Effects of Formative Assessment Tools on Secondary School Students' Achievement in Mathematics in Rwanda, A Case of Kayonza District

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ABSTRACT:

Background: Promoting Science and technology is one of main long term objectives and tasks of Rwanda. Promotion of Science and technology depends on mathematics worldwide. To know the level of students' performance in Mathematics and how to improve it, the assessment of students in form of summative and formative is the best predictor of Academic achievement in Mathematics. This current study sets out to explore the effect of formative assessment tools on students' academic achievement in Mathematics in Kayonza District. This research aimed at exploring the formative assessment tools that are currently used in teaching and learning mathematics, assessing the factors that influence secondary school learner's low performance in mathematics and exploring the effects of formative assessment tools on secondary school students' achievement in mathematics.

Materials and Method: The study adopted a mixed research design using both qualitative and quantitative approaches. A sample size of 95 respondents were drawn from a target population of 1851, it was calculated using Slovin's formula. Purposive, stratified and simple random sampling techniques were used to select 95 respondents from 1851. Questionnaire and Interview as well as documentary tools were used to collect both primary data. Data was cleaned, coded, entered and analyzed using Statistical Package for Social Science (SPSS, Version 21.0). Quantitative data was analyzed using frequencies, percentages, descriptive statistics (means and standard deviations) while Qualitative data was analyzed in narrative way. SPSS was used because it is fast and flexible and provides more accurate analysis resulting in dependable conclusions.

Results: Quantitative findings revealed that coursework, teachers' observations, group/class work and test assignments were used by the teachers at in secondary schools at Kayonza District. However, the results showed that teacher respondents agreed that fear towards mathematics (strong mean of 4.29), high number of students per classroom (mean= 3.98) and low level of teachers' training (Mean=4.99) as well as lack of science culture among students (Mean= 3.78) were the leading factors to low performance in mathematics in secondary schools in Kayonza District. The study findings further indicated use of group discussions to enhance students' enactment and scoring, student's participation in mathematics duties/tasks through observations and group work encourages peer learning affect positively the students; performance in Mathematics in Kayonza District. Using Pearson correlation coefficient, the results revealed that one-unit increment in using formative assessment tool led to 0.791 increase in learners' academic performance in mathematics in 12 secondary schools in Kayonza District.

Conclusion: In line with the findings and the conclusions emerging from the study, the following recommendations are made to the teachers, school staff and District as well as Ministry of Education (MINEDUC): Teachers should therefore plan carefully for mathematics quizzes, homework and end term mathematics tests to increase students' motivation to learn mathematics. In addition, it is recommended to

the school staff, the district and MINEDUC to evaluate teachers regularly because evaluation is an obvious vehicle for using incentives to direct the teachers on the path towards professional growth and improvement

Keywords: Formative Assessment Tools, Secondary School Students' achievement, Mathematics, Kayonza District, Rwanda.

INTRODUCTION

Historically, formative assessment tools to evaluate learners began when the doors of schoolhouses were first opened. By the early 19th century (US. Department of Education, 2008). Worldwide, students' assessment activities to know their level of achievement are a basic phase in any educational investigation and projection (Wass, 2011). The most effective assessment for learning occurs when learners have precise and concise idea of what teacher expect them to have specifically in related skills and competences (Caules & McMillan, 2010). Assessment for learning is all about providing to learners the information related to their progress in order to empower them to take the necessary action to improve their understanding in a certain field of study where teachers have to establish the learning room where learners can learn effectively using maximum effort to perform well in any given educational activities (Heritage, 2017). Student assessment should affect the quality of students graduated from a certain program of study, however different assessment strategies affect differently this intention of using assessment tool reflecting the competencies and skills expected to students (Adman, 2020), however there are specific criteria that need to be satisfied in order to ensure the effectiveness of any assessment. Teaching and learning processes related with mathematics and sciences are main components of school activities to build adequate competences in mathematics, assessment for learning is required (Angeli & Iravannini, 2018).

In Singapore, assessment for learning has a contribution in developing teacher's competences and capacity as well as student learning by transferring professional development experiences to the lesson plans and classroom instructions, many teachers use a variety of assessment activities and tools in the classroom in order to get a complete overview of how learners are learning and developing different skills. Furthermore, in providing feedback to the students about what they have done, they analyze the information, giving comment on it and suggest where to improve, and use it to coordinate and organize better teaching and learning. Students are mainly active information providers. They not only participate in learning and teaching activities, but also use assessment information to identify goals and even criteria of success, make decisions about their own development, and develop an understanding of how qualified a work will be (Berry, 2008)

In Pakistan teaching styles which are fixed and rigid to learners, ineffective assessment for learning tools students' lack of intrinsic motivation and concentration in learning mathematics while teaching mathematics were identified as the main causes of low academic achievement in mathematics (Hafiz & Hina, 2016).Additionally, Nomsa Mabena (2021) found out that in South Africa, the factors affecting low performance in mathematics there is teacher related factors including traditional teaching style which does not provide opportunities to learners of participating in their own learning and poor assessment tools which does not influence positively understanding of mathematical concepts.

In Rwanda, the research showed that students are not actively engaged in their learning due to poor application of assessment for learning AFL, this can also hinder motivation of learners in studying mathematics as AFL is one of motivating factor for studying actively mathematical concepts (Ukobizaba,2022), this makes the researcher committed to find out the effects of assessment for learning tools on academic performance in mathematics. In this study; researcher need to investigate the effect of assessment for learning strategies on students' academic achievement in mathematics case of Kayonza district, since assessment is one of the main determinants of learner's achievement and also assessment is one the main elements highlighted in competence based curriculum to be used to develop competences.

The specific objectives that guided this thorough research are:

1. To explore the formative assessment tools that are currently used in teaching and learning mathematics in Kayonza district.
2. To assess the factors that influence the learner's performance level in mathematics in secondary schools in Kayonza District
3. To explore the effects of formative assessment tools on learners 'performance in mathematics in secondary schools in Kayonza District.

THEORETICAL LITERATURE

Teacher quality is extensively remarkable by policymakers, practitioners, and researchers alike to be the most powerful school-related influence on a learners' academic performance in any subject as recommended by the academic syllabus and the learners' performance in subject taught by the teachers indicate the teachers' quality of teaching (Motoko, et al, 2017). Several studies that have been carried out on leading factors for learners 'achievement, offer profounder and insightful reflection that teachers' quality of using assessment for learning tools during teaching learning activity influence positively the learners' performance in sciences, focally, mathematics (Irfan & Shabana ,2012).

Gore (2017), maintains that teacher quality of assessing learners' progress influences student performance while Fenster (2014) highlights academic qualification and experience as some of the qualities of a teacher as well appropriate formative assessment tools to have impact on student performance in mathematics. Really, formative assessment is just a way the teachers use to guide the learners during teaching and learning activities whereby assessment for learning activity provides feedback based on regulate continuing teaching and learning strategy to advance students' achievement of wished-for instructional objectives (Sadler, 2009). For Pophan (2008), assessment for learning is the educators to adjust their future teaching materials, procedures, strategies and instructional procedures to update the existing learning policies and approaches, base on a deliberate procedure in which learners' suggestion. Formative assessment is not the same as the summative assessment, the first differs to the summative assessment as that the latter is generally alarmed with making a short summary of learners' achievement status and is directed towards reporting students' status at the end of a course of study for purposes of guarantee (Sadler, 2009). The procedure of assessing learning tasks or duties include classroom discussion, collaborative environment between teacher-learners, learners-learners, questioning, organized classroom tasks, and response and learner's reaction on asked questions geared at helping students to bond together the learning holes. Students are also actively engaged in the assessment progression through self- and learners-learner's collaborative assessment (Sheppard, 2000).

