



## **Relevance of Remedial Classes on Academic Performance of Mathematics Subject in Secondary Schools.**

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### **ABSTRACT**

Abstract: In the early 20th century, the progressive education movement, led by educators such as John Dewey, emphasised individualised instruction and the importance of meeting the needs of each student. This movement laid the groundwork for the development of remedial education programs focused on addressing specific learning difficulties and providing targeted interventions. This study examined the relevance of remedial classes on academic performance in Mathematics in secondary schools in Singida Municipality. The study used a combination of qualitative and quantitative approaches and a descriptive research design. The target population included parents, academic teachers, Mathematics teachers, and form four students. Both probability and non-probability sampling techniques were used. Data were collected through questionnaires and interviews. Quantitative data were analysed using descriptive statistics, and thematic analysis was used to analyse qualitative data. Findings revealed that the establishment of remedial classes was aimed at boosting academic performance among students. The primary aim of remedial classes is to provide additional instructional support to students who are struggling to meet the expected academic standards. These classes are designed to help students bridge gaps in their understanding, improve their skills in specific subject areas, and ultimately enhance their overall academic performance. The study recommended that remedial classes in the study area need to be redesigned, especially in the way Mathematics subject content is delivered to students. This should go hand in hand with proper teaching methods, interactive learning, and the integration of instructional technology to stimulate learners' interest in Mathematics.

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### **Introduction**

The 21st century has seen a shift in remedial education towards more personalised and technology-enhanced approaches (Taylor & Smith, 2012). With the advent of digital learning platforms and educational technology, remedial classes now often incorporate online resources, adaptive software, and virtual tutoring to provide individualised support to students (Jones, 2018). Additionally, there has been an increased emphasis on evidence-based practices and data-driven decision-making in the design and implementation of remedial education programs (Brown & Johnson, 2019). This includes the use of diagnostic assessments and progress monitoring tools to identify students' specific needs and track their academic growth over time (Garcia, 2021). Furthermore, there is growing recognition of the importance of addressing underlying socio-economic and systemic barriers to academic success in conjunction with targeted remedial interventions (Martinez & Patel, 2020).

In the United State of America, remediation began in higher education in the 17th century. (Boylan, White, 1994) The Harvard College, one of the world's most prestigious universities, was the first to offer remedial education to its students in 1636 with the sole purpose of advancing learning and perpetuating it for prosperity. This need for remediation resulted from the fact that the language in which most learned books were written was Latin. Latin was also the language of instruction for most courses. Few books, particularly scholarly works, were available in any language other than Latin. Consequently, it was necessary for those who wished to attend Harvard College to study Latin before they could be successful in their studies. Harvard, therefore, provided tutors in Latin for incoming students (Brubacher, & Rudy, 1976).

In the United Kingdom, remedial classes have been implemented over time with various initiatives and programs addressing the needs of students requiring additional support. However, a notable milestone was the Education Act of 1944, which laid down the foundations for modern education in the UK and included provisions for remedial education to support students with learning difficulties. Since then, remedial classes and support services have evolved to meet the changing needs of students. Remedial classes also known as intervention or support classes are typically offered to students who require additional help to catch up or excel in certain subjects. They may focus on subjects such as Mathematics, English or literacy skills.

In Kenya, remedial education is implemented as part of efforts to address learning gaps and improve academic outcomes among students. The Kenyan government has implemented various initiatives to support remedial education. For example, the Ministry of Education has launched programs such as the National Remedial Education Program (NREP) to provide targeted support to students who are struggling academically (MoE, 2017). Teacher-Led Interventions: In many Kenyan schools, remedial education is delivered through teacher-led interventions. Teachers identify students who need additional

support and provide extra lessons or personalised instruction to help them catch up with their peers (Chepkemoi & Chege, 2019). Non-governmental organisations (NGOs) in Kenya also play a significant role in providing remedial education support. Organisations such as Bridge International Academies and Educate are some of the active participants in this cause. Kenya collaborates with schools to offer remedial classes, mentorship programs, and academic support services to disadvantaged students (Ndirangu, 2018). By combining these various approaches, Kenya aims to improve educational outcomes and ensure that all students have the opportunity to succeed academically.

