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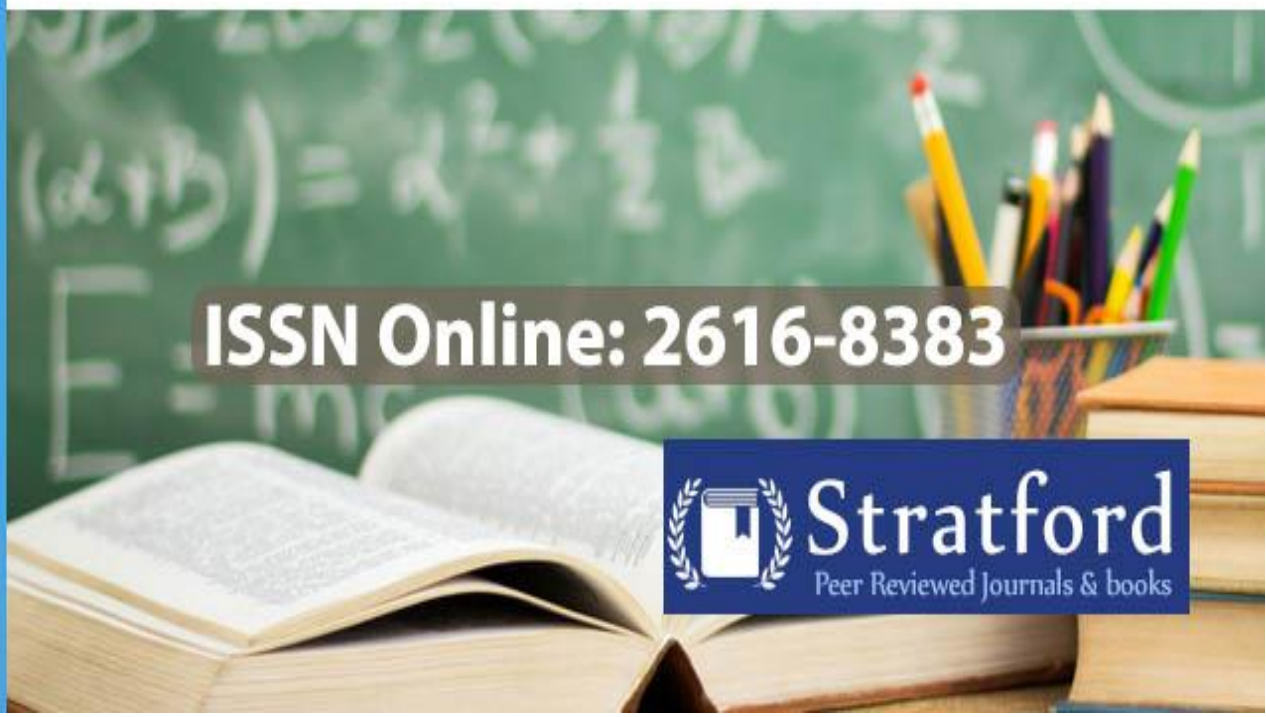


# Strategies to Improve Students' Performance of Level three Culinary Arts at ERM-HOPE TVET Center Kabuga in Mathematics, Kicukiro District

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# Strategies to Improve Students' Performance of Level three Culinary Arts at ERM-HOPE TVET Center Kabuga in Mathematics, Kicukiro District

