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RESEARCH ARTICLE

INFLUENCE OF HOME COACHING PRACTICES ON SKILLS ACQUISITION IN MATHEMATICS AMONG PUBLIC SECONDARY SCHOOLS STUDENTS IN RWANDA A CASE OF RWAMAGANA DISTRICT

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Abstract

Background: Education is a critical component in human resource development. Educators typically utilise standardised test results, graduation rates, and classroom performance to assess students' achievement. Coaching aims to assist individuals improve their performance across multiple disciplines. It increases their personal efficacy, development, and progress (Hamlin et al.2019). The Purpose of this study was to analyse the influence of home coaching practices on skills acquisition in mathematics among public secondary schools students in Rwanda. This study was guided by three specific objectives and three research hypotheses focusing on Home coaching practices and their influences on skills acquisition in mathematics among public secondary schools.

Methods and Results: This study utilised a mixed-methods research design. The target population were 100 teachers, 110 parents, and 20 school leaders, for a total population of 230 respondents from public secondary schools in Rwamagana District. This study used purposive, stratified, and simple random sampling procedures to create a sample group of respondents. The study collected and analysed data using both quantitative and qualitative approaches. In IBM SPSS Version 21.0, descriptive statistics and inferential statistics (correlational and regression analysis) were used to show quantitative data, while content analysis helped with qualitative data analysis.

Results: the study found that home coaching practices are significantly associated with students' skills acquisition in mathematics in public secondary schools in Rwanda, particularly in the Rwamagana District, with most associations having a level of significance greater than 0.05 in relation to academic performance.

Conclusion : The study's conclusions highlight the critical role that home coaching strategies play in helping public secondary school students in the Rwamagana District acquire mathematical abilities. The necessity for ongoing emphasis on these

techniques to improve educational results is highlighted by the favorable correlations found between students' performance and coaching activities. This study supports the incorporation of structured home coaching activities to improve students' academic progress in mathematics by offering insightful information to educators and parents.

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Introduction:-

Nowadays, enrolling in a 'coaching class' is nearly required. Students lack confidence in many subjects, and instructors may not always have the time to finish the coursework at school. Educationists say that the rising coaching sector stems from the Indian schooling system's inability to keep up with the numbers. In large courses, it is sometimes impossible to provide individual attention to pupils, and the pressure to complete the section is a continual source of anxiety for teachers. In the past, parents would often train their children themselves, but today's parents do not have as much time because both husband and wife work (Bharucha, 2016). Excellence in mathematics may benefit developing nations like Rwanda by strengthening education systems, infrastructure, economic knowledge, culture, morals, and living standards (Roohi, 2012). Mathematics underperformance remains a continuous concern in developing countries, impeding progress towards development objectives (Mokgosi, 2022).

According to MINEDUC (2019), the Rwandan government has implemented several initiatives to ensure quality education for all and raise mathematics subject standards, including teacher training programs (AIMS), student mentoring programmes, curriculum changed from knowledge-based to competency-based, and ICT integration in teaching and learning.

Despite the implementation of these measures, pupils' performance in mathematical disciplines in public secondary schools remains low. According to Mbarute (2022), "my seven-year teaching experience in three districts including Rwamagana (2020) has led to low mathematics performance among Rwandan upper secondary students", this study will examine the influences of home coaching practices on students' performance in mathematics subjects in Rwanda by taking the case of Rwamagana District

This study was guided by the following specific objectives:

1. To identify the coaching activities in mathematics subjects in public secondary schools in Rwamagana District, Rwanda
2. To identify the skills acquired in mathematics subjects by the learners in public secondary schools in Rwanda that is due to home coaching practices.
3. To determine the relationship between coaching activities and the skills acquired in mathematics by learners in public secondary schools in Rwanda.

Theoretical framework

Experiential learning theory

Theorists like Jean Piaget and David Kolb support the experimental learning theory, which asserts that learning is a dynamic process in which people actively create knowledge via practical experiences and reflection (Piaget, 1972; Kolb, 1984). This approach is put to use in home coaching settings where students participate in experiential learning through exercises that promote reflection, trial and error, and application in the real world. Home coaching echoes the theory's emphasis on learners' active participation in constructing knowledge (Kolb, 1984) by enabling personalized learning experiences catered to individual speed and interests. By incorporating these ideas, parents and teachers can create settings that support the development of critical thinking and a deeper comprehension of concepts in addition to facilitating the acquisition of skills (Piaget, 1972)

Transformative learning theory

The foundation of Jack Mezirow's transformative learning theory is the notion that learning entails a process of critically analyzing presumptions and beliefs, which can result in significant changes in perspective and knowledge (Mezirow, 1991). This approach is applicable to home coaching sessions as well, as these settings frequently foster in-depth reflection and personal development.