In Tanzania, there is no specific nationwide policy explicitly dedicated to remedial classes in secondary schools. However, remedial education does play a role within the broader educational framework and is often implemented at the school or district level to support students who are struggling academically. Remedial programs are usually organised by individual schools and can vary significantly in their structure and implementation regarding different practices based on remedial issues. For example, this program focuses on key subjects like Mathematics, English and Science subjects (MoEST 2020). Secondary education in Tanzania is a critical stage of formal schooling where students prepare for national examinations that determine their future educational and career paths (Mushi, 2017). Despite efforts to improve educational quality and access, secondary schools in Tanzania face various challenges, including overcrowded classrooms, limited resources, and disparities in learning outcomes between urban and rural areas (Kafyulilo, 2015). Remedial classes offer additional instruction and support to students who have fallen behind in their studies, aiming to improve their academic performance and overall educational attainment (Biswas, 2018).

The government of Tanzania and other education stakeholders have been taking several initiatives to improve academic performance of their students in secondary schools. Among them includes remedial classes, regular tests, academic competitions, rewards to teachers and students performing well in examinations and subject clubs (Kisiga, 2022).

Despite these initiatives, academic performance especially Mathematics among public secondary schools in Singida Municipality has not been satisfactory. For instance, NECTA (CSEE) results for Mathematics for the past five years (2018 – 2022) statistics for public secondary school students indicated that over the years, the pass rate has stayed remarkably low as the failure rate ranging from 80.8% in 2018, 78% in 2021, 78.7% in 2020, 79.1% in 2021 and 78.8% in 2022 as reported by Francis (2024). In this case, an immediate intervention is needed to examine the relevance of remedial classes on academic performance of Mathematics subjects in secondary schools, which was the motive of this study.

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## Empirical Literature Review

Hema and Sonam (2020) conducted a study designed to find out the impact of remedial class on low-achiever students' learning achievement. The research was action based that employed a mixed mode which consisted of qualitative and quantitative research methods. The instruments for data collection were learning achievement tests, semi structured interviews, students' reflective journals, and teachers' journals. Participants who scored below the benchmark in the class test attended the remedial class in English (class 7) and Geography (class 7 and 8). Achievement Test, Pretest and posttest were administered to the group. The pretest was administered before the treatment whereas the posttest was administered after the treatment. The findings show that the posttest scores were higher than the pretest scores with significance value (p) 0.000. This revealed that remedial class enhanced the learning achievement of students.

The findings were similar to the studies carried out by Louch (2014) who investigated the impact of remedial English on improvement of English Proficiency of freshmen at the United States International University. Using a quasi-experimental design, it tracks 46 underprepared students, admitted to the USIU in the Summer Semester of 2011 who failed to make the threshold for university course in a placement test (pretest) and went through a remedial English course for 14 weeks. On completion of the course, they were given the same placement test (posttest). Comparisons between the scores in the pretest and those on the post-test are used to determine the significance of change that the treatment gave the students. Further comparisons were made between the scores in composition and in the grammar sections of the pretest and posttest and variation between the scores of students. T-tests establish a significant and positive difference at p value of  $p=0.00$  between overall performance between the pretest and posttest and between grammar and composition aspects of the tests. The conclusion is therefore that the remedial class raised the English proficiency of the students.

Study conducted by Jarrar (2014) investigated the impact of remedial classes on the performance of fourth grade low achievers in English in public schools in Ramallah District. It also examined the effect of gender and group variables on those pupils' performance. The researcher developed 59 items of English proficiency test that covered four language skills. Additionally, the researcher conducted an interview with all English language teachers. The data were collected and analysed using SPSS. The finding revealed that there was an obvious effect for the remedial classes on improving the students' level in English language learning, particularly in speaking skill which was also approved by English teachers' response in the interview. The semi structured interview and teachers' journal on learning behaviour of students were used to find the impact of remedial class to support quantitative data. The findings revealed that remedial class improved the competencies of low achievers. As it helped them to enhance knowledge and improve their performance, it motivated them to learn. They also displayed interest towards the lesson and actively participated in the activities.