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## Abstract

The study examined the effectiveness of various strategies for improving the mathematical performance of Level Three Culinary Arts students at ERM-HOPE TVET Center KABUGA. The research involved collecting data from 37 students in both morning and afternoon sessions, as well as from two mathematics teachers. Methods included interviews, classroom observations, and analyzing assessments. Results showed a modest improvement in students' mathematics performance following the implementation of strategies like integrating technology, increasing homework, and conducting assessments. The COVID-19 pandemic, however, posed significant challenges, affecting collaborative learning and emphasizing the need for a conducive learning environment. The study highlighted strategies such as fostering curiosity, providing real-world problems, and effective classroom management. Additionally, it emphasized the importance of school motivation in addressing students' psychological challenges during the pandemic. In conclusion, the study found that a combination of increased exercises, homework, motivational initiatives, and classroom management positively impacted students' mathematical skills, pointing to the need for multifaceted educational approaches in challenging circumstances. The study recommends mathematics teachers to consider students cultural and learning backgrounds in choosing instructional strategies. It is suggested that they 50 align teaching methods with the assessed learning needs and capabilities of students. Teachers may attempt to find a balance of teaching strategies rather than teaching student hence few understand the subject and at last many fail the subject. They may be able to realize the importance of recognizing learning styles, identify students' differences, and adjust the teaching methods accordingly. It is recommended that for students to learn effectively, they need to be flexible by using strategies outside their preferences to meet the demands of the challenging environment. Students must be ready to be guided in mathematics using learner centered methods, which is the very effective way of teaching. Student must not be lazy by not doing self-practice daily. They are also encouraged to actively participate in classroom activities in order to have an enjoyable and satisfying learning outcome. For school administrators, it is recommended to ensure availability of the instructional materials and facilities for the execution of different teaching methods that are aligned with the teaching methods and students' learning in classrooms. Effective teaching and learning cannot be achieved in the absence of those instructional materials.

**Keywords:** *Students' Performance, Level Three Culinary Arts, Erm-Hope Tvet Center Kabuga in Mathematics, Kicukiro District, Rwanda*

## 1.0 Introduction

After learning about the issue of poor performance in mathematics among Level Three Culinary Arts learners at ERM-HOPE TVET Center KABUGA, a researcher embarked on a study to identify strategies for enhancing their mathematical abilities. The teacher, committed to improving student outcomes, focused on tailoring instructional practices to the unique learning strengths and challenges of the students. Recognizing the importance of addressing students holistically, the teacher employed diverse methods and instructions to meet their needs and foster achievement. The Action Research was conducted at ERM-HOPE TVET Center KABUGA, situated in the KICUKIRO District, MASAKA Sector. Established on 12th November 2009, the school offers five programs: Culinary Arts, Tailoring, Masonry, Hairdressing, and Sewing, and has a student population of 235. Its mission is to advance technical studies, technology, and culture.

A noticeable issue was the passivity of the Level Three Culinary Arts students, which negatively impacted their performance in mathematics. This correlation prompted the researcher to conduct a thorough investigation, collecting data both inside and outside the classroom from learners and tutors. It was observed that this issue existed prior to the researcher's involvement. Suspecting that this passivity was a contributing factor to poor mathematical performance, the researcher decided to address the problem during their internship. The research aimed to improve learner performance by incorporating cooperative learning and motivational strategies in the teaching and learning process of Mathematics for Level Three Culinary Arts students. In terms of technology, the school encouraged the use of the ICT Room to enhance the teaching and learning process. The promotion of culture involved motivating students to participate in various cultural clubs, such as the Justice and Peace Club, Environment Club, and Traditional Dance Club. However, the COVID-19 pandemic limited these activities, and some students, having been found on the streets, needed training in Rwandan culture. This approach was integral in helping all students understand the concept of ITORERO in Rwanda.

Hence, the study examined the impact of various strategies on improving the mathematical performance of Level Three Culinary Arts students at ERM-HOPE TVET Center KABUGA. It was initiated after identifying a significant problem of passivity and poor performance in mathematics among these students. The research involved in-depth data collection from both students and teachers, focusing on understanding the root causes of this issue. It aimed to implement and assess the effectiveness of cooperative learning and motivational strategies in the classroom. Additionally, the study considered the role of technology and cultural activities in enhancing the learning experience. Despite challenges posed by the COVID-19 pandemic, which affected students' participation in cultural clubs and other activities, the research sought to create a more engaging and effective learning environment, aiming to improve both the academic performance and overall development of the students.

### 1.1 Statement of the Problem

A large number of Level Three Culinary Arts learners at ERM-HOPE TVET Center KABUGA hold negative feelings towards mathematics, attributing its difficulty to their lack of previous exposure and a lack of motivation stemming from the teaching methodologies employed. This sentiment is evidenced by their performance in previous years. A comparison of their marks in culinary arts modules with those in mathematics, Swahili, and ICT suggests that they find mathematics particularly challenging. The researcher undertook a study to understand why these students are disinterested in

studying mathematics. The table below illustrates their performance in various subjects, further highlighting the issue.

