instruments. Specifically, PLI and PLM instruments were adapted from Parmjit (2006) and constructed based on form 3 Mathematics Curriculum Specification while SMAT items were adapted from the Kenya Certificate of Secondary Examination (2008-2015) test items. They attained a reliability coefficients equivalent to .630, .699 and .660 respectively estimated from data obtained from the study based on Kuder-Richardson formula 20 (KR-20) and presumed to be good enough (Weir, 2005).

Data Analysis

The data obtained were analysed using paired sample t-test and hierarchical regression analysis for hypothesis 1, logistic regression for hypotheses 2 and 3 and hierarchical regression analysis for hypothesis 4. Specifically, sample t-test and hierarchical regression were used to assess the existing relationship between learners' skills in language of instruction and language of mathematics, logistic regression was used to test the existing relationship between learner skills in language of instruction as well as language of mathematics with their achievement in mathematics and lastly, a hierarchical regression analysis was used to assess the mediating effect of language of mathematics within the relationship between learners' proficiency in language of instruction and achievement in mathematics. In each case, the hypotheses were tested at 0.05 level of significance.

RESULTS AND DISCUSSION

Hypothesis 1: *There are no significant differences in learners' achievement in language of instruction and language of mathematics*.

The study to begin with sought to test the link between language of instruction and language of mathematics. A paired sample t-test was conducted to compare respondents' proficiency in language instruction and language of mathematics. Results obtained were as represented in Table 1.

Findings showed that learners' proficiency in language of

Table 1. Paired sample statistics.

	Variables	Mean	N	Std Error Mean
Pair1	PLM	52.24	126	1.369
	PLI	41.93	126	1.238

Table 2. Logistic regression results predicting passing due to language of instruction.

Skills	B	S.E	Wald(χ^2)	df	Sig.	Exp (B)
Reading	0.026	0.009	8.931	1	0.003	1.027
Writing	-0.030	0.015	4.097	1	0.043	0.971
Listening	0.013	0.009	1.886	1	0.170	1.013
Speaking	0.019	0.014	2.025	1	0.155	1.020
constant	-1.597	0.881	3.288	1	0.070	0.203

Variable(s) entered on step 1: Reading, Writing, Listening, Speaking.

mathematics had a higher mean (M=52.24; SE=1.37) compared to language of instruction (M=41.93; SE=1.24). Paired sample test illustrated that this difference was significant, t(125)=17.66, p<.001. A hierarchical regression analysis confirmed that proficiency in reading and listening in language of instruction were significant predictors of language of mathematics, F(1, 124) = 2.99, *p* =.003; F(3, 122) = 2.00, *p*=.048 respectively. The overall model which was significant illustrated that 34.7% variation in proficiency in language of mathematics could be attributed to proficiency in language instruction. Findings led to the rejection of the hypothesis. Consistent with previous findings, learners' mastery of various domains of language instruction was poor. Mastery of reading, writing, listening, and speaking could be perceived to contribute to mastery of language of instruction based on Pearson's correlation analysis with listening being the greatest contributor. It is probable that the poor achievement in language of instruction was mostly due to learners' poor achievement in speaking and listening skills. This finding is in line with the observation of several researchers who underscored the significance of language domains to performance. In particular, Kranda (2008) found that students, who can speak in mathematical terms with precision, can communicate effectively with the teacher, and that effective communication aids mathematics learning. Varughese and Fehring (2009) argued that writing about mathematics seems to go hand in hand with the understanding of mathematics and that student who is unable to write or solve problems using written language will many times have problems in fully understanding or solving mathematical problems in the first place. Washington (2001) on his part noted that strong oral vocabulary skills, both expressive and receptive, are critical for general academic success.

Hypothesis 2: *Learners' proficiency in language of instruction has no significant effect on their achievement in mathematics*.

The study also sought to assess the link between language of instruction and achievement in mathematics. Logistic regression was used to illustrate the factors that best predict the extent to which learners' ability in language of instruction influence their achievement in mathematics. Table 2 presents the findings.