During home coaching, students are led through thought-provoking activities and conversations that make them reevaluate their preconceived notions about who they are and how the world works. This approach is consistent with the transformative learning theory, which places a strong emphasis on developing a critical awareness of one's own perspectives and how they influence learning and personal growth (Mezirow, 1991). In the home environment, coaches assist students in exploring different perspectives, thinking about new ideas, and this approach is consistent with the transformative learning theory, which places a strong emphasis on developing a critical awareness of one's own perspectives and how they influence learning and personal growth (Mezirow, 1991). In the home context, coaches assist students in exploring different perspectives, thinking through novel ideas, and ultimately changing their understanding of different subjects and themselves through guided questioning and debate.

Additionally, home coaching provides a tailored and encouraging environment for life-changing educational experiences. In addition to giving students individualized attention, coaches who are usually parents or educators create a safe environment where students can freely explore and challenge their presumptions without worrying about being judged (Cranton, 1994). This individualized approach makes it possible to participate meaningfully in transformative learning processes, which promotes academic as well as emotional and personal development. Educators and parents can create environments where learners are empowered to critically examine their beliefs, broaden their perspectives, and navigate complex challenges with greater resilience and insight by incorporating transformative learning theory into home coaching practices (Mezirow, 1991; Cranton, 1994). This all-encompassing approach to education encourages lifelong learning and equips students to flourish in a world that is constantly changing.

Conceptual framework Independent variables

Coaching Activities :

- Self-assessments and self-reflective coaching exercises
- Debriefing real-time feedback
- Strategic goal development
- Thoughtful journaling exercises
- Developing and rehearsing communication

Dependent Variables

Academic performance in mathematic :

- Completion of tasks
- Active participation
- Self-motivation
- Creativity and innovation

1. Government educational policies
2. Headteacher style
3. School location

Source: Researcher,2024

Research Methods and Methodology:-

Target population

According to Mugenda (2012), the target population is a population that the research needs in order to generalise the findings. This study's target population was 100 teachers, 110 parents, and 20 school leaders, for a total population of 230 respondents from public secondary schools in Rwamagana District.

Sample size

Before locating this study's participants, it is essential to present how the sample size was presented. For this study, the following formula was used as presenter Taro Yamane (1967) was employed:

where n is the sample size, N is the population size, and e is the imaginary error. General scientific formula: $\frac{N}{1+N(e)^2}$; and then the sample size is $n = \frac{230}{1+230(0.05)^2}$;

$n = \frac{230}{1.575} = 146.031$; then the sample size is 146 respondents

Table 2.1:- Sample Distribution.

Population	Target Population	Sample Population
Head Teachers	20	12
Teachers	100	63
Parents of Student	110	71
Total	230	146

Source: Rwamagana District office, 2024

Data Collection Methods:-

This section describes the data gathering approaches that were used in the data collection analysis, such as questionnaires and documentation research procedures. According to Cheung (2020), data collection methods are strategies and processes used to collect data for research objectives. These methods can range from basic self-reported surveys to more complicated studies, and the data can be collected quantitatively or qualitatively. Surveys, interviews, observations, focus groups, experiments, and secondary data analysis are some of the most commonly used data gathering methods. The data gathered using these approaches may then be analysed and utilised to support or disprove research hypotheses and form conclusions about the study's subject.

Data Collection Instruments

To collect information relevant to the objectives, the research employed a questionnaire with a series of open-ended questions about themes predicted from respondent information. The researcher delivered these sorts of questions to the respondents while interview guide was used for gathering data from head teachers.

Findings and Discussions:-

The study analyses data gathered in line with the study's objectives and dependent variables. The study collected both quantitative and qualitative data from 146 respondents, identify the coaching activities in mathematics in public secondary schools in Rwamagana District, Rwanda, evaluated the skills acquired in mathematics by the learners in public secondary schools in Rwanda that is due to home coaching practices and determine the relationship between coaching activities and the skills acquired in mathematics by learners in public secondary schools in Rwamagana.

