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Effects of Emerging Issues In Education On Students Academic Performance In Rwanda A Case of Public Secondary Schools In Gasabo District

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Abstract:

Background*: The integration of technology has notably enhanced traditional teaching and learning methods, presenting new challenges in education. The Rwandan Education Sector Strategic Plan 2018–2024 emphasizes promoting ICT to improve education quality at all levels. The United Nations' 70th General Assembly established 17 Sustainable Development Goals (SDGs) in 2015, with the fourth SDG aiming to ensure inclusive, equitable quality education and promote lifelong learning for all. This study aimed to examine the impact of emerging challenges on Rwandan students' academic performance. It specifically sought to assess the effects of technology integration, blended and online learning, and equity and inclusion on academic outcomes.*

Methods and Materials: *The research employed a descriptive survey combining quantitative and qualitative methods. The target population included three stakeholders from 42 public secondary schools in Gasabo District, totaling 126 participants, with a sample size of 96 determined using Slovin's formula. Purposive sampling methods were used to gather both primary and secondary data. Primary data was collected via questionnaires, while secondary data comprised academic articles, government publications, and ministry reports. Data analysis was performed using SPSS version 25. Qualitative data from interviews and open-ended survey responses were analyzed thematically, with data coded to identify key concepts. Quantitative data from closed-ended survey questions were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations.*

Results: *Triangulation of qualitative and quantitative data enhanced the validity of the findings. The regression model analysis revealed significant positive impacts of technology integration ($\beta = 0.678$, $p < 0.001$), online and blended learning ($\beta = 0.160$, $p = 0.021$), and teacher professional development ($\beta = 0.266$, $p < 0.001$) on academic performance. Equity and inclusion, while positive ($\beta = 0.133$), did not achieve statistical significance ($p = 0.063$), indicating the need for further investigation.*

Conclusion: *In conclusion, the study underscores the importance of technology integration and teacher professional development in improving academic performance. It recommends implementing robust professional development programs tailored to teachers' needs and enhancing technology use in educational settings to boost student outcomes.*

Key words: *Emerging Issues, Education, Students Academic Performance, Public Secondary Schools, Gasabo District, Rwanda.*

i. Introduction

The landscape of education is continually evolving with the emergence of new issues and technologies, profoundly impacting students' academic performance worldwide (Selwyn, 2016). However, the rapid transition to remote learning in response to global events like the COVID-19 pandemic has brought to light the digital divide, exacerbating disparities in access to education (Education International, 2020). Furthermore, the advent of project-based learning approaches and the growing influence of social media platforms present both opportunities and challenges for students, influencing their academic engagement and performance (Kara, 2017; Junco, 2015). As education becomes increasingly globalized, fostering cultural

awareness and competencies is essential, but it also introduces complexities related to diverse learning needs and linguistic diversity (Sawir, Marginson, Deumert, Nyland, & Ramia 2023). Additionally, the growing emphasis on skills development and 21st-century competencies has spurred the adoption of progressive pedagogical approaches such as personalized learning and project-based learning across Asian educational systems (Sengupta, 2019). According to UNESCO (2020), Sub-Saharan Africa still grapples with issues of access to quality education, with millions of children out of school or receiving inadequate instruction.

With the rapid advancement of technology, there is a growing emphasis on integrating digital tools and resources into the curriculum to promote interactive and personalized learning experiences in Ghana (Agbenyega, 2020). Additionally, Ghana's educational policies are increasingly aligned with international standards, emphasizing the need for innovation, critical thinking, and global competence (UNESCO, 2021). With advancements in technology and the increasing integration of digital tools in classrooms (Alhassan, 2019), students have access to a wealth of information and learning resources like never before. Additionally, the COVID-19 pandemic has accelerated the adoption of remote learning modalities, presenting both opportunities and challenges for students (Donkor & Owusu-Boateng, 2021).

Students and educators in South Africa are negotiating a fast changing educational environment due to the introduction of digital technology, personalized learning approaches, and the growing emphasis on global awareness (Chigona, Davids, & Erasmus, 2020). The academic performance of kids is presented with both opportunities and challenges by these issues.

In Kenya, emerging issues in education are shaping the landscape of academic performance for students across various levels of the educational system. Additionally, the emphasis on personalized learning approaches tailored to individual student needs is becoming more prevalent, fostering engagement and enhancing academic outcomes (Gakunga, Njoroge & Inyega., 2019). To fully realize the promise of these concerns, however, hurdles like the digital divide and the requirement for efficient teacher training in technology integration continue to be major obstacles (Mwende & Kang'ethe, 2018). Furthermore, the COVID-19 epidemic and other worldwide events have expedited the shift to remote learning and brought attention to the advantages and disadvantages of online learning in Kenya (Mutiso, 2021).

Rwanda has made education a top priority as a major factor in socioeconomic growth, with the goal of becoming a knowledge-based economy (Rwanda Education Board, 2018). The government's initiatives to increase educational access, raise standards, and match curricula to industry demands demonstrate this commitment (Ministry of Education, 2019). Rwanda's educational landscape is changing as a result of emerging challenges such the use of technology in the classroom, the promotion of STEM (Science, Technology, Engineering, and Mathematics) education, and the focus on entrepreneurship and innovation (Ndayambaje, Uwizeye, & Nzabonimpa, 2020). Notwithstanding, several obstacles persist, such as unequal educational opportunities across urban and rural regions, restricted resources, and the requirement for teachers to get ongoing professional development in order to proficiently employ novel pedagogical techniques (Ministry of Education, Rwanda, 2021).

Additionally, the advent of emerging educational issues, such as technology integration and personalized learning, brings forth new possibilities for enhancing student achievement but also requires careful consideration and adaptation within the Rwandan context. Thus, understanding the effect of these emerging issues on students' academic performance in Gasabo District's public secondary schools is crucial for informing targeted interventions and policy decisions aimed at promoting educational equity and excellence in Rwanda's evolving landscape. The main objective of this study was to investigate the effect of emerging issues in education on students' academic performance in Rwanda. It was guided by the following specific objectives:

i. To identify the factors of technology integration on students' academic performance in Rwanda.
ii. To determine the effect of equity and inclusion on students' academic performance in Rwanda.
iii. To analyze the relationship between emerging issues in education and academic performance in Rwanda.

ii. Theoretical Framework

Theories such as the following served as the basis for the research included Cognitive Development Theory and Social Learning Theory.

Cognitive Development Theory

The theory of cognitive development, specifically as put forward by Piaget (2016), places significant emphasis on the role that active exploration and engagement with the environment play in molding cognitive development. This idea holds that people build their knowledge of the world by assimilating information and making accommodations, continuously improving their mental models via experiences. In the context of education, technology integration can provide students with diverse and interactive learning experiences, fostering cognitive development by engaging them in active problem-solving, critical thinking, and information processing (Jonassen, 2021).

In Rwanda, disparities in technology access and infrastructure may exacerbate inequalities in educational opportunities, limiting the benefits of technology integration for students in underserved communities (Gasana & Munyandamutsa, 2018). Furthermore, worries about teacher readiness and digital literacy may make it more difficult to successfully incorporate technology into instruction, which would limit its ability to help Rwandan students' cognitive growth and enhance their

academic performance (Nsengiyumva & Karema, 2020). Therefore, even if integrating technology is in line with theories of cognitive development, