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Effects of Students' Class Attendance on the Academic Performance in Mathematics Subject in Public Secondary Schools in Rwanda a Case of Ngoma District

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Abstract:- The Rwandan education system places significant emphasis on mathematics as a foundational subject for students pursuing careers in science and technology. Despite this, students have encountered persistent challenges in achieving success in mathematics. To address this issue, a research project investigated the link between class attendance and academic performance in mathematics within Rwandan public secondary schools. Additionally, the study aimed to identify factors influencing class attendance and assess interventions to enhance attendance.

The research combined qualitative and quantitative methods, employing correlation analysis and a descriptive design. It involved 382 students, with 195 selected through random and purposive sampling. Data collection included questionnaires and interviews, and analysis was conducted using SPSS Version 21 and Microsoft Excel.

The study revealed a significant, positive correlation (p-value of 0.01, r = 0.827) between class attendance and mathematics performance, highlighting the pivotal role of regular attendance. Irregular attendance resulted in delayed assignments, lower scores, and incomplete notes, hindering overall mathematics performance. Factors influencing attendance included motivation, socioeconomic disparities, health issues, peer pressure, and teaching methods. Long travel distances were a common obstacle.

Proposed solutions included technology integration, personalized learning, parental involvement, and enhanced teacher training. Financial challenges, including low income and school expenses, also impacted attendance. Most teachers and students agreed that long distances affected attendance.

The study recommended parental support, engaging teaching methods, government investment in resources, and professional development for teachers. Students were encouraged to take personal responsibility for their education.

Keywords:- *Students' class attendance; academic performance in mathematics subject.*

I. INTRODUCTION

Class attendance's impact on academic performance has been a topic of debate. While proponents argue that attendance correlates with academic success, particularly in subjects like mathematics, some scholars disagree. Studies by Daniel & Ahmad (2021), Ruelf et al. (2021), and Karinena et al. (2016) suggest that regular attendance is linked to better academic performance, especially in high school.

Crede & Kieszcynka (2010) and Hattie (2008) found that class attendance is a strong indicator of academic success, ranking sixth out of 105 factors related to high school performance according to Schneider & Preckel (2017). Poor attendance is a widespread issue in the United States, with one in six students being consistently absent, as reported by the US Department of Education.

In the European Union, attending lectures is considered beneficial for university students, but the conventional physical attendance model is being challenged by online learning alternatives. Aden et al. (2013) emphasize the negative impacts of absenteeism, which affect all students differently. Studies in Saudi Arabia and Somalia (Allyhamdi et al., 2016; Ahmed Aden et al., 2020) confirm the strong correlation between class attendance and academic success.

Ghana's research, conducted by Daniel (2022), shows a clear link between class attendance and mathematics achievement. Plant & Hill (2013) examine the relationship between study time and academic success, suggesting that increased effort should lead to better grades.

Tanzanian research by Kitambazi & Lyamuya (2022) reveals poor student attendance due to child labor, which impacts science and math performance negatively. In Rwanda, an increase in school enrollment due to a nine-year basic education program has led to various challenges, including disobedience, high teacher-student ratios, lack of parental involvement, and facility disrepair, according to Tuyishimire & Hesbon (2020).

Overall, the connection between class attendance and academic success, particularly in mathematics, remains a significant focus of research and educational policy.

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II. LITERATURE REVIEW

In the realm of education, the influence of students' class attendance on their academic performance is a perennial subject of discussion. This relationship is particularly pertinent in the context of mathematics education, a discipline that holds a central position in preparing students for future careers in sciences and technology. This literature review aims to delve into the effects of students' class attendance on their academic performance in mathematics, specifically in public secondary schools within the district of Ngoma in Rwanda.

Scholars and researchers have long debated the significance of students' presence in the classroom and its direct impact on their academic outcomes. For instance, Daniel and Ahmad (2021) emphasized the pivotal role of class attendance and its correlation with academic success. Their research findings supported the notion that students who attend classes regularly tend to achieve higher academic standards, especially in subjects like mathematics. This perspective aligns with the view of Ruelf et al. (2021), who found that consistent class attendance is closely linked to improved academic performance.

However, the issue of class attendance as a predictor of academic success is not without its detractors. Karinena et al. (2016) suggested that class attendance might not always be an infallible indicator of a student's achievement. Despite these reservations, it is noteworthy that the majority of high school educators strongly encourage students to attend their lessons with the expectation that it will enhance their learning and improve their grades. This push for regular attendance is in light of the findings of Crede & Kieszcynka (2010) and Hattie (2008), who concluded that class attendance is one of the best indicators of academic success, ranking it significantly higher than numerous other factors.