Collecting Data for formative assessment

Assessment in learning activity is possible throughout a strict collection of data and there are many ways of collecting data necessary for assessment in learning activities. Griffin (2007) suggests that sign of learning can be obtained through 3 remarkable behavior structures: these includes learners speaking, writing and works. This indicates that through speaking, writing and works data can be easily collected during the process of teaching and learning that are mostly planned before instruction.

EMPIRICAL LITERATURE

Application of formative assessment

Formative assessment requires a structured design on side of teachers so that they use feedback and obtained results to determine not only what learners acquired but also how, when and whether they apply different

learned concepts in different situation (Lorna et al, 2006). Ajogbeje (2013) emphasized that the use of assessment for learning instruments in the teaching-learning process consists of separating or dividing the content to be studied or course into smaller chronological units for instruction; specifying the objectives for each assessment for learning activity; providing remediation in areas where students are facing difficulties before proceeding to next unit or chapter and then administering assessment of learning test on completion of chapter or all units.

Correlation analysis on Formative Assessment and student academic performance

Kasiisa & Tamale (2013) studied the impact of assessment as learning strategy on the performance of Primary social studies in Eastern Uganda. A cross-sectional survey design was adopted with a sample size of 128 Senior Primary Schools social studies teachers. The research findings revealed a positive correlation between assessment as a teaching strategy and pupils' academic achievement in sciences. Fuchs and Fuchs (2016) examined 21 controlled studies about the effects of frequent formative assessment and evaluation on the achievement of students in preschool through Grade 12. In these studies, teachers conducted formative assessments between two and five times per week. The average effect size was 0.70 standard deviations for classrooms that used student data to draw progress reports on each student and to adjust instruction, and the average effect size was 0.26 for classrooms that used formative assessments but did not systematically organize the resulting data.

William, Lee, Harrison, and Black (2014) have conducted research examining the impact that formative assessment practices of 24 teachers had on student achievement in schools in the United Kingdom. The intervention was several full-day and half-day workshops provided to the teachers about formative assessment practices. The quantitative results of achievement scores for students taking the local standardized assessment used by the school and the graduation exit exam known as the "national school-leaving examination" (GCSE) from previous or tandem classes showed a statistically significant increase in the average score of students in mathematics and other t courses. The results showed an impact of formative assessment on student's performance in mathematics (Wiliam, Lee, Harrison, & Black, 2014).

A study of Swearing revealed that the main purpose of teachers in using formative assessment is not to evaluate learners grades rather than employs the results of formative assessment solely to adjust and regulate teaching approaches and strategies to uplift learners progress in academic duties especially in mathematics activities, exercises and homework (Swearing, 2002). It can be comprehended as assessing tools for studying not of studying (Chudowsky, & Glaser, 2001). Black and William (2008), who published the results through a close examination of the contribution of student self-assessment and learners-learners intra assessment coupled with determinative evaluation strategies used by the educators. Results of survey on the use formative assessment in public schools by Although Stiggins (2016) revealed that the use of determinative evaluation and learner presence as a decision maker and a user of assessment information, are scarce and limited in America's public schools or educational systems and the research of its use is likewise as rare (Herman et al., 2008). However, in the cases and studies that have since been reported, the impact of formative assessment attributes has reflected the positive contribution of summative assessment on learner's hard work and performance in sciences in most secondary schools in America (Black et al., 2014).

Summative Assessment and learners' Performance

Yassin Adinan Ayume (2016) carried out a study on the assessment of learning and student academic performance in Uganda and the findings of his study indicated that the correlation value between summative assessment and student performance was 0.776 to mean that summative assessment improved students' performance at 77.6%. Therefore, the better the level of summative assessments tools applied by teachers,

the better the learning of students and high performance in sciences. Summative assessment is one of the key academic evaluation tool aims at summing up learner's outcomes and the end of unit, course and academic programme (Sadler, 2009). '' 'It is also reported that is integrally submissive and does not normally have immediate impact on learners' learning ability but it affects decisions making on teaching methodologies which may have deep educational and personal consequences for the students (Sadler, 2009).

Summative assessment enables the educators, schools, district, parents and other educational stakeholders to be aware whether a learner has reached a certain level of competence after a particular period of learning; for example, a unit, content, subject, semester, term and the academic year in secondary schooling (REB, 2011). The main aim of using summative assessment in teaching and learning activity is to reveal the student's overall performance in a specific area of learning at the end of term /year and a specific academic period of time (Harlen, 2015). Secondary schools in Kayonza District, being the centers of learning, also assess their learners at the end of the term or semester, to determine their progress to the next levels in terms of marks. So, based on investigations carried, the results revealed that there was significant positive relationship between learning tools and learners' performance in many secondary schools worldwide and in Rwanda in general but no clear literature and studies carried out on in Kayonza District to show this relationship, thus a deep investigation on this relationship is paramount important in secondary schools in Kayonza District to close this gap.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study portrays the relationship between independent variable (formative assessment tools) and learners' performance as dependent variable. The figure 1 presents formative assessment tools and its sub-variables as independent variables while students' achievement in Mathematics and its components as the dependent variable.

Figure 1: Conceptual Framework
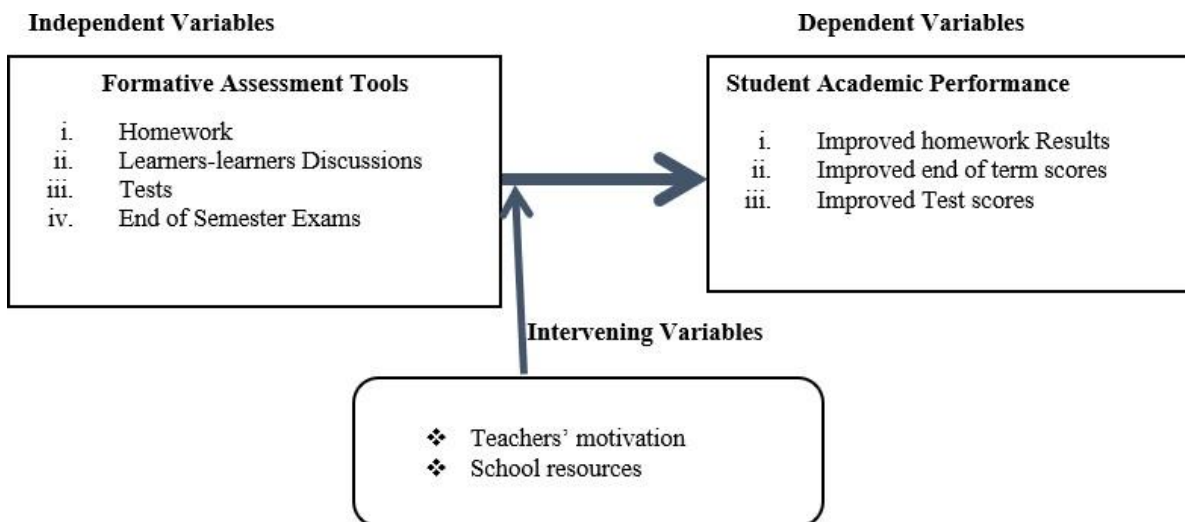
Source: This study (2022).