Study conducted by Kaliwa (2023) intended to look into the effect of remedial education on students' performance in lower secondary school Biology in Tanzania. 80 form four students from 3 selected community day secondary schools participated in this study. A mixed methods approach was applied whereby observation, documentary review, and pre and post-testing were used to collect data. The findings revealed that the study was more effective because students in Biology classes improved their performance than it was before remedial interventions. It was also revealed that learner-centred teaching strategies such as small group discussions, field works, computer-assisted instructions, one to one instructions, and others have a great impact on students' performance and they help students to learn and do things on their own which strengthens their knowledge and understanding of Biology.

Tshimiyimana, Rutegwa and Nsengimana, (2023) conducted a study on evaluation of teaching and learning strategies used in remedial teaching and learning of Biology in lower secondary schools of Rwanda. The study aimed to address covid 19 as a challenge to lower secondary schools of Rwanda and how the remedial teaching and learning were implemented to tackle the challenge in Biology subject of Rwanda. Qualitative research approach was used with interviews and observations as means of data collection. The findings revealed that the implementation of remedial education faced the challenge of low level of students' English and short time devoted to remedial teaching. Some of the teachers were ignorant of the remedial teaching process as it was argued to be a time consuming process.

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## Research Methodology

The study employed a mixed research approach including quantitative and qualitative research. The goal of qualitative research is to produce intensive authentic descriptive accounts of experience and action. Through qualitative methods teachers and their supervisors are able to bring out data on their experiences, the feelings and emotions using flexible language. The researcher is not confined to observable phenomena or to only what is quantifiable. The quantitative approach allowed the researcher to handle large numbers of cases and patterns of interactions between variables and to verify the presence of cause and effect relationships between variables.

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## Population and Samplings

In this study, the targeted population was the parents, academic teachers, mathematics teachers and form four students. Singida municipality has 20 public secondary schools and 1842 form four students. The sample size was determined by the following formula;  $S_2 = P \div [1 + P(d^2)]$ . Due to the nature of the study, purposive and simple random sampling techniques were applied. Purposive sampling technique was employed deliberately to get key informants such as heads of public secondary schools, academic teachers and mathematics teachers because they sought to be knowledgeable about the practices of remedial classes and its impacts on improving academic performance in mathematics.

### Data Collection Techniques

The study employed interviews, particularly semi-structured interviews, to gather information from key informants. This method was crucial due to the expertise of the respondents and the need for in-depth information. Semi-structured interviews allowed for both key and probe questions, enabling exploration of answers and freedom of expression for the respondents. Guiding questions were prepared to aid the data search process, and efforts were made to establish rapport with the interviewees. The researcher took notes and tape-recorded the interviews for future data analysis. Moreover, questionnaires were used as a data collection instrument due to the large population sample of 240 respondents in the study. Questionnaires were prepared in English language. Questionnaires had five options for respondents to indicate their level of agreement or disagreement as follows: 5 = Strongly Disagree, 4 = Disagree, 3 = Neutral, 2 = Agree, 1 = Strongly Agree. These questionnaires were designed to gather data from both students and teachers. The researcher was responsible for crafting a comprehensive set of questions, aiming for diversity and relevance. The questionnaires were distributed and collected by the researcher personally.

### Validity and Reliability

In order to test validity and reliability of the methods for data collection and analysis, a pilot study was conducted three weeks before actual data collection. This was done in order to observe the following: test data collection instruments, see if tools provide the required information, hence identify potential problems, assess and estimate time needed for data collection, check availability of study population, reactions of respondents and see whether the costs and other requirements were adequate.

### Data Analysis Plan

The collected quantitative data from questionnaires were processed using descriptive statistics techniques. Data from all three research objectives were analysed through Statistical Packages for Social Sciences (SPSS) version 20. Data analysis was done and involved computation of descriptive statistics (frequencies in terms of numbers and percentages) of the distributions interpreted accordingly. Qualitative data were used to analyse factors that influence the success of remedial classes in secondary schools and also to explore the perceptions of teachers, regarding remedial classes in secondary schools where interviews were used to analyse data qualitatively through thematic methods.