Moreover, the impact of class attendance transcends the boundaries of the classroom. The U.S. Department of Education acknowledges the widespread issue of poor student attendance, reporting that one in every six students in the United States is consistently absent. This not only affects the immediate educational outcomes but also has long-lasting consequences into adulthood, highlighting the broader societal implications of this problem. In the European Union, the importance of physical attendance at the university level is well-acknowledged, even as new models of education that challenge traditional physical presence emerge, propelled by advancements in information technology.

To further this discussion, it is crucial to explore how the effects of class attendance on academic performance in mathematics manifest within the specific context of Ngoma district, Rwanda's public secondary schools. By investigating the experiences, challenges, and outcomes of students in this region, this literature review will contribute to a more nuanced understanding of the relationship between class attendance and academic performance, thereby aiding educators and policymakers in devising effective strategies to enhance mathematics education in Rwandan public schools.

A. Students' class attendance

- *Class attendance*

Class attendance is a critical factor in students' academic success. Research by Aden et al. (2013) and Daniel & Ahmad (2021) shows that regular attendance enhances learning outcomes and the likelihood of achieving academic success, while chronic absenteeism impedes progress and can lead to legal issues and community problems.

- *Factors influencing class attendance*

Class attendance is affected by various factors. Devados & Foltz (1996) and Paisey (2004) noted higher attendance between 10 am and 3 pm. Massingham & Herrington (2006) found that class timing can impact attendance. Lukusa et al. (2015) identified timetabling concerns as a significant cause of absenteeism. Other factors include students' motivation, GPA, self-financing, teaching quality, and lecture format (Stephen & John, 1996).

B. Academic performance

- *Students' Academic Performance in mathematics*

Researchers like Galiher (2006) and Darling (2005) commonly use GPA to assess student performance in a specific semester, while others, like Mushtaq et al. (2012), utilize test data or prior-year findings. Numerous studies explore factors affecting academic achievement, with two key categories: internal classroom elements (e.g., class size, textbooks, teacher's role) and external factors (e.g., family, work, social issues). Gender, age, and learning environments can also influence student success (Hansen & Joe B., 2000).

- *Influence of Students' class attendance on academic performance*

Jones (2006) noted classroom environmental factors influencing students' outcomes and advocated for increased resources, particularly in high-enrollment schools. However, Rothman and DeKalb (1999, 2001) revealed a significant connection between school attendance and academic performance. Kearney et al. (2014) further linked chronic absenteeism to various negative behaviors and school dropout.

C. Solution to the problem of students' class attendance in Rwanda.

- *Measures to increase students' attendance in class*

To enhance class attendance, various strategies have been suggested. Clair (1999) underscores the importance of an engaging classroom environment and relevant content. Moores, Higson, Fjortoft, Van, Menkveld, & Ruiters (2019) advocate for excellent teaching and real-world applications. White (1992) suggested using incentives to boost attendance in early studies.

D. Research objective

This research examined the influence of students' attendance behaviors on their academic performance within the context of mathematics classrooms in public secondary schools in Rwanda.

E. Research question

- What are the primary factors that influences students' class attendance in mathematics subject and how do these factors impacts their attendance patterns in Rwandan public secondary schools?
- Is there a statistically significant correlation between students' class attendance in mathematics and their academic performance in the subject?

III. METHODOLOGY

A. Research design; Study Population; Sample Size; Data Collection Tools

➢ *Research Design*

Research design serves as a systematic framework for study procedures. This research employed both qualitative and quantitative methods to investigate the causes, effects, and relationships between variables. Using a survey research design, data from students, teachers, and parents in Ngoma District's public secondary schools were collected to examine the direct impact of class attendance on students' success in mathematics.

➢ *Study Population*

The study focused on students, teachers, and head teachers in three selected Ngoma District schools, as well as parents and Sector Education Inspectors. The total population surveyed was 382.

➢ *Sample Size*

Sampling selects a subset from the broader target population based on existing knowledge (Cohen et al., 2011). In this study, 195 respondents were chosen from the larger target population.

➢ *Data Collection Tools*

Data was gathered through questionnaires and interviews to probe unobservable factors like opinions and emotions in this study.