The independent variables in the model were language domains: reading, writing, listening and speaking. The model was significant, $\chi^2(4) = 26.23$, $p < 0.001$ and the Hosmer and Lemeshow Test confirmed model fit, $\chi^2(7) = 28.77$, $p < 0.001$. The findings led to the rejection of the hypothesis. Cox and Snell Square predicted variance of 19%, while Nagelkerke R Square predicted 25% in variation in achievement explained by the model. The model with independent variables explained 62.7% of learners passing mathematics due to the language of instruction, an improvement from the 50.0% initially predicted. Reading significantly predicted passing mathematics, Wald $\chi^2(1) = 8.93$, p = 0.003, Exp(B) = 1.03) while it dropped by 0.97 due to writing. Though insignificant, listening increased the odds of passing by 1.01. Additionally, speaking increased the odds of passing by 1.02. This finding on the relationship between languages of instruction and achievement in mathematics is consistent with findings by Botes and Mji, (2010) who pointed out that in order to master mathematics, a learner has to understand a commonly spoken everyday language, language of instruction and a subject-specific mathematics language. Similarly, DoE (2002) emphasized that language of instruction plays an important role in the development of mathematics. It is a resource for communication and thinking in mathematics. Howie (2003), observed that pupils who speak the language of the test (i.e., the instructional medium) more frequently also attain higher scores in the mathematics test. He concluded that pupils' proficiency in English (as a media of instruction) was a strong predictor of their success in mathematics.

Hypothesis 3: *Learners' proficiency in language of mathematics has no significant effect on their achievement in mathematics*.

Similarly, logistic regression was used to illustrate the factors that best predict the extent to which learners' ability in language of mathematics influence their achievement in mathematics. Table 3 presents the

Table 3. Logistic regression results predicting passing due to language of Mathematics.

Skills	B	S.E	Wald(χ^2)	df	Sig.	Exp (B)
Reading-A	0.048	0.015	9.732	1	0.002	1.049
Writing-A	0.028	0.013	4.903	1	0.027	1.028
Listening-A	0.018	0.011	2.462	1	0.117	1.018
Speaking-A	-0.020	0.020	.970	1	0.325	0.980
constant	-2.151	.484	19.751	1	0.000	0.116

Variable(s) entered on step 1: Reading_A, Writing_A, Listening_A, Speaking_A.

findings.

Reading, writing, listening and speaking – domains of language learning were similarly used as the independent variables. The model was significant, $\chi^2(4) = 35.34$, $p < 0.001$ and the Hosmer and Lemeshow Test confirmed model fit, $\chi^2(7) = 24.96$, $p = 0.002$. Findings led to the rejection of the hypothesis. Cox & Snell R Square predicted variance of 25% while Nagelkerke R Square predicted 33% in variation in passing explained by the model. The model with independent variables explained 72.2% of learners passing mathematics due to language of mathematics, an improvement from the 50.0% initially predicted. Reading and writing significantly predicted passing mathematics, Wald $\chi^2(1) = 9.73$, p = 0.002, Exp(B) = 1.05; Wald $\chi^2(1) = 4.90$, p = 0.027, Exp(B) = 1.03). Though insignificant, listening increased the odds of passing by 1.02. However, the odds of passing decreased by 0.98 due to speaking. This is in line with the findings of Adler (2001) and Setati (2005) who perceive learning to communicate mathematically as a central aspect of learning mathematics. This was also strongly supported by Szydlik et al. (2003) who revealed that student's performance in mathematics strongly depends on their understanding of mathematical terminologies. Ishaku (2005), in his study on the effects of the understanding language of mathematics on performance in mathematics among secondary school students in Plateau State, found that understanding the language of mathematics has a significant effect on performance in mathematics.