**Table 1: Shows Performance of Students in Mathematics and Other Subjects**

| Subjects | Performed Learners | Percentages |
|---|---|---|
| Mathemathics | 2/24 | 8% |
| Kiswahili | 3/24 | 13% |
| Entrepreneurship | 8/24 | 33% |
| English | 5/24 | 21% |
| Ict | 6/24 | 25% |

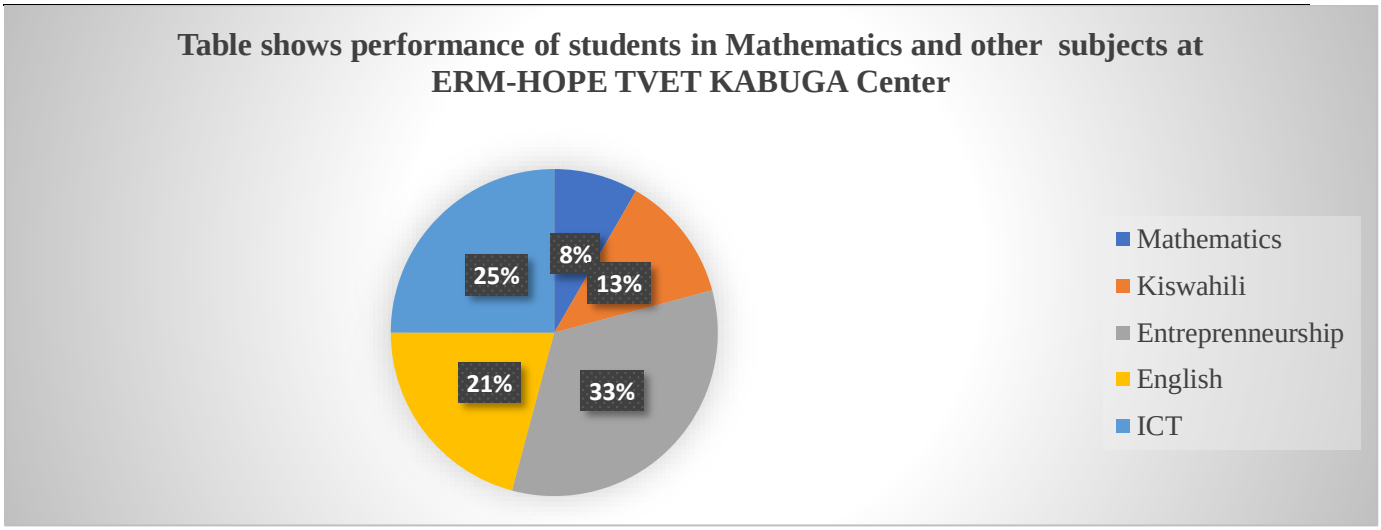


**Figure 1: Shows Performance of Students in Mathematics and Other Subjects**

### 1.2 Objectives of the Study

The general objective of this study was to identify and implement effective strategies for enhancing the performance of Level Three Culinary Arts students in mathematics at ERM-HOPE TVET Center KABUGA. To achieve this overarching goal, the study was guided by the following specific objectives:

i. To find out the factors that contribute to low performance of learning mathematics
ii. To identify the strategies that can be used to improve performance in mathematics subject
iii. To examine the influence of cultural backgrounds on students' performance in mathematics.