IV. ANALYSIS AND FINDINGS

A. Software used to analyze Data

➢ *SPSS Version 21*

SPSS Version 21 is a versatile statistical software widely used for data analysis and visualization. It offers a broad range of analysis techniques, from basic statistics like descriptive analysis and t-tests to advanced methods such as factor analysis and non-parametric tests. Its user-friendly interface simplifies data manipulation and provides options for data visualization and reporting. However, users must be cautious of potential misinterpretation of results, especially without a strong understanding of statistical concepts. Data quality and accuracy are crucial, as SPSS relies on reliable input data. Users may also encounter limitations for complex or specialized analyses, necessitating the use of supplementary tools to address specific research needs. In summary, SPSS Version 21 was used to analyze data collected to answer this research question "Is there a statistically significant correlation between students' class attendance in mathematics and their academic performance in the subject? "

➢ *Microsoft Excel*

Microsoft Excel is a widely used spreadsheet software with basic data analysis capabilities, offering functions like formulas, pivot tables, and charts for tasks like mean and standard deviation calculations. While suitable for simple statistical analysis, Excel falls short with complex statistical tasks and may lead to errors due to user misuse. It struggles with large datasets and lacks the precision of dedicated statistical software, prompting the need for specialized tools for more advanced and reliable statistical analyses. Users must exercise caution when handling critical research data, as Excel's limitations can impact accuracy and reliability in complex statistical tasks, this drive researcher to use both SPSS Version 21 and Microsoft Excel on low extent.

B. Findings

Table 1: Distribution of students based on where they were studying

School	Frequency	Percentage
G.S Rukira	17	11
E.S Rukira	39	26
G.S Kabare	97	63
Total	153	100

Table 2: Distribution of teachers based on their schools.

School name	Frequency	Percentage
G.S Kabare	2	40
G.S Rukira	2	40
E.S Rukira	1	20
Total	5	100

Table 3: Distribution of parents by their level of Education

Level of Education	Frequency	Percentage
Primary level	2	6
High school level	15	45.5
Higher education level	16	48.5
Total	33	100

The table 3. showed the level of Education of the parents. The 2 of 33 parents had primary education level corresponding with 6%, 15 of 33 parents had Secondary Education level corresponding with 45.5% and 16 of 33 parents had Higher Education level (University level) corresponding with 48.5%.

All five teachers who were respondents for this study participated in data collection, and they each returned the distributed questionnaires, which revealed a correlation coefficient of 0.827 in Table 4.12. This finding implies that a one-level increase in students' attendance is associated with a 0.827 increase in their academic performance in mathematics. Furthermore, with a probability of 0.01, the correlation coefficient is unlikely to occur by chance, indicating a statistically significant strong positive relationship between students' class attendance and their performance in mathematics ($r= 0.827$, $p<0.01$).

Table 4: Distribution of Sector Education Inspectors and Head teachers

Level of Education	Frequency	Performance
Primary Level of Education	0	0
Secondary Level of Education	0	0
University Level of Education	4	100
Total	4	100

The Table 4. showed the level of Education to the side of Sector Education Inspectors. The 4 of 4 varied to 100% respondents were qualified and had degrees from the universities. The findings showed that to be Inspector of education at a sector level and head teacher of the Secondary School required a qualification in education at least a bachelor's degree. That was the reason why both sector education Inspectors and Head Teachers were bachelor's degree holders.

Table 5: Teachers' feedback on the correlation between students' class attendance and their academic performance in mathematics subject

Variables		Academic performance in mathematics subject	Students' class attendance
Academic performance in mathematics subject	Pearson correlation Coefficient(r)	1	0.827
	Significance. (2-tailed)		0.01
	N	195	195
Students' class attendance	Pearson correlation Coefficient(r)	0.827	1
	Significance. (2-tailed)	0.01	
	N	195	195

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

Table 6: Students' feedback on the correlation between students' class attendance and their academic performance in mathematics subject

Statements	Strongly disagree		Disagree		Neutral		Agree		Strongly Agree	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Irregular students' class attendance leads to low scores in mathematics subject.	7	5%	12	7.5%	12	7.5%	38	25%	84	55%
Irregular students' class attendance leads to delays in the completion of mathematics homework.	7	5%	7	5%	16	10%	64	42%	59	38%
Irregular students' class attendance leads to not having all notes	12	7.5%	12	7.5%	6	4%	36	23%	87	58%
Average	8.6	5.8%	10.3	7%	11.3	7.2%	46	30%	76.6	50%

There were 4 interviewed Sector Education Inspectors and head teachers, the findings from the interview given to them About students' class attendance and academic performance in mathematics subject showed that all respondents unanimously agree that there is a strong correlation between students' class attendance and their academic performance in the mathematics subject. Irregular attendance tends to lead to poorer performance due to missed learning opportunities, incomplete understanding, and lack of practice.