The skills acquired in mathematics by the learners in public secondary schools in Rwanda

Analysis was used for investigating the degree of the skills acquired in mathematics by the learners in public secondary schools in Rwanda that is due to home coaching practices.

Table 3.1:- The analysis on the skills acquired in mathematics by the learners due to home coaching practices among public secondary schools in Rwanda.

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly	Mean	Std
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									Agree			
	N	%	N	%	N	%	N	%	N	%		
The completion of tasks indicates the student's Aquired skills in mathematics.	1	1.4	2	2.7	2	2.7	4	5.5	64	87.7	1.25	.760
Active participation indicates the student's aquired skills in mathematics	0	0.0	1	1.4	2	2.7	2	2.7	68	93.3	1.12	.498
Self-motivated indicate the student's Aquired skills in mathematics	1	1.4	1	1.4	2	2.7	5	6.8	64	87.7	1.22	.692
Creativity and innovation in a subject indicate the student's Aquired skills in mathematics	0	0.0	2	2.7	7	9.6	30	41.1	34	46.6	1.71	.858
Student examination result in mathematics indicate the student's Aquired skills in mathematics	1	1.4	3	4.1	2	2.7	4	5.5	63	86.3	1.32	.864

Source: Data (2024)

According to the information depicted in Table 3.1, 93.3% stongly agreed that active participation indicates the student's acquired skills in mathematics while 2.7% Agreed with the statments, and 87.7% of teachers Strongly agreed that the completion of tasks indicates the student's acquired skills in mathematics While 5.5% Agreed with the statment. Additionally, 87.7% strongly agreed and 6.8% Agreed that being self-motivated indicates the student's acquired skills in mathematics. Furthermore, 46.6% strongly agreed that creativity and innovation in a subject indicate the student's acquired skills in mathematics, while 41.1% agreed and 86.3% strongly agreed and 41.1 %Agreed that student examination results in mathematics indicate the student's acquired skills in mathematics. This means that according to the numbers of respondents, the following statements, such as active participation, task completion, self-motivation, creativity, innovation, and examination results, are key indicators of a student's acquired skills in mathematics, and creativity and innovation are also significant factors, both of which are the skills acquired in mathematics by the learners. The research conducted by Gajda (2019) According to 35% of respondents who strongly agreed and 38.6% of respondents who agreed, understanding mathematics aids people in solving issues in their daily lives. The correlation between instructional techniques and students' mathematical competencies revealed that, with the exception of using ICT to help with math learning, the regression coefficient of the group's mathematical learning was not statistically significant in explaining students' critical thinking and problem-solving abilities. The study suggested that the education ministry collaborate closely with other education stakeholders to ensure that science, particularly mathematics, is taught with great diligence. Koçak et al. (2019) suggest that group work can enhance individual and team development by translating learning into reality and fostering creativity. Aktepe and Coskun (2014) found that group members are keen to take on responsibility for achieving group goals and addressing faults. However, the national investment in coaching has most certainly not reached its full potential (Russell et al., 2017). Research indicates that coaching programmes have inconsistent outcomes due to implementation issues, including insufficient coach training, direction, and support (Kraft et al., 2018).

Table 3.2:- Correlation analysis of home coaching practices and the skills acquired in mathematics by learners among public secondary schools in Rwanda.

	Positive interdepend	Individual and group	Interpers onal and	Level of participa	Scores in	Interest in	Succe ss rate
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		ence	accounta bility	small group skills	tion in learning.	tests, classw ork and exams	learning mathema tics	of studen ts.
Positive interdepend ence	Pearso n Correlat ion	1						
	Sig. (2- tailed)							
	N	170						
Individual and group accountabili ty skills Interperson al and small group skills	Pearso n Correlat ion	.916**	1					
	Sig. (2- tailed)	.000						
	N	170	170					
Positive interdepend ence	Pearso n Correlat ion	.968**	.911**	1				
	Sig. (2- tailed)	.000	.000					
	N	170	170	170				
Level of participatio n in learning.	Pearso n Correlat ion	.966**	.910**	.970**	1			
	Sig. (2- tailed)	.000	.000	.000				
	N	170	170	170	170			
Scores in tests, classwork and exams	Pearso n Correlat ion	.378**	.412**	.370**	.385**	1		
	Sig. (2- tailed)	.000	.000	.000	.000			
	N	170	170	170	170	170		
Interest in learning mathematic s	Pearso n Correlat ion	.967**	.894**	.983**	.985**	.366**	1	
	Sig. (2- tailed)	.000	.000	.000	.000	.000		
	N	170	170	170	170	170	170	
Success rate of students	Pearso n Correlat ion	.570**	.572**	.580**	.586**	.397**	.598**	1
	Sig. (2- tailed)	.000	.000	.000	.000	.000	.000	
	N	170	170	170	170	170	170	170
**. Correlation is significant at the 0.01 level (2-tailed).								