## 2.0 Literature Review

In scientific research, we use theories and review of other researchers. Literature review shows others' views on how to overcome the problem of low performance teachers found on the ground along with their teaching activities as well as teaching and learning strategies, methods and principles used by other experts to solve the problem of poor performance among learners. The secondary school years are quite turbulent for most adolescents, regardless of their families' socioeconomic status or home neighborhood. Adolescence is a time for identity formation or individuation away from family of origin while moving toward increased conformity with peers (Erikson, 1968). Carol Dweck's (2007) work on mindset offers good insight into understanding students who seem relatively closed as learners, unwilling to take on academic challenges, in comparison with others who are open to learning new concepts and willing to take risks, even as the academic content increases in complexity. Students who are willing to struggle with new ideas and concepts are those who Dweck refers to as having a "growth mindset." These are the students who are ready to challenge the "not cool to be smart" perspective and are ready to let people see that they may have to struggle to learn a new concept or task. What is important to this group of students is the belief that, through hard work, they will ultimately be able to master what seems so difficult for them to learn at any given point. In the face of academic challenges, they persevere, embodying an implicit theory (Dweck, 1996) that they will eventually master the new material. Learning stories typically include (a) a discussion of a problem or project, (b) the learning challenges and the degree of difficulty the problem/project presents, (c) the actions the student chose that kept him or her engaged and working in the face of difficulty, (d) the way success with this problem/project was assessed, and (e) the extent to which the student was successful (Carr, May, & Podmore, 1998).

**Theoretical Framework**

**Strategies of Improving Learner's Performance**

To address the problems of poor performance, researchers have carried out some strategies. These include, discovery learning, concept mapping, cooperating learning, formative testing with remediation (Ugamadu, 1990)

All these strategies gave a little improvement on the conventional teacher-centered method, which is being used in most of our secondary schools.

**Discovery Learning**

This form of self-directed learning could promote high form of thinking with the aid of meta – cognitive strategy,Borish,2004,Discovery learning electronic journal of science education sees learners as having much more active role in their learning ,it is also argued that the enhanced learning by learners is due to their active participation learning process .The use of discovery approach for teaching and learning has been associated with science education for one hundred year now Trowbridge and bybee996,Trowbridge et al ,2000.

**Concept Mapping**

**Concept mapping** Students create a visual representation (like a flow chart) that identifies and shows the interconnections among various ideas related to a specific topic or problem. Foncesca et al. (2004); Prezler (2004); Yarden et al. (2004). According to Novak (1984), ajaja21011,noticed that map help in understanding ideas by showing the connection with others ideas ,a concept can be heuristic device that is a process in which the learner can make discovery and uncover meaning through trial and error .It helps in developing critical thinking skills which is conscious effort to think about thinking . The literature on concept mapping indicates that it has been used for instruction assessment and learning , Johnson and Raven,1998,novak and Musonda 1991,Power and Wright 1992.Somes some studies on

the effect of concept mapping when used as instructional tools for teaching and learning process indicate its relevance in improving the cognitive and effective learning. A study conducted by Ajaja2011 determined the effective of concept mapping as study skills on students 'achievement in biology. Kinchin (2000) found significant impact of concept mapping on achievement which use for instructing secondary school in Mathematics. Okebukola (1989) investigated whether concept mapping alone as an instruction strategy in mathematics would enhance meaningful learning when compared with concept mapping in cooperative learning.

## 3.0 Research Methodology

This chapter dealt with the methodology used in carrying out the research. The purpose of this methodology was to provide detailed explanations of all the steps undertaken during the action research, which aimed to improve the performance of Level Three Culinary Arts students at ERM-HOPE TVET Center KABUGA. It involved outlining the research design, identifying the population of the study/target group, and describing the techniques and tools/instruments used.

### 3.1 Research Design

The study was carried out using a descriptive research survey design. (Orodho A. ), 2009) notes that a descriptive research survey design is an appropriate way of evaluating educational programs as educational activities operate in a social context. According to Omari (2011), research design refers to a distinct plan on how a research problem will be attacked. Creswell, (2003) & Kerlinger (1978) defined research design as the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance. In this study the researcher applied a survey research design where the researcher employed cross-sectional survey. Cross-sectional survey is done where a researcher uses different categories of people (Enon, 1998). Therefore, the researcher surveyed secondary schools in Kibaha district whereby mathematics teachers, students, academic masters and head of schools were involved so as to systematically describe a situation of poor performance in mathematics subject. However, the study applied both quantitative and qualitative research approaches. Quantitative approach helped to quantify the problem by way of generating numerical data or data from the field and transform them into useable statistics. Qualitative approach helped to study attitudes, opinions, behaviors, and other defined variables of the population.