The above conceptual framework identifies that the independent variable mainly will focus on the formative assessment tools and its dimensions (Homework, learners-learners' interaction in groups and Tests) and End of term Exams). Conversely, the dependent variable (students' performance in Mathematics) is conceptualized into three (3) sub-variables/components (improved homework Results, improved End of term scores, Test scores). The relationship between two above variables will be well explained by the intervening variable for example the teachers' motivation and school resources.

RESEARCH MATERIALS AND METHODS

Research Design

Research design is a distinct plan on how a research problem was attacked (Omari, 2011). The study adopted a descriptive and cross-sectional design. The descriptive survey design method was useful in exploring effects of formative assessment tools on secondary school students' achievement in mathematics. It is an efficient approach of collecting data regarding characteristics of sample of a population, current practices, conditions or needs (Chandran, 2014). This design is preferred because it provides tools for describing collections of statistical observations and reducing information to an understandable form (Sekaran, 2013). Furthermore, the study relied more on both quantitative and qualitative approach. Quantitative approach was predominantly used as a synonym for data collection technique (such as a questionnaire) or data analysis procedure, such as: graphs or statistics that generates or uses numerical data (Rolfe, 2016). Qualitative method of data collection was used in order to study perception as well as understanding of respondents of the issues under discussion.

Research Population

For the purpose of this study, 1,851 individuals (12 Head teachers, 12 Director of studies, 21 mathematics teachers and 1804 students in combination with mathematics) in 12 secondary schools in Kayonza District. Since the researcher wants to catch a wide range of perspectives and perceptions, he endeavors to have respondents representing a diverse group of people.

Sample Size

In this study, a total of 95 participants was sampled from a population of 1851 respondents, the researcher applied Slovin's formulae (Solvin, 2004) to determine the sample. Solvin says a 90% confidence level and 10 % precision are assumed for equation. With the help of the above formula the sample size is as follows.

$$n = \frac{N}{1+N\,(e^2)} , n = \frac{1851}{1+1851\,(0.1^2)} , n = \frac{1851}{1+18.51} , n = \frac{1851}{19.51}\ n = 94.8 \approx 95 \text{ respondents}$$

Sampling Techniques

According to Gay (2003) sampling is the way of choosing a small group of people which symbolizes the features of a big cluster identified as populace in order to generalize the outcomes to the whole inhabitants. This is commonly applied in quantitative research. However, in qualitative research, sampling is used to choose representatives of the population not for generalizing outcomes but for the purpose of looking at certain research questions within definite cases which we accept that symbolize the inhabitants (Abdalla, 2010). Considering different categories of the target population, the researcher used the stratified sampling, simple random sampling and purposive sampling techniques to get different elements of the sample. Furthermore, Bryman (2012) adds that stratified sampling was used where the sampling of individuals from strata is carried out randomly. Thus, based on Kothari's view, head teachers, deputy head teachers in charge of studies and teachers was universally and purposive sampled as it is recommended that when the population is homogenous and small, there is no need to resort on computing the partial sample size of the them (Kothari, 2009). Therefore, 12 head teachers and 12 Deputy Head teachers in charge of studies were purposively taken in 95 sampled participants. Purposive sampling technique was applied to the school staff (head teacher and director of studies) and based on the level of experience and position in managing students behaviour and personality. Simple random sampling was used to get the sample of 48 students. For this, teachers and learners were systematically drawn from the total population. The researchers managed to use this formula

$$n1 = \frac{n * P1}{N}$$

Therefore, the sample size for each respondents' stratum has been computed as below:

- Sample size for learners (Fawe Girls school): [293*48] /1757 = 8 Learners
- Sample size for learners (Nyawera): [33*48]/1757= 1 Learner
- Sample size for learners (Ndego I) [110*48]/1757= 3 Learners

The same formula was applied for the remaining selected secondary schools to obtain the representative sampled learners as shown in table 2 (see the appendix VIII). The total sample size for this study is 95 respondents (12 head teachers, 12 Director of studies, 23 teachers and 48 learners).

Data collection Procedures

An introductory letter/recommendation letter from Mount Kenya University was obtained. Visa approval for data collection in Kayonza District was also sought. Consent letter from respondents was sought from respondents. Using these letters, the researcher introduced himself to the appropriate institution authorities of selected secondary schools and seeks visa approval to carry research in 12 selected secondary schools in Kayonza District. Ethical consideration was obeyed to ensure respondents' responsibility, freedom and confidentiality. Questionnaire and interview were formulated basing on three objectives of the study and quantitative data for all three objectives were supported or contradicted by qualitative data. Data collection for qualitative data was collected using interview guide which has only 13 open ended questions which were given to 12 head teachers and 12 director of studies. On the other hand, quantitative data was collected using questionnaires which contains 3 main questions with different statements to tick in (for teachers) and 6 questions for learners. The questions were both open and close- ended.

RESULTS

Demographic Characteristics of Respondents

The sample size for the interview and questionnaire is 95 respondents, 24 key informants (12 head of studies and 12 head teachers) of which are earmarked for interviews and 71 respondents (23 teachers and 48 students) were to give their views through completion of questionnaires. Out of the total of 95 respondents, 24 interviews were directed and carried out and 65 questionnaires were completed and submitted as required, giving a total of 89 respondents who participated in the data collection exercise. This means that 6 questionnaires that were given to the students were not retrieved rendering a missing rate of 8%. This rate is small enough to affect the data presentation. The demographic data is important for the study as it provides for the fortitude of whether the individual respondents who participated in the study are a representative sample of the target population, thus giving confidence to their responses in answering the research questions and objectives. The demographic characteristics of the respondents are set out in the table below.

Gender of Respondents

Gender disparities significantly play a big role in data interpretation. This is the reason why gender variable was taken into consideration in this research.

Table 1: Gender of Respondents

Variable	Category	Frequency	Valid Percent	Cumulative percent
Gender	Male	28	43.1	43.1
	Female	37	56.9	100.0
	Total	**65**	**100.0**	

Source: Research data (December, 2022)

The results indicated in Table 1 revealed that majority, 56.9 % of the respondents were female while the male was represented by 43.1%. The percentages were attributed to the low ratio of male students as compared to female students. The gender imbalance is not likely to affect the study as the nature of the research and questions asked were not gender sensitive and any unlikely error as a result of the gender imbalance may be tolerated because views from female respondents were no different from those of the male respondents rather they were complementing each other.

Age of Respondents

Individuals of different age groups usually have different opinions of a given topic of study and this provides comprehensive data on the topic from all dimensions

Table 2: Age of Teachers

Variable	Category	Frequency	Valid Percent	Cumulative percent
Age of teachers	29 years and Below	6	26.1	26.1
	30-34 years	8	34.8	60.9
	35-39 years	4	17.4	78.3
	40-44 years	2	8.7	87.0
	45-49 years	2	8.7	95.7
	50 years and above	1	4.3	100.0
	Total	**23**	**100.0**	

Source: Research data (December, 2022)

The study revealed that majority, 34.8 % of the respondents were within the age group of 30-34 years, followed by 26.1% who were within the age group of 29 years and below, while those within the age group of 35-39 years were represented by 17.4% followed by those aged between 40-44 years old and 45-49 years at 8.7% while 4.3% of respondents were aged 50 years and above. The supremacy of the respondents within the age group of 30-34 years implies that most of the teachers are mature and therefore have the proficiency in the subjects they teach.

Respondents' Education Qualification

Education level of respondents can provide a clue on how individuals are willing to contribute to the development of research knowledge on a given area.