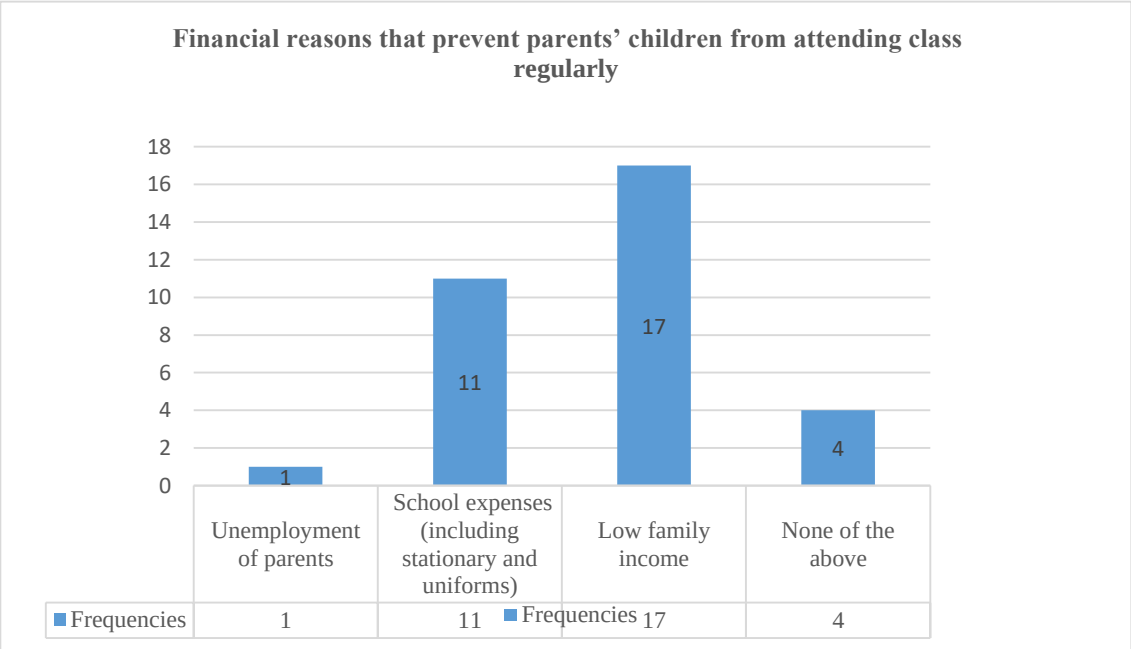

Fig. 1: Financial reasons that prevent parents' children from attending class regularly

The data in Fig 1 indicates that only a very small percentage of parents (3.03%) see parental unemployment as the main financial reason for their children's irregular school attendance. On the other hand, a notable proportion (33.33%) identify school expenses (including stationery and uniforms) as a significant barrier to regular attendance. A majority (51.51%) of parents view low family income as the primary financial obstacle to their children attending school regularly. Additionally, some parents (12.12%) did not single out one specific reason among parental unemployment, school expenses, and low family income, suggesting that a combination of these factors or other unmentioned reasons may contribute to irregular attendance. Overall, financial challenges, particularly low family income and school expenses, play a substantial role in affecting children's consistent class attendance.

V. CONCLUSION

The conclusions stem from a study focused on the relationship between students' attendance and their academic achievements in mathematics within public secondary schools in Rwanda. The initial finding underscores a notable correlation (0.827) between class attendance and mathematics performance, with irregular attendance leading to delays in homework completion, lower mathematics scores, and incomplete notes. The second conclusion highlights diverse factors influencing attendance trends and underscores the importance of strategies such as incorporating technology, setting clear learning objectives, fostering peer collaboration, and nurturing teacher-student relationships to enhance attendance.

In light of the conclusions drawn, the researcher offers several recommendations for various stakeholders in the Rwandan education system. Parents are encouraged to actively promote regular attendance in mathematics classes, emphasizing its importance and fostering a supportive home learning environment. Teachers should adopt engaging teaching methods, implement effective attendance tracking, and provide support to students with attendance issues. Government educational leaders should allocate resources, provide professional development for teachers, and enforce attendance-related policies. Students are urged to take personal responsibility, manage their time effectively, seek help when needed, and set academic goals. In conclusion, enhancing mathematics class attendance in Rwandan public secondary schools necessitates collaborative efforts among parents, teachers, educational leaders, and students to improve academic performance and future educational outcomes.

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