### 3.2 Target Population

The target population for this study, as defined by Kothari in 2004, is a specific group of people sharing one or more common characteristics relevant to the research focus. In this case, the targeted population included mathematics teachers, students, and all administrative staff at ERM-HOPE TVET Center KABUGA. The study's emphasis on this population was crucial for deriving meaningful insights relevant to the research objectives. In terms of the student demographic, Table 2 provided a gender breakdown, showing that the student body consisted of 22 boys and 8 girls, totaling 30 students. This gender distribution was an important aspect of the study, offering insights into the dynamics within the student population and possibly influencing the effectiveness of the educational strategies implemented. Regarding the teaching staff, the study involved two mathematics teachers, both of whom were men. This gender composition among the teachers was noteworthy, as it could have implications for the teaching methodologies and the interactions between teachers and students. The gender dynamics, both among the students and the teachers, were therefore integral to understanding the overall educational environment and the outcomes of the study at ERM-HOPE TVET Center KABUGA.

### 3.3 Tools for Data Collection

In this study, data were collected using various methods: interviews, observations, and tests.

Interviews: Interviews are a direct method of data collection, functioning as a social process where an interviewer poses questions, typically in a face-to-face setting, to an interviewee. The interviewee's responses provide valuable information through this interactive and amicable social exchange. Utilizing this method, the researcher conducted interviews with both Level Three Culinary Arts students and teachers, offering them the opportunity to share their perspectives on mathematics performance. This also allowed the researcher to provide feedback on their minor and major assessments.

Observation: Observation is a technique where the researcher directly observes the behavior of the respondents in their natural settings. In this study, this method was applied to observe all learners, particularly focusing on how they performed in mathematics classes. This direct observation was crucial in understanding the students' engagement, participation, and learning styles in the classroom environment.

Tests: For the purpose of collecting empirical evidence on student progress, this research incorporated the use of minor and major assessments. After observing and collecting results from these assessments, the researcher analyzed them to draw conclusions and implement measures aimed at improving the students' performance in mathematics. This method provided a quantitative dimension to the study, allowing for a more comprehensive analysis of the students' academic progression.

### 3.4 Schedule of Activities

The activities were planned and carried out monthly. In the beginning of the month, I dressed a monthly plan showing activities to be carried out and the monthly report done at the end of the month helped me to reflect on what has been done. This reflection guided me to plan for the upcoming month. The following table shows in details all the activities involved in this action research from the beginning to the end.

**Table 2: Schedule of Activities during Action Research**

| **Problems** | **Activities, interventions and strategies** | **Participants** | **Periods /Durations** |
|---|---|---|---|
| Students face the problems of low participation in mathematics subject | Observation period: during this period, I discovered the challenges faced by the students, I used two kinds of instrument to collect information, these are observation and interview | Learners, Internee, and teacher | From 16/11/2020 to 27/11/2020 |
| Low participation in mathematics subject, sleepiness, disruptive | For those issues, I thought about some the strategies to use for overcoming it. | Learners, Internee, and teacher | From 04/12/2020 to 11/12/2020 |

| | | | |
|---|---|---|---|
| behavior and social distancing in class due to COVID-19 Pandemic were observed in level three culinary arts | | | |
| Improving level three students' performance in mathematics | Teaching by letting students provide their opinion about the matter<br>Using presentation made by students<br>Providing more tests and more homework but no group discussions due to COVID-19 pandemic. | Learners, Internee, and teacher | September |
| insufficient hard textbooks for students while are learning mathematics subject. | Use of ICT to help out to get some good session plans, schemes of work, books, sufficient teaching aids,… | Internee Learners and Other teachers | September |
| Instructional languages was a barrier for a big number of students | Providing them some textbooks written by different mathematicians which contain a number of exercises to do which helped them to understand ways doing questions of mathematics and make presentation<br>Encouraging them to use ICT room for more information<br>Providing them a topic and make research on internet. | Internee, Learners and Other teacher. | From September 2020 to January-2021 |
| Making opportunities for students to learn | Providing homework and group works to learners. | Internee, Learners and | January |

| | | | |
|---|---|---|---|
| mathematics and give the exams to some were finishing their schoolings | Visiting library.<br>Indicating some textbooks and their resources to read.<br>More exercises and homework<br>Then presentations of students. | teacher | |
| Teaching students of morning program module two introduction to algebraic | Indicating some textbooks and their resources to read.<br>Giving learners some assignment, exercises and homework<br>Then presentations of students | Internee, Learners and teacher | February |
| End of term two exam of mathematics and Identifying the Problem statement, Literature Review<br>Methodology& data collection, Data analysis and List of reference | Give learners end of term two exam of mathematics. | Researcher, Learners and teacher | March |