Table 3: Respondents' Education Qualification

Variable	Category	Frequency	Valid Percent	Cumulative percent
Respondents' qualification	Secondary level	1	4.3	4.3
	Diploma	6	26.2	30.5
	Bachelor degree	14	60.8	91.3
	Masters	2	8.7	**100.0**
	Total	**23**	**100.0**	

Source: Research data (December, 2022)

The results as indicated in Table 3 revealed that majority, 60.8% of the respondents had Bachelor Degree as education Qualification, followed by 26.2 % who had Diploma, while those within Master's Degree and secondary certificates were represented by 8.7% and 4.3% respectively. The domination of the respondents with Bachelor degree implies that most secondary schools in Kayonza District recruit and employ academically sound teachers who have huge acquaintance and knowledge of the subjects they teach.

Distribution of Respondents by Experience

Respondents' experience is a variable of interest as it helps to know how long the respondents had worked as the teachers. Period spent in education activities is important as it helps explain the respondent's knowledge on the research objectives.

Table 4: Experience in Teaching

Variable	Category	Frequency	Valid Percent	Cumulative percent
Experience in teaching	Below 1 Year	**0**	**0.0**	**0.0**
	1-5 Years	4	17.4	17.4
	6-10 Years	7	30.4	47.8
	11-15 Years	10	43.5	91.3
	16 years and above	2	8.7	100.0
	Total	**23**	**100.0**	

Source: Research data (December, 2022)

The results in Table 4 revealed that majority, 43.5 % of the respondents had work experience between 11-15 years, followed by 30.4% who had work experience of 6-10 years, while those with work experience between 1-5 years and 16 years and above were represented by 17.4% and 8.7% respectively. The dominance of the respondents with working experience of 11-15 years in teaching implies that most of the secondary schools in Kayonza District employ experienced teachers so as to provide outstanding teaching using the most insightful teaching devices and methods to provide a wide range of mathematical skills and knowledge to the students.

PRESENTATION AND DISCUSSION OF FINDINGS

This section sets out the key themes of the research and presents the findings resulting from the interview process, questionnaires and the consequent data analysis. The main themes which emerged following the data analysis process, and aligned to the research questions were the following: formative assessment tools that are currently used in teaching and learning mathematics, the factors that influence the learner's performance level in mathematics in secondary schools and the effects of formative assessment tools on learners 'performance in mathematics in secondary schools in Kayonza District. For ease of interpretation of the findings, the researcher divided the respondents into three categories, being key informants (head of studies and Head teachers), teachers and students. These categories are classified as A, B and D respectively. Category B and D gave their views through questionnaires whereas category A gave interview responses. Of the interviewees, they are further marked as Interviewee 1 being the Head teachers and, Interviewee 2 being Head of studies respectively.

Formative Assessment tools used in Teaching and Learning Mathematics

The first objective of this study was to identify the formative assessment tools that are currently used in teaching and learning mathematics in secondary schools in Kayonza district. The following Tables and figures present the findings.

Table 5: Scale, Mean Range, Response and Interpretation

Scale	Mean range	Response	Interpretation
1	1-2	Strongly disagree	Very low mean
2	2-3	Disagree	Low mean
3	3	Neutral	Moderated mean
4	4-5	Agree	High mean
5	5	Strongly agree	Very high mean

Source: Research data (December, 2022)

Table 6: Formative assessment tools Used in Teaching and Learning Mathematics

Formative assessment tools	Min	Max	Mean	Std. Deviation
Use of standardized test in assessing students achievements in Mathematics	4	5	4.25	.452
Use of swelling work to evaluate learners	4	5	4.08	.289
Use end of unit or chapter tests to evaluate students	1	5	3.50	1.624
Use of end of term or middle term exams or tests to evaluate learners	1	5	3.17	1.697
End of Semester Exams confirm the level of students in mathematics	3	5	4.67	.651
District benchmark or interim assessments are used to test students achievements	1	5	4.75	1.485
Group discussions to assess students achievements in Mathematics	2	5	4.58	.900
Average mean			**4.142**	

Source: SPSS output (December, 2022).

The results revealed that teachers usually use standardized test in assessing students' achievements in Mathematics in secondary schools in Kayonza District, this is evidenced by a mean value 4.25 which is approaching to 4 (Agree) with a standard deviation of .452 that shows a weak variation of respondents' responses to the statements. The results also showed that the teachers in Kayonza District use swelling work to evaluate learners (Mean=4.08 which tends towards maximum 4 (Agreeing) and weak Std of .289 that shows that respondents have almost the same reactions on the assertion. However, teachers were not in full agreement that they use end of unit or chapter tests to evaluate studjents' performance in mathematics (Mean= 3.50, Std= 1.624).

Furthermore, the respondents were aware that End of Semester Exams confirms the level of students in mathematics as shown by a very high mean of 4.67. The respondents were in full agreement that the district

benchmark or interim assessments are used to test students' achievements (Mean=4.67, Std=.651). Along with these findings, the teachers strongly agreed that group discussions to assess students' achievements in Mathematics as evidenced by a high mean value of 4.58. Based on the above findings, it is clear that standardized test, swelling work, group discussion, end of unit or chapter tests, end of term or middle term exams or tests, semester exams and District benchmark or interim assessments are the formative assessment tools that are currently used in teaching and learning mathematics in Kayonza district.
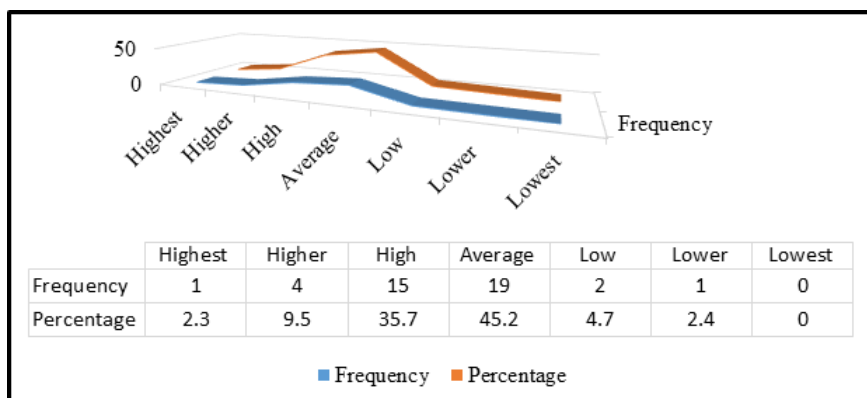
The above findings are confirmatory with the Interviewee 2 (Director of studies' views that: the teachers at Kayonza District that is to say formative and summative apply both forms of assessment. During the discussion, it was revealed that formative forms of assessment are continuous for the purpose of checking the progress of students in learning and the include elements like coursework's, teachers' observations group/class work and test assignments which are aimed to check the performance of students in mathematics.

As noted during the interview session with the Interviewee 1 (Head teachers), formative assessment is a powerful tool for increasing students' performance in mathematics and the lesson plans have been prepared for the use of formative assessment practices throughout clarification of learning goals and criteria for success, designing effective classroom discussions and other learning tasks that elicit evidence of student understanding, providing feedback that moves students forward and activating students as instructional resources for each other as well as activating students as owners of their own learning.