Hypothesis 4: *Learners' proficiency in language of mathematics has no mediating effect between their proficiency in language of instruction and achievement in mathematics*

Lastly, the study set out to assess whether learners proficiency in the language mathematics mediates the influence of the language of instruction on their achievement in mathematics. The mediation effect was tested in a three-step regression analysis. First, proficiency in the language of instruction was regressed against achievement in mathematics. The model was significant, and proficiency in the language of instruction accounted for 34.5% of the variance in achievement in mathematics. Then learners' proficiency in language instruction and their proficiency in the language of mathematics were entered in the second model and regressed. The model was also significant, and language of instruction accounted for 9% of total variance in the language of mathematics. Lastly, proficiency in the language of mathematics and learners' achievement in mathematics was entered in the third model and language of instruction controlled for. The model which was significant illustrated that language of mathematics for its own accounted for 8.5% of the total variance in achievement in mathematics. Addition of language of instruction on the model altered the total variance in achievement in mathematics by a further 27.5%. Mediation effect was seen $F(1, 125) = 3.39$, p<.001; $F(2, 124) = 1.68$, p=.096. Findings led to the rejection of the hypothesis.

Conclusions

The study investigated the existing relationship between language proficiency and learner's achievement in mathematics, the Kenyan perspective. It illustrated that learners' achievement in mathematics is highly dependent on their proficiency in the language instruction and language of mathematics. Further, findings illustrated that learners' proficiency in the language of mathematics is influenced by the language of instruction. Learner mastery of the four language domains including reading, writing, listening and speaking impact proficiency in the language instruction which in turn predict language mathematics and ultimately learner achievement in mathematics. At the same time, the study illustrated that language of mathematics mediates the relationship between the language of instruction and learner's achievement in mathematics. Taken together, findings confirm the significance of language of instruction in the teaching and learning process especially as regards mathematics education. The study, therefore, recommends that English as a language of instruction be given more attention, especially among non-native English users to enhance their language skills and ultimately knowledge acquisition. In the processes, due regard should be given to each of the language domains, and particular emphasis be put on mastery of listening and speaking skills.