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## Results

### *Relevance of remedial classes on academic performance of mathematics subject in secondary schools*

To reach this target, respondents were to respond by ticking the most appropriate option ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Scale of mean score interpretation was as follows: Mean scores from 1 to 1.80 were interpreted as strongly disagree. Mean scores from 1.81 to 2.60 were interpreted as disagree. Mean scores from 2.61 to 3.40 were interpreted as Neutral/Undecided. Mean scores from 3.41 to 4.20 were interpreted as agree and mean scores from 4.21 to 5.00 were interpreted as strongly agree. The results of analysis are shown in table 4.1.

Table 1: Respondent's opinions about relevance of remedial classes on academic performance of mathematics subject in secondary schools in Singida Municipality

Relevance of remedial classes on academic performance				Overall rating
	N	Mean	Stdev	
Remedial classes build self confidence among students	88	4.88	.57463	Strongly Agree
Remedial classes promotes student interest in learning mathematics	88	4.63	.69254	Strongly Agree
Remedial classes allow students to get more time to practise mathematics	88	4.70	.58825	Strongly Agree
Remedial classes improve understanding in mathematics	88	4.69	.66061	Strongly Agree
Remedial classes promotes student's curiosity in mathematics	38	4.45	.78316	Strongly Agree

Source: Field Data (2024)

As shown in table 4.1 the mean score for all items in the questionnaires ranged from 4.21 to 5.00 denoting strongly agree. This means respondents strongly agreed with all items in the questionnaire. Specifically, respondents strongly agreed that remedial classes build self confidence among students, remedial classes promotes student interest in learning mathematics, remedial classes allow students to get more time to practise mathematics, remedial classes improve understanding on mathematics and remedial classes promotes student's curiosity in mathematics with the mean score of 4.88, 4.63, 4.70, 4.69 and 4.45 respectively.

Findings presented in table 4.1 denote that the establishment of remedial classes was geared to boost academic performance among students. The relevance of remedial classes is that its primary aim of remedial classes is to provide additional instructional support to students who are struggling to meet the expected academic standards. These classes are designed to help students bridge gaps in their understanding, improve their skills in specific subject areas, and ultimately, enhance their overall academic performance.

In the interview, of the academic teacher commented that:

*"...to me these remedial classes are relevant to the academic performance of mathematics subjects in secondary schools in Singida Municipality. Despite the fact that the performance is not so good, without these remedial classes the results would be worse"* (Interview data: Academic teacher, school 1).

On the other hand, one of the mathematics teachers commented that;

*"...ooh yes, it is relevant to academic performance as it promotes student interest in learning mathematics and allows students to get more time to practise mathematics. The problem we have is how to make all students engage in their large numbers"* (Interview data: Mathematics teacher, school 2).

Furthermore, another academic teacher said that;

*"...these remedial classes allow students to get more time to practise mathematics and improve their understanding of mathematics. Teachers should be creative enough to design appropriate teaching methods to help students master the subject"* (Interview data: Academic teacher, school 3).

In the interview, one of mathematics teacher has it to say;

*"...a conducive environment from home to school contributes to more studying and hence improves learning. The government should collaborate with parents to create a supportive environment"* (Interview data: Mathematics teacher, school 2).

Moreover, one of the parents commented that;

*"...in my opinion, these remedial classes are relevant to the academic performance of mathematics subjects in our schools as it gives these students ample time to study and practice mathematics compared to when they are at home. To me I think the school management should improve the way it is conducted especially in terms of teaching methods"* (Interview data: Parent).

Findings from interviews relate to those obtained from descriptive statistics as presented in table 4.1

These findings are in harmony with those of Albreiki, Habuza and Zaki, (2022) conducted a study on the framework for automatically suggesting remedial actions to help students at risk based on an explainable rule based model in the United Arab Emirates. The study aimed to develop a model that could automatically identify students who are at risk of low performance in the United Arab Emirates. The finding was revealing that predicting or identification of students at risk performance is very crucial. Also provision of the appropriate remedial solution to these students is very important. That means remedial intervention for those students will help the students to perform better and increase the institutional effectiveness.