Three experts reviewed formative assessment practices and lesson plans and corrections were made. One of the formative assessment applications used in assessing learners' performance in Mathematics in secondary schools in Kayonza District are test assignments, group work and course work as well as exams. In review of the documents from the different schools in Kayonza District in head of studies' offices, documents revealed to the researcher that the teachers as shown on mark sheets applied formative forms to students. For examples, coursework/ take homework is marked out of 15% in some schools and 20% in the other schools where 15% as group work and 70% as test assignments totaling to 100% or 70 marks out of 70 marks and this could be the reason why the majority of teachers and staff have agreed with the statements on formative assessment and its elements that formative assessment is the procedure employed by teachers during the learning process in order to modify teaching and learning activities to improve student academic performance.

The findings of this current study were in line with the empirical data: Gordon and Reese (2017) reported evidence that teachers can train students to pass any kind of test, coursework and exams even those intending to assess higher thinking skills, frustrating those who consider that teaching to well -designed tests can influence teaching in positive directions (Yeh, 2011). Similar, Harder, (2018) asserted that the teachers employ coursework, observations, group discussions and tests as tools of formative assessment to improve student academic performance in course of the study.

Figure 2: Students' Reactions on the Rate of the Effects of Group work Activities on their Performance in Mathematics

	Highest	Higher	High	Average	Low	Lower	Lowest
Frequency	1	4	15	19	2	1	0
Percentage	2.3	9.5	35.7	45.2	4.7	2.4	0

Source: Research data (December, 2022)

Based on the above findings, all the respondents when asked their rating of effect of group work activities on their performance in Mathematic, they unanimously rated it as average for example 45.2% of students had the same view. Further, 35.7. % of the students rated it as high. Very few students 9.5% and 4.7% rated it Higher and low respectively while 2.3 rated it as lower and highest. These views were in line with those of the key informants that group discussion activities give an open room to the students to share their own views to raise the level of their attainment, increasing equity of their outcomes, and improving their ability to learn. The findings further complement those of the International Public Management Network (2009) who allude that the successful group discussion formation has been important to raising overall levels of student achievement in academic activities especially mathematics.

Figure 3: Students' reactions on the Effects of test Assignments on their Performance
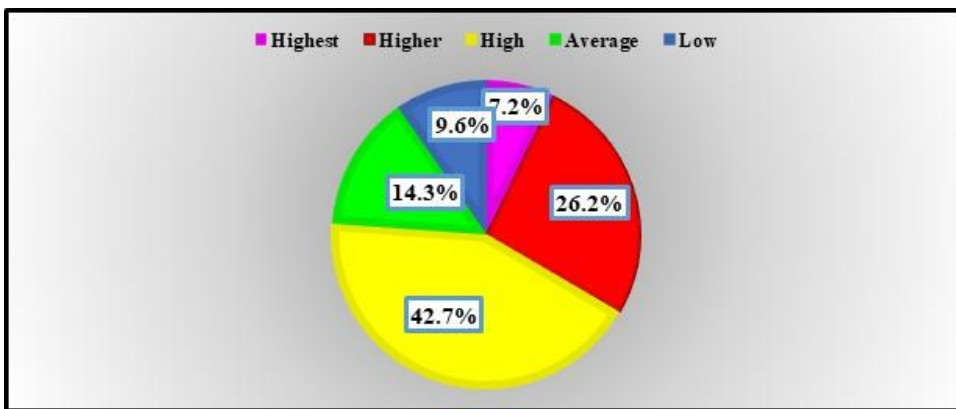

Source: Research data (December, 2022)

All the student respondents when asked their rating of effect of test assignments on their performance in mathematics, they unanimously rated it as high. Further, 26.2 % of the student respondents rated it as higher. Very few student respondents (14.3%) rated the effect of test assignment on their performance in mathematics at average while 9.6% of the students rated it low and lastly, 7.2% of student respondents rated the effect of test assignment on their performance in mathematics as highest.

Factors influencing Learner's Performance Level in Mathematics in Secondary Schools

The second objective of this study was to assess the factors that influence the learner's performance level in mathematics in secondary schools in Kayonza District. Different items were set to test this aspect and findings are presented in figure 4 for students' views and table 9 for teachers' responses.

Figure 4: Factors Influencing Learner's Performance in Mathematics in Secondary Schools
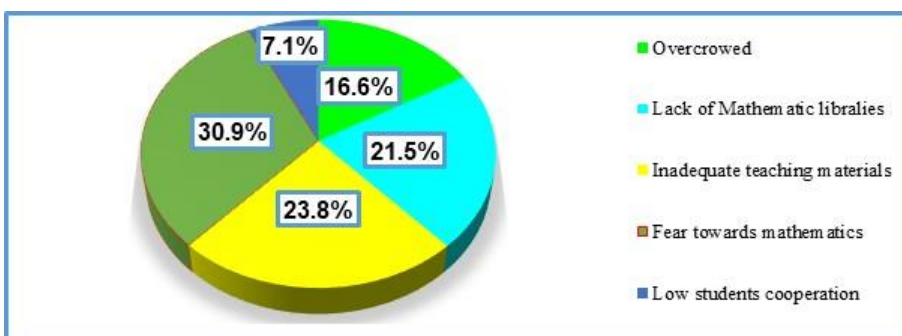
Source: Primary Data (December, 2022).

Results from figure 4 above, indicated that the majority of students (30.9%) asserted that fear towards mathematics among students lead to their low performance in mathematics, 23.8% of students argued that inadequate teaching materials is one of the major factors leading to low performance of students in mathematics, 21.5% of students felt that lack of mathematic libraries influence their low performance in mathematics. Furthermore, 16.6% of students believed that over cowed /high number of students in one class affects negative the students' mathematics in secondary schools in Rwanda. Finally, 7.1% replied that low students' cooperation during group discussion affects negatively the students' performance. One of the student revealed strictness while teaching mathematics as the major cause of low achievement in mathematics by the perception of students and lack of exercise as a major cause by the perception of teachers.

Table 7: Factors influencing Learner's Performance in Mathematics in Secondary Schools

Factors influencing learner's performance in mathematics in secondary schools	Min	Max	Mean	Std. Deviation
Fear towards mathematics	4	4	4.29	.237
High number of students per classroom	3	4	3.98	.477
Low level of teachers' training	1	5	4.99	1.38
Lack of science culture among students	1	4	3.78	.210
Lack of understanding about signs and symbols	1	2	1.56	.732
Low level of teaching materials	1	5	4.88	.249
Deficiencies regarding school curriculum	3	4	3.56	.251
Average mean			**3.805**	

Source: SPSS output (December, 2022).

Findings in Table 7 reveal the factors influencing learner's performance in mathematics in secondary schools. The analysis made by the researcher taking into consideration the mean value and standard deviations so as to come up with clear interpretation and conclusions. The results showed that teacher respondents agreed that fear towards mathematics among students led to low performance of students in secondary schools in Kayonza District. This was justified by a strong mean of 4.29 which is near equal to 4 (Agree).

However, a sight low standard deviation of .237 that shows that respondents tend to have the same view that fear towards mathematics among students led to low performance of students in secondary schools in Kayonza District. The findings presented in table 9 revealed that high number of students per classroom affect negatively student's performance in mathematics. This was assessed and respondents agreed on it (Slight mean= 3.98 rough towards 4, Std =0.477). Furthermore, the teachers strongly agreed that low level of teachers' training among some teachers in Kayonza District led to low performance of students in mathematics and this was evidenced by a strong mean of Mean=4.99 and Std of 1.38).