*Correlation is significant at 0.05

level (2-tailed)

Source: Primary Data (2024)

A strong relationship with positive significance was established between Interest in learning mathematics and Individual and group accountability ($r = .967^{**}$, $p\text{-value} = 0.000$), Interest in Scores in tests, classwork and exams learning mathematics and Individual and group accountability show positive significance ($r = .894^{**}$, $p\text{-value} = 0.000$), and Interest in learning mathematics and Scores in tests, classwork and exams show positive significance ($r = .985^{**}$, $p\text{-value} = .000$). The success rate of students and Positive interdependence indicate positive significance ($r = .570^{**}$, $p\text{-value} = .000$), the success rate of students and Individual and group accountability indicate positive significance ($r = .572^{**}$, $p\text{-value} = .000$), and the success rate of students and also indicated that there was positive significance ($r = .580^{**}$, $p\text{-value} = .000$). Hence Scores in tests, classwork and exams with Positive interdependence indicated positive significance at ($.378^{**}$, $p\text{-value} = .000$), Scores in tests, classwork and exams indicated positive significance with Individual and group accountability ($r = .412^{**}$, $p\text{-value} = .000$), and Scores in tests, classwork and exams and Scores in tests, classwork and exams indicated positive significance at ($r = .370^{**}$, $p\text{-value} = .000$). According to Russell (2020), many schools and districts use coaches to help with instructional adjustments. While coaching programmes have been shown to improve teaching, research has not yet identified effective coaching approaches. Our research team collaborated with state officials and coaches to develop a math coaching model and document the strategies used in one-on-one sessions with teachers. Videotaped coaching conversations and teaching events show that model-trained coaches have improved their ability to use high-leverage coaching practices, such as deep and specific pre-lesson planning conversations. This practice predicts teaching enhancement, including increased opportunities to allow pupils to engage in conceptual thinking.

Conclusions and Suggestions for further study:-

Reconsidering findings from this present research and the first research objectives, the study reveals that most commonly, Self-assessments and self-reflective coaching exercises, Debriefing real-time feedback, Strategic goal development, Thoughtful journaling exercises and Developing and rehearsing communication skills, indicating that the homecoaching practices. The second objective, the study revealed that Active participation, task completion, self-motivation, creativity, innovation, and examination results are all considered indicators of a student's acquired skills in mathematics, are the skills acquired in mathematics by the learners in public secondary schools in Rwanda that is due to home coaching practices. Results from objective three indicated that coaching activities and the skills acquired in mathematics by learners in public secondary schools in Rwanda were positively and statistically correlated since most of their level of significance was more than 0.05 in association with the mathematic students' academic achievement at the Rwamagana district's public secondary schools.

Suggestions for Further Studies:-

The researcher investigates Influence Of Home Coaching Practices On Skills Acquisition In Mathematics Among Public Secondary Schools Students In Rwanda. The following are suggestions for further studies:

- Effect of Parental Involvement on Mathematics Performance in Rural vs. Urban Public Secondary Schools in Rwanda: This study may look into how children from rural and urban areas acquire mathematics abilities in relation to varying parental involvement levels in home coaching
- A comparative study is needed to be conducted to compare the effectiveness of home coaching and formal school teaching methods in improving mathematics skills in secondary schools in Rwanda. The efficiency of home coaching in comparison to conventional classroom teaching techniques and the combined effect of both on students' mathematical ability might be investigated in this study.
- The effect of Technology on Home Coaching: Improving Mathematical Proficiency in Rwandan Secondary School Students This study could look at how home coaching using educational technology and internet resources affects students' development of mathematical skills.

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