Source: primary data

At the beginning of the period, we did a monthly plan which has described by different activities we had to carry out. We managed those activities and at the end of the period we reflected on the link between what we planned and implemented at the beginning of the monthly report.

### 4.0 Data Presentation, Findings, Interpretation and Discussion

This part of Research Report contains data of all kinds, how and when they have been collected. It also includes the data presentation and analysis of the results from the study in relation to the problem statement and objective of the research. The intended objective to find out strategies to improve learners' performance. Allocation time for teaching was four hours per week in level three culinary arts morning program and four hours per week in level three culinary arts afternoon program. Most of the students had inefficient outcomes in mathematics. From the time of observation, I tried to find out some of the factors behind their lower performance. Many strategies were used including observation, tests, and interviews. More work was on exercises and homework These activities resulted in good answer from the learners and also displayed some improvement for them. In general, they were active.

### 4.1 Social Information of Respondents

Table 3 presents the study results on the categories of respondents in age and sex (students and teachers)

**Table 3: The Categories of Respondents in Age and Sex (Students and Teachers)**

| Ages | Number of students | | Number of teachers | | Total | Percentages |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | | |
| Between 16-18 | 3 | 8 | 0 | 0 | 11 | 34.37% |
| 18-20 | 2 | 6 | 0 | 0 | 8 | 25% |
| 20-22 | 1 | 4 | 0 | 0 | 5 | 15.62% |
| 22-24 | 1 | 2 | 0 | 0 | 3 | 9.37% |
| 24-26 | 0 | 1 | | 0 | 1 | 3.12% |
| +26 | 1 | 1 | 2 | 0 | 4 | 12.5% |
| Total | 8 | 22 | 2 | 0 | | |
| **General total** | **30** | | **2** | | **32** | **100%** |

### 4.2 Presentation and Interpretation of Data Collected Through Tests

At the beginning of my teaching, I realized that students do not perform well in mathematics due to the results of the first and the second tests that I gave them in mathematics of level three culinary arts. This was the results proved by the first test I gave them on 10 marks

**Table 4: Results from the Test to Identify the Level of Student's Performance**

| Responses | Number of students | Percentages |
|---|---|---|
| Pass | 11 | 36.66% |
| Fail | 19 | 63.33% |
| Total | 30 | 100% |

This table shows the results got by level three culinary arts at ERM-HOPE TVET Center KABUGA students in Mathematics. As the results indicated, only 11students (36.66%) succeed, and 19 students (63.33.3%) failed.