However, respondents agreed that lack of science culture among students led to low students' performance in mathematics (Mean= 3.78, Std=.210). Teacher respondents strongly disagreed that lack of understanding about signs and symbols affect learners' performance in mathematics (Mean=1.56, Std =.732). Moreover, low level of teaching materials is the factor that affects low students' performance in mathematics as reflected by the mean value that is 4.88 which is tending towards the maximum value of 5 (that is strongly agreeing). However, the standard deviation of .249 suggests small variations in responses by the respondents. Lastly, the respondents strongly agreed that deficiencies regarding school curriculum (Mean= 3.56, Std =.251).

Interview guide revealed that anxiety and fear, inadequate qualified teachers of mathematics, poor teaching methods, inadequate mathematics teaching materials, overcrowded or mathematics classes, lack of libraries and mathematics laboratories. Lack of supervision and inspection of mathematics teachers as well as lack of parental involvement to help students in homework activities. Empirical review collaborated with primary data that the main factors which can be cited to account for the low performance in science include the lack of science culture and deficiencies regarding the school curriculum, the teaching learning process, instructional materials and teacher training (Filipino, 2020).

Students' performance in Mathematics brought out by formative Assessment Tools

This section presents the students' academic performance in mathematics. The researcher compared students' scores in mathematics for four consecutive years (2018 and 2021).

Table 10 gives the summary of the findings.

Table8: Students' Performance in Mathematics brought out by formative Assessment Tools

Year (s)	Mean	Standard deviation	Interpretation of the Performance
2018	3.12	1.561	Moderate
2019	3.25	1.213	Moderate
2020-2021	3.68	1.490	Good
2021-2022	3.99	.753	Good
Average	**3.2925**	**1.254**	**Good**

Source: National Examination Board (2018-2021)

The results presented in Table 8 revealed that students' academic performance from the year 2018 and 2019 was moderate, though slowly in 2020 and 2021, it started to gradually improve (students 'performance in mathematics was good). This is because, much as the change was drastic and negatively affected students' performance for lack of readiness for both the teachers and the students in mathematical practices even before 2019, the government laid much efforts to ensure that most mathematics text books were availed,

teachers were more equipped with mathematical skills , introduction of technology in teaching (Supplying computers to the secondary schools enabled students to widen the students' mathematical skills and knowledge) , teachers also underwent mathematical trainings in the same realm/way. Basing on the average mean, the performance of students in mathematics in secondary schools in Kayonza District was good in last four years. This signifies that training provided to the teachers to be equipped with the much needed expertise to teach mathematics can lead to high students' performance in mathematics from good performance (3.41-4.20) to the excellent performance (4.21-5.00).

Effects of formative Assessment tools on Learners 'Performance in Mathematics

The third objective of this study was to assess the effects of formative assessment tools on learners 'performance in mathematics. Different items were set to test this aspect and findings are presented in table 11 for teachers' responses.

Table 9: Effects of formative Assessment tools on Students' Performance in Mathematics.

Formative Assessments	Min	Max	Mean	Std. Deviation
It changes teaching and learning activities to boost students performance in Mathematics	3	5	4.42	.793
Teachers use group discussions to enhance students enactment and scoring	4	5	4.83	.389
Homework enable the learners to have good study behavior to perform well in any education tasks	1	5	3.33	1.371
Homework helps learners to perform well in mathematics class activities	4	5	4.08	.289
Teachers encourage student's participation in mathematics duties/tasks through observations and monitoring.	4	5	4.75	.452
Teachers use observations to judge student performance features.	4	5	4.50	.522
Group work encourages peer learning and performance in Mathematics	2	5	4.25	.965
Average mean			**4.30**	

Source: SPSS output (December, 2022).

In Table 11 above, respondents agreed that formative assessment tools change teaching and learning activities to boost students' performance in Mathematics with a mean of 4.42 relates to 4 (Agree). However, a considerable deviation of .793, which signifies that formative assessment, tools change teaching and learning activities to boost students' performance in Mathematics. Similarly, the researcher set out to know whether the teachers use group discussions to enhance students' enactment and scoring and the findings strongly agreed to the above statement for example (mean value, i.e 4.83 and the standard deviation of .389). Additionally, respondents have no idea about that the homework enable the learners to have good study behavior to perform well in any education tasks. The findings showed that respondents were not aware about the statement (a mean of 3.33 that is about equal to mean value 3 (i.e. Undecided) to mean that a high number of respondents had no idea that when teachers gave a homework to the students, their parents actively help the students in performing well what is given as a homework.

Correspondingly, respondents agreed that homework helps learners to perform well in mathematics class activities as it was evidenced by a mean value of 4.08 (approaching 4 stands for agreement). Furthermore, the researcher investigated whether the teachers encourage student's participation in mathematics duties/tasks through observations and monitoring and the findings revealed that respondents strongly agreed to the assertion (a mean of 4.75, which tends to be the maximum value of 5 (meaning completely agree). Moreover, respondents agreed that the teachers use observations to judge student performance features and group work encourages peer learning and performance in Mathematics as shown by the mean values: 4.50 and 4.25 respectively.

Based on findings, it is clear that to say that use group discussions to enhance students' enactment and scoring, teachers encourage student's participation in mathematics duties/tasks through observations and monitoring and group work encourages peer learning and performance in Mathematics in secondary schools in Kayonza District. This study confirms the findings from the study of Mansoor (2012) who investigated the effects of formative assessment tools in one university in Pakistan and found less than half of the participants showed group discussion, use of tests to assess the students' level of understanding help teachers to improve students' performance in sciences. Similarly, Nakafeero (2015), his study revealed that coursework's; teachers' observations group/class work and test assignments play a great role in enabling the teaching and learning in schools. However, the poor use of formative assessment tools had made this realization very difficult, thus poor use of formative assessment tools by teachers, poor student's performance in mathematics in secondary schools in Kayonza District.

Table 9: Pearson Correlation Coefficient Matrix

		Formative assessment tools	**Students' performance**
Formative assessment tools	Correlation Coefficient	1	.79.1[**]
	Sig. (2-tailed)	.	.000
	N	65	65
Students' performance	Correlation Coefficient	.79.1[**]	1.
	Sig. (2-tailed)	.000	.
	N	65	65

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output (December, 2022).

To establish the relationship between variables, Pearson correlation index number was calculated by taking into consideration formative assessment tools as the independent variable and students' performance in mathematics. A high positive value (r=. 79.1, p< 0.01) was established between formative assessment tools on students' performance in mathematics. Therefore .79.1 (i.e. 79.1 %) indicated that formative assessment tool affects the students' performance at 79.1 % other 20.9 % are coming from other factors (Moderate variables) that can also affect students' performance in mathematics. The findings of the current study rhyme well with empirical data that feedback had a positive effect on students' thinking, goal orientation, and perceived autonomy (Rones, 2019).

DISCUSSIONS OF FINDINGS

Formative Assessment tools used in Teaching and Learning Mathematics

The first objective of this study was to identify the formative assessment tools that are currently used in teaching and learning mathematics in Kayonza district. The results revealed that formative assessment tools were used by teachers in teaching mathematics in Kayonza District, this was evidenced by the average mean =4. 142.This was attributed to the fact that standardized test, end of unit or chapter tests, end term exams and interim assessments as well as group discussions were used to assess students' achievements in Mathematics in secondary schools in Kayonza District.