References

Adler J (2001). Teaching and Learning Mathematics in Multilingual

Classrooms. Netherlands: Kluwer Academic Publishers.34-42.
Anker, S. (2004). Real writing with readings: Paragraphs and essays for college, work, and everyday life. Bedford Books, www.brqswqatf04.storage.googleapis.
Ausubel D (1963). The psychology of meaningful verbal learning. New York: Grune & Stratton.
Botes H, Mji A (2010). Language diversity in the mathematics classroom: does a learner companion make a difference? South African Journal of Education, 30(1): 123-138.
Chen K (2005). Matrix preconditioning techniques and applications. Cambridge University Press.41-60.
Department of Education [DoE]. (2002). Government Gazette. Pretoria: National Department of Education.
Cummins J (1979). Linguistic interdependence and the educational development of bilingual children. Review of Educational Research, 49:222 -251.
Cummins C (2006). Understanding and Implementing Reading First Initiatives: The Changing Role of Administrators. Newark, DE: International Reading Association.pp.19714-8139.
Dhillon JK, Wanjiru J (2013). Challenges and strategies for teachers and learners of English as a second language: The case of an urban primary school in Kenya. International Journal of English Linguistics, 3(2): 14-24.
Garcia O (2008). Bilingual education in the 21st century: A global perspective. Oxford, UK: Wiley-Blackwell.
Gathumbi A (2013). Underachievement in reading and writing skills and the implications in promoting life-long learning. Journal of Education Practice 4(13):79-85.
Glasson T (2009). Improving Student Achievement: A Practical Guide to Assessment for Learning. Carlton South, VIC: Curriculum Corporation.
Hakuta K, Butler GY, Witt D (2000). How long does it take learners to attain English proficiency. University of California Linguistic Minority Research Institute Policy, 1. 11-19.
Han Y, Ellis R (1998). Implicit knowledge, explicit knowledge and general language proficiency. Language teaching research, 2(1):1-23.
Howie SJ (2003). Language and other background factors affecting secondary pupils' performance in mathematics in South Africa. African Journal of Research in Mathematics, Science and Technology Education, 7(1):1-20.
Ishaku BSA (2005). Effects of Understanding the Language of Mathematics on Performance in Mathematics among Secondary School Students in Plateau State. Nigeria: University of Jos.MED Thesis.
Kanga M, Indoshi, FC, Okwach TO, Osodo J (2012). Teaching styles and learners' achievement in Kiswahili language in secondary schools. International Journal Academic Research Program Education and Development. 1(5), 11-20.
Kenya National Examination Council (2015). The Year 2014 KCSE Examination Report. Vol.2 Nairobi: KNEC.
Kenya National Examination Council (2016). The Year 2015 KCSE Examination Report. Vol.2 Nairobi: KNEC.
Kioko A (2015). Why schools should teach young learners in home language. https://www.britishcouncil.org/
Kranda J (2008), "Precise Mathematical Language: Exploring the Relationship Between Student Vocabulary Understanding and Student Achievement". Summative Projects for MA Degree. P.7. http://digitalcommons.unl.edu/mathmidsummative/
Kotsopoulos D (2007). Communication in mathematics: A discourse analysis of peer collaborations. PhD dissertation., The University of Western Ontario.
Leibowitz B (2005). Learning in an additional language in a multilingual society: A South African case study on university-level writing. Tesol Quarterly, 39(4):661-681.
Mbugua ZK, Kibet K, Muthaa GM, Nkonke GR (2012). Factors contributing to students' poor performance in mathematics at Kenya Certificate of Secondary Education
in Kenya: A case of Baringo county, Kenya. American International Journal of Contemporary Research, 2(6): 87-91.
Moore KA, Redd Z (2002). Children in poverty: Trends, consequences, and policy options. Washington, DC: Child Trends.1-12.
Muchiri MN (2009). Papers on Language and Culture: An African Perspective. [S.l.]. Nairobi: Authorhouse.
Muthwii, K. (2004). New Language Bearings in Africa: A Fresh Quest, 1st Edn. Clevedon, Buffalo: Multilingual Matters.
Nillas L (2002). Does Language Make a Difference: A TIMSS-R Analysis?. The Mathematics Educator Journal, 6(2):95-112.
Parmjit S (2006). An Analysis of Word Problems in School Mathematics Texts: Operation of Addition and Subtraction. Journal of Science and Mathematics Education in South East Asia, 29(1):41-61.
Setati M (2005). Teaching mathematics in a primary multilingual classroom. Journal for research in Mathematics Education, 36(1):-466.
Szydlik JE, Szydlik SD, Benson SR (2003). Exploring changes in pre-service elementary teachers' mathematical beliefs. Journal of Mathematics Teacher Education, 6(3):253-279.
Taole JK, Zonneveld M, Letsie-Taole L (1995). Gender interaction in mathematics classrooms: Reflection and transformation. Educational Studies in Mathematics, 28(3):263-274.
Tella J, Indoshi FC, Othuon LA (2010). Relationship between students' perspectives on the secondary school English curriculum and their academic achievement in Kenya. Educational Research. 1, pp.390–395.
Udofia NA, Etuk GLK (2014). Science/Mathematics language and student's achievement in Chemistry. International Journal of Educational Research and Information Science, 1(3):27-34.
Usó Juan E (2006). Current Trends in the Development and Teaching of the Four Language Skills. Berlin, New York: M. de Gruyter.
Varughese VK, Fehring H (2009). Effects of students' approaches to learning on performance in two pedagogical environments. International Education Studies, 2(4):10-15.
Wanjiru BN, Miheso-O'Connor M, Ndethiu S (2015). Effects of mathematical vocabulary instruction on students' achievement in mathematics in secondary schools of Murang'a County, Kenya. Proceedings of the 4th International Conference on Education. Nairobi, Kenya: Kenyatta University.
Washington JA (2001). Early literacy skills in African-American children: Research considerations. Learning Disabilities Research & Practice, 16(4):213-221.
Weir JP (2005). Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. Journal of strength and conditioning research, 19(1), 231.
Yushau B, Omar MH (2015). Mathematics performance and its relation to English language proficiency level of bilingual Arab University Students. Indian Journal of Science and Technology, 8(13):1-15.