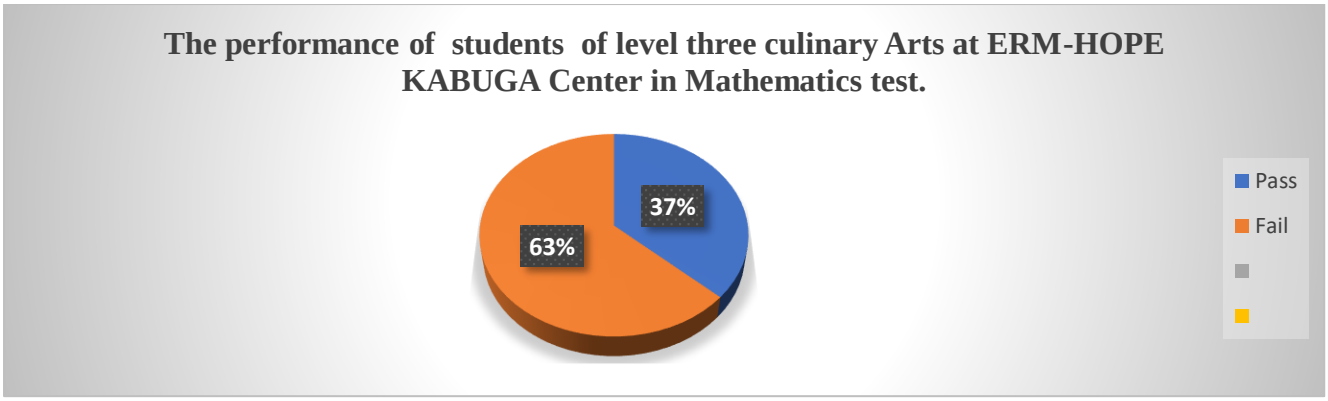


**Figure 2: Performance of students of level three Culinary arts at ERM-HOPE KABUGA CENTER in test of Mathematics**.

To check whether more exercises, more homework and using tangible examples helped some students to understand mathematics subject, I gave them a test for checking, the results showed a little improvement of some students in mathematics.

**Table 5: Results from Test after Using the Strategies of Giving More Exercises, More Homework and Using Tangible Examples to Learners**

| Responses | Number Of Students | Percentages |
|---|---|---|
| Pass | 16 | 53.33% |
| Fail | 14 | 46.66% |

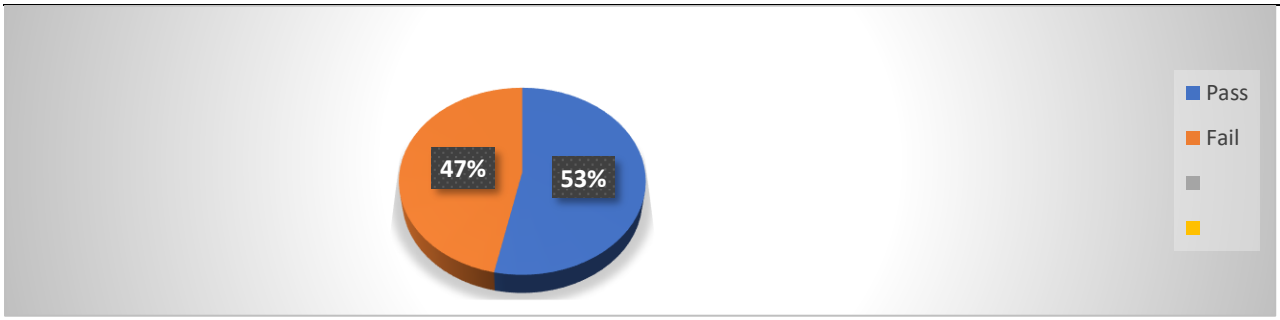


**Figure 3: Pie Chart Shows Students' Performance In Mathematics After Applying All Possible Strategies**

The use of the techniques and methods showed a great improvement of the learners from 36.33%to 53.33%. Averages and increase of standard deviation. so there is improvement of level three culinary arts students' mathematics those are some of the techniques used: improvisation; Give many exercises and home works; Doing many tests; Give many examples related to the real life situations, ask learners to present their findings during learning and teaching process; Give the learners the time of research.

### 4.3 Presentation and Interpretation of Data Collected Through Interview

**Teachers' Views**

The data collected through interview have also great contribution in this study. I asked the teachers to provide their views about the impact of more exercises, more assessments, and more home works and on students' performance in Mathematics subject and the suggestion that can be taken to encourage students. Their views reflect that works that are more individual have great contribution for achievements of students, they said that teachers have to be role model for the students to be motivated, they have to use all possible teaching style/ methods so that the students engage actively in teaching learning process. These are active methods, class presentations discussion, educational games, Introductions/warm up activities, demonstration, role play/dramatization, rewarding, praising engage them to pursue mathematics. In addition, teachers said that also the parents have to motivate and help their children, by rewarding them, interact with school staff in order to know how their children are doing in their lessons.