Quantitative findings are in line with interview, school staff informants narrated saying that: both formative and summative forms of assessment are applied by the teachers at Kayonza District that is to say that during the discussion, formative forms of assessment are continuous for the purpose of checking the progress of students in learning and those include elements like coursework's, teachers' observations group/class work and test assignments which are aimed to check the performance of students in mathematics. This result is in line with the view of Obinaju (2016), which states that use of group work activities and coursework as well as test assignments help teachers to improve student academic performance. The results are also in line with the views of Gordon and Reese (2017) who reported that evidence that teachers can train students to pass any kind of test, coursework and exams even those intending to assess higher thinking skills, frustrating those who consider that teaching to well -designed tests can influence teaching in positive directions. Similar, Harder, (2018) asserted that the teachers employ coursework, observations, group discussions and tests as tools of formative assessment to improve student academic performance in course of the study.

Factors that influence the Learner's Performance Level in Mathematics

The second objective was to assess the factors that influence the learner's performance level in mathematics in secondary schools in Kayonza District. The study revealed that the majority of students (30.9%) asserted that fear towards mathematics among students lead to their low performance in mathematics. Correspondingly, 23.8% of students argued that inadequate teaching materials are one of the major factors leading to low performance of students in mathematics. However, 21.5% of students felt that lack of mathematic libraries influences their low performance in mathematics. Furthermore, 16.6% of students believed that over cowed /high number of students in one class affects negative the students' mathematics in secondary schools in Rwanda. Finally, 7.1% replied that low students' cooperation during group discussion affects negatively the students' performance. Teachers' responses revealed that the factors influencing learner's performance in mathematics in secondary schools were fear towards mathematics among students (Mean =4.29, Std= .237), high number of students per classroom (Slight Mean= 3.98, Std =0.477) and level of teachers' training among some teachers in Kayonza District (Mean=4.99 and Std of 1.38) as well as lack of science culture among students (Mean= 3.78, Std=.210) and Insufficient of teaching materials (Mean=4.88, Std =.249)

Interview guide revealed that anxiety and fear, inadequate qualified teachers of mathematics, poor teaching methods, inadequate mathematics teaching materials, overcrowded or mathematics classes, lack of libraries and mathematics laboratories. Lack of supervision and inspection of mathematics teachers as well as lack of parental involvement to help students in homework activities. Empirical review collaborated with primary data that the main factors which can be cited to account for the low performance in science include the lack of science culture and deficiencies regarding the school curriculum, the teaching learning process, instructional materials and teacher training (Filipino, 2020).

Effects of formative Assessment tools on Learners 'Performance in Mathematics

The third objective of this study was to explore the effects of formative assessment tools on learners 'performance in mathematics in secondary schools in Kayonza District. The study revealed that formative assessment tools highly affected leaners' performance in mathematics as shown by an average mean 4.30 tends to high mean (table 11). This was attributed by the fact that formative learning tools change teaching and learning activities to boost students' performance in Mathematics (Mean=4.42, Std= 793) , use of group discussion in teaching to enhance students' enactment and scoring (mean value, i.e 4.83 and the standard deviation of .389) and use of homework to helps learners to perform well in mathematics class activities (Mean=4.08) as well as encouragement of student's participation in mathematics duties/tasks through observations and monitoring.

Qualitative data fund out that use group discussions to enhance students' enactment and scoring, teachers encourage student's participation in mathematics duties/tasks through observations and monitoring and group work encourages peer learning and performance in Mathematics in secondary schools in Kayonza District. This study confirms the findings from the study of Mansoor (2012) who investigated the effects of formative assessment tools in one university in Pakistan and found less than half of the participants showed group discussion, use of tests to assess the students' level of understanding help teachers to improve students' performance in sciences. Similarly, Nakafeero (2015), his study revealed that coursework's, teachers' observations group/class work and test assignments play a great role in enabling the teaching and learning in schools. However, the poor use of formative assessment tools had made this realization very difficult, thus poor use of formative assessment tools by teachers, poor students performance in mathematics in secondary schools in Kayonza District.

CONCLUSION

The following conclusions were drawn because of the research work carried out in the area of the effect of formative assessment tools that include homework, learners-learners Discussions, Tests and end of semester exams to boost the students' performance (Improved homework results, improved end of term scores and Improved test scores) in mathematics. Conclusively, it is reported that the four of the sub- variables of independent variable namely homework, learners-learners Discussions, Tests and end of term exams are significantly explaining the variations in explanatory variable. Therefore, the formative assessment tools affect positively the students' academic performance at about 79.1% because R Square is positive (.79.1> 0).

Therefore .791(i.e. 79.1 %) indicated that formative assessment tool affects the students' performance at 71.9 % other 20.9 % are coming from other factors (Moderate variables) that can also affect students' performance in mathematics. Golden (2019) concluded that students' formative assessment scores were a predictor of their summative assessment scores. The qualitative findings of the research coincided with the quantitative findings. These findings revealed the positive effects of formative assessment tools in mathematics lessons on students' achievement of functions topic and attitudes towards mathematics. The results of the studies on formative assessment in the literature supported the results of the current study (Andersson & Palm, 2017; Box, 2019; Cormier, 2020; Faber et al., 2017; Kline, 2013; Köksalan, 2019; Ozan & K?ncal, 2018).

REFERENCES

1. Adeyemi T.O. (2008). Use of Assessment practices and students learning outcomes in secondary schools in Ondo state, Nigeria. MED Project, Department of Educational Foundation and Management, University of Ado-Ekiti-Nigeria.
2. Airasian, P. (2001). Classroom assessment: Concepts and applications (4th ed.). Columbus, OH: McGraw-Hill.

3. Akbari, R., Khayer, M., & Abedi, J. (2014). Studying the effect of education state metacognition on learning mathematics. Reef Resources Assessment and Management Technical Paper,40(2), 220-229.

4. Ali, H. T. (2016). Causes of Poor Performance in Mathematics from the Perspective of Students, Teachers and Parents. American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS).

5. Andersson, C., & Palm, T. (2017). The impact of formative assessment on student achievement: A study of the effects of changes to classroom practice after a comprehensive professional development programme. Learning and Instruction 6, (49), 92–102.

6. Angeli, F and Ira vannini, F.P. (2018). Formative assessment for mathematics teaching and learning. Milano, Italy: ricerca-formazione.

7. Barton, M. L. & Heidema, C. (2020). Teaching Reading in mathematics. Aurora, CO: Midcontinent Research for Education and Learning.

8. Baumert, J., Kunter, M,. Blum, W., Voss, T., Jordan, A., Klusmann, U. (2010). Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress. American Educational Research Journal, 47(1): 133–180.

9. Beesley, A. D., Clark, T. F., Dempsey, K., & Tweed, A. (2018). Enhancing formative assessment practice and encouraging middle school mathematics engagement and persistence. School Science and Mathematics, 118(1–2), 4–16.

10. Black, P. (2008). Testing: Friend or foe? Theory and practice of assessment and testing. London: Falmer Press.

11. Black, P. J., & William, D. (2004). Assessment and classroom learning. Assessment in Education: Principles, Policy, and Practice, 5(1), 7-74.

12. Bowling, A. (2012). Research methods in health: investigating health and health services (2nd edition. Buckingham: Open University Press.

13. Bridgeman, B. (2014). Effects of test performance feedback on immediately subsequent Computers & Education, 150, 103833. https://doi.org/10.1016/j.compedu.2020.103833.

14. Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83(1), 1–6.

15. Chappuis, S. & Chappuis, J. (2008). The Best Value in Formative Assessment Journal of Innovative Education Research .1 (3) 69-75.