Findings about performance of mathematics subjects relates to other previous studies. For instance Tshimiyimana, Rutegwa and Nsengimana, (2023) conducted a study on evaluation of teaching and learning strategies used in remedial teaching and learning of biology in lower secondary schools of Rwanda. The study aimed to address covid 19 as a challenge to lower secondary school secondary schools of Rwanda and how the remedial teaching and learning were implemented to tackle the challenge in biology subject of Rwanda. The findings were revealing that the implementation of remedial education was faced by the challenge of low level of student English and short time devoted to remedial teaching. Some of the teachers were ignorant of

the remedial teaching process as it was argued to be a time consuming process. It recommended providing continuous professional development programs for teachers in Rwanda.

Moreover, a study conducted by Jarrar (2014) investigated the impact of remedial classes on the performance of fourth grade low achievers in English in public schools in Ramallah District. The finding revealed that there was an obvious effect for the remedial classes on improving the students' level in English language learning, particularly in speaking skill which was also approved by English teachers' response in the interview. The semi structured interview and teachers' journal on learning behaviour of students were used to find the impact of remedial class to support quantitative data. The findings revealed that remedial class improved the competencies of low achievers. As it helped them enhance knowledge, improved performance thus they were motivated to learn. They also displayed interest towards the lesson and actively participated in the activities.

Furthermore, Francis (2024) examined anxiety and the performance of secondary school students in mathematics within Singida district. The results indicate that over the years, the pass rate has stayed remarkably low. Four grades were derived from this pass rate: D (30–40), C (41–60), B (61–80), and A (81–100). Moreover, the results demonstrate a widespread failure, with most students receiving a grade F, or less than 29, or (0-29) marks. These statistics show that recently, less than 25% of students in the Singida area have met the requirements to enrol in second-cycle institutions by passing the mathematics subject.

### Performance of mathematics subject in secondary schools

The researcher sought to examine the performance of mathematics subjects in secondary schools in Singida Municipality. Respondents were to respond by ticking the most appropriate option ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Scale of mean score interpretation was as follows: Mean scores from 1 to 1.80 were interpreted as strongly disagree. Mean scores from 1.81 to 2.60 were interpreted as disagree. Mean scores from 2.61 to 3.40 were interpreted as Neutral/Undecided. Mean scores from 3.41 to 4.20 were interpreted as agree and mean scores from 4.21 to 5.00 were interpreted as strongly agree. The results of analysis are shown in table 4.2.

Table 4.2: Respondents opinions about performance of mathematics subject in secondary schools in Singida Municipality

Relevance of remedial classes on academic performance				Overall rating
	N	Mean	Stdev	
The performance of mathematics subject is very good	88	1.90	.97392	Disagree
The performance of mathematics subject is satisfactory	88	3.74	.70571	Agree
The performance of mathematics subject is not good	88	4.23	.68395	Strongly Agree

Source: Field Data (2024)

Findings as presented in table 4.2 revealed that performance of mathematics subjects is not good. This gives an expression that despite the best practice of remedial classes in secondary schools in the study area; there still exist some challenges such as improper delivery methods and inadequate interaction which does not guarantee students' academic performance. Findings presented in table 4.2 suggest that remedial classes in the study area need to be redesigned, especially the way mathematics subject content is delivered to students.

## Conclusions

The study concluded that the establishment of remedial classes was geared to boost academic performance among students. The relevance of remedial classes is that its primary aim of remedial classes is to provide additional instructional support to students who are struggling to meet the expected academic standards. These classes are designed to help students bridge gaps in their understanding, improve their skills in specific subject areas, and ultimately, enhance their overall academic performance.

## Recommendations

The study recommended that the remedial classes in the study area need to be redesigned, especially the way mathematics subject content is delivered to students. This should go hand in hand with having proper teaching methods that will ensure mastery of mathematics subjects among students despite the large number of students. The study recommends that for remedial classes to be effective in terms of interactive learning, instructional technology should be integrated in the whole process of teaching and learning. This will not only make an interactive session but will stimulate learners' interest in mathematics. It was further recommended that since mathematics subjects require students to regularly practise for mastery, teachers should design the individualised instruction and use small groups. The situation will allow each student to fully participate in learning and practice of mathematics.

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