### 4.4 Presentation and Interpretation of Data Collected Through Observation

At the beginning of my observation period, I noticed that the students were not motivated to study Mathematics subject. But after implementing all possible techniques, they intervene in classroom activities even if they are some students still need to be put on much efforts. The students of level three culinary arts had low performance at the beginning of the term. This was proved by the marks they got in the test done individually. Correctively, they were not motivated in physics lesson. They had also the problem of shyness and did not participate actively in teaching learning activities. The use of exercises, assessments, homework and presentations approaches have been found vital to address their weaknesses. Generally, the research was fruitful.

## 5.0 Conclusion

Based on the findings of the study, it can be concluded that majority of the students of level three culinary at ERM-HOPE KABUGA Center are performing well due to some strategies were used to improve their performance in Mathematics, where some strategies and techniques are at the top. Improvement can be made through, cooperation learning, motivation, improvisation, and the effective use of teaching methods. The education policy makers should consider the importance of Mathematics in different domains especially in our daily life and developing all facilities necessary for improving the performance by using competitive strategies in the secondary schools and TVET centers in general. Thus, they should design Mathematics in all curricula each level of learners and provide enough and appropriate guidelines of teaching Mathematics in secondary schools and TVET centers. I wish the future researchers could refer to this Research and carry out further researches about large groups within similar topics**.**

## 6.0 Recommendations

Based on the results of the study, the following recommendations were made:

### Mathematics Teachers

The researcher recommends mathematics teachers to consider students cultural and learning backgrounds in choosing instructional strategies. It is suggested that they 50 align teaching methods with the assessed learning needs and capabilities of students. Teachers may attempt to find a balance of teaching strategies rather than teaching student hence few understand the subject and at last many fail the subject. They may be able to realize the importance of recognizing learning styles, identify students' differences, and adjust the teaching methods accordingly. By doing that, teachers would be

able to deliver content clearly, making every student understand mathematics, motivate students leading better performance in mathematics subject.

**Students**

The study highly suggest that students take in hand their perception and feedback towards their teachers' teaching methods in order for the teachers to effectively bring into line their way of teaching to the students' way of learning. It is recommended that for students to learn effectively, they need to be flexible by using strategies outside their preferences in order to meet the demands of the challenging environment. Students must be ready to be guided in mathematics using learner centered methods, which is the very effective way of teaching. Student must not be lazy by not doing self-practice daily. They are also encouraged to actively participate in classroom activities in order to have an enjoyable and satisfying learning outcome.

**School Administrators**

For school administrators, it is recommended to ensure availability of the instructional materials and facilities for the execution of different teaching methods that are aligned with the teaching methods and students' learning in classrooms. Effective teaching and learning cannot be achieved in the absence of those instructional materials.

**Future Research**

The researcher is recommending research to be done in future on identifying student individual factors that makes them fail in mathematics while performing better in other science subjects such as Physics and Chemistry. The research must also be conducted on individual teacher factors that affect their teaching practice to the extent students are poorly performing in mathematics. This is highly suggested in order to widen the scope of the current study and initiate the process of creating 52-evidenced based teaching strategies that will enhance the quality of instruction and learning to enhance students' performance in mathematics.

## REFFERENCES

Ali, R., Altcher, A. & Khan, A. (2010). Effect of Using Problem-Solving Method in Teaching Mathematics on the Achievement of Mathematics Students. https://doi.org/10.5539/ass.v6n2p67

Ambrose, B. S. (2004). "Investigating student understanding in intermediate mathematics tools: Identifying the need for a tutorial approach to instruction." American Journal of Mathematics, 72(4):453–459. https://doi.org/10.1119/1.1648684

Armbruster, P., M. Patel, E. Johnson, and M. Weiss. (2009). "Active learning and student-centered pedagogy improve student attitudes and performance in introductory Mathematics." Education 8: 203-213. https://doi.org/10.1187/cbe.09-03-0025

Armstrong, N., S. Chang, and M. Brickman. (2007). "Cooperative learning in industrial-sized Mathematics classes." Education 6: 163-171. https://doi.org/10.1187/cbe.06-11-0200

Bartlett, L. (2008). Paulo Freire and Peace Education. Department of International & Transcultural Studies Teachers College, Columbia University.

McKeachie, W. J. (1954). Student-centered versus instructor-centered instruction. *Journal of Educational Psychology*, *45*(3), 143. https://doi.org/10.1037/h0060215