16. Chen, I. H., Gamble, J. H., Lee, Z. H., & Fu, Q. L. (2020). Formative assessment with interactive whiteboards: A one-year longitudinal study of primary students' mathematical performance.

17. Churchill, G. A. (2006). Basic marketing research methods (5th ed.). New York: the Dryden Press.

18. Cormier, K. (2020). The use of ongoing formative standards-based assessments to improve student learning in an eighth-grade mathematics classroom (Order No. 27956608). ProQuest Dissertations & Theses Global. (2412152148).

19. Creswell, J. W. (2009). Research design: Qualitative, Quantitative and Mixed methods aproaches,3rd Ed. Los Angeles: SAGE Publication Inc.

20. Crooks, T. J. (2008). The impact of classroom evaluation practices on students. Review electronic version. Educational Leadership, 65, 14-19.

21. Erwin, J. D. (2015). Attending to assessment: A process for faculty. In P. Knight (Ed.). Assessment for Learning in Higher Education. London: Kogan Page.

22. Faber, J. M., Luyten, H., & Visscher, A. J. (2017). The effects of a digital formative assessment tool on mathematics achievement and student motivation: Results of a randomized experiment. Computers & Education 9 (106):83–96.

23. Fenster, E.D. (2014). Implications of Teacher Tenure on Teacher Quality and Student Performance, (Unpublished Honours thesis, Duke University Durham, North Carolina).

24. Fidele, U. (2022). Active Learning through Assessment for Learning: A Way to Enhance Students' Understanding of mathematical concepts. Rwandan Journal of education, 4-9.

25. Gagne R.M., Wager W.W., Golas K.C. and Keller J.M. (2005). Principles of Instructional Design, Thomson Wadsworth.

26. Garcia, G. E. (1994). Equity challenges in authentically assessing students from diverse backgrounds. Educational Forum 8, (59), 64-73.

27. Githua, B. N. & Mwangi, J. G (2021) Students' mathematics self-concept and motivation to learn mathematics: International Journal of Educational development 9 (23): 487-499.

28. Goe, L. (2007). The Link Between Teacher Quality and Student Outcomes: A Research Synthesis. Available from National Comprehensive Centre for Teacher Quality database. (Record No. S283B050051).

29. Golden, J. B. (2019). The relationship between formative math assessments and the state summative assessment for middle school students in Alabama (Order No. 27544015). ProQuest Dissertations & Theses Global (2316839127).

30. Griffin, S. (2007). Implications of research on children's learning for standards and assessment: A proposed learning progressions formatter and atomic-molecular theory. Measurement: Interdisciplinary Research and Perspectives, 14(1-2), 1-9.

31. Heritage, M. (2017). From formative assessment: Improving teaching and learning. Paper presented at the CRESST 2017 Assessment Conference, Los Angeles, CA.

32. Herman, J. L. (2010). Coherence: Key to next generation assessment success (CRESST Policy Brief). Los Angeles, CA: CRESST.

33. Herman, J. L. (2010). Coherence: Key to next generation assessment success (CRESST Policy Brief). LosAngeles, CA: CRESST.

34. Irfan. M & Shabana.N (2012). Factors Affecting Students' Academic Performance. Global Journal of Management and Business Research. 12 (9), I21- I25.

35. Isaac. A, Daniel, A and Joana, B (2019). Knowledge of Formative Assessment Practices among Senior High School Mathematics Teachers in Ghana. American journal of humanities andscience researches, 4-6.

36. James, A. O. (2015). effect of formative testing on students' achievement in junior secondary school mathematics. European Scientific Journal, 8(8), 9.

37. Kaplan, L. S. & Owings, W. A. (2015). Enhancing teacher and teaching quality: Recommendations for principals. NASSP Bulletin, 85 (628): 64-73.

38. Kasiisa. F.& Tamale. B. (2013). Effect of assessment in learning on the Pupils Performance in test performance. Journal of Educational Psychology, 6(1), 62-66.

39. Kothari, R.C., 2004. Research methodology: methods and techniques. New Delhi: New Age International (P) Ltd Publishers.

40. Looney, S. (2011). Assessment in Education from principles to practice of Primary School Social Studies: Implication on Teacher Quality in Uganda. Educational Research, 58: 438-481.

41. Mai, X. (2021). The Application of Formative Evaluation Strategies in College English Classroom from the Perspective of Teacher Questioning. open journal of modern linguistics(https://doi.org/10.4236/ojml.2021.116067), 20_24.

42. McManus, S. (2008). Attributes of Effective Formative Assessment. Formative Assessment for Teachers and Students (FAST) State Collaborative on Assessment and Student Standards (SCASS) of the Council of Chief State School Officers. Greenwich, CT: Information Age Publishing.

43. Motoko, A., Le Tendre, K., & Scribner, J. (2007). Teacher Quality, Opportunity Gap, and National Achievement in 46 countries. Educational Researcher, 36(7), 369-387

44. Mugenda O, & Mugenda A (2008). Research methods: Quantitative and Qualitative Approaches. Nairobi: Acts Press, Nairobi.

45. Mugenda, O. & Mugenda, G. (2003). Research methods: Quantitative and qualitative approaches: Nairobi. Applied Research and Training Services Press.

46. N.R.C. (National Research Council). (2001). Taking science to school. Washington, DC: National Academies Press.

47. Neuman, L. (2010). Research methods: Qualitative and quantitative approaches. Oakland: Sage Publications.

48. Nitko, A. J. (2001). Educational assessment of students (3rd ed.). Upper Saddle River, NJ: Merrill.

49. Njiru, B, K (2015). Influence of formative evaluation on learner performance in mathematics in secondary schools in EMBU county, Kenya.

50. Omari, I. M. (2011). Concepts and Methods in Education Research. Dar-es-Salaam: Oxford University Press.

51. Popham, W. J. (2008). Expanding dimensions of instructional objectives. Upper Saddle River, NJ: Prentice-Hall.

52. Robson, C. (2002). Real world research: A resource for social scientists and practitioner researches (2nd ed.). Oxford: Blackwell Publications.

53. Rolfe, G. (2016). Validity, trustworthiness and rigour: quality and the idea of qualitative research. J AdvNurs; 304–10.

54. Rones, D. D. (2019). Student and teacher response to formative assessment feedback in eighth grade mathematics: A design experiment (Order No. 13856648). ProQuest Dissertations & Theses Global. (2248614511).

55. Sadler, D. R. (1989). Formative assessment and the design of instructional systems. Instructional Science, 18,119-144.

56. Sekaran, U. (2013). Research Methods for Business: A Skill-Building Approach (4th edn). New York: Wiley.

57. Shikuku B. N. (2019). Effects of syllabus coverage on students' performance at KCSE mathematics: A case of Kakamega South District Kenya. Lap Lambert Academic Publishing: rehagmbh, Dudweilesrstra Be 72 66111 Saarbrucken.

58. Stiggins, R. J. (2016). Evaluating Classroom Assessment Training in Teacher Education Programs. Educational Measurement: Issues and Practice,18 (1), 23-27.

59. Tunstall, P., & Gipps, C. (2009). Teacher feedback to young children in formative assessment: a typology. British Educational Research Journal, 22, 389-404.

60. Department of Education (2008). Great exceptions holding ourselves and our schools accountable for results. Retrieved from www2.ed.gov/nclb/overview/importantance/greater exceptions.

61. Wass, V., Van der Vluten, C., Shatzer, J. & Jones, R. (2015). Assessment of clinical competence. Toronto: University of Toronto Bookstore Custom Publishing, 357,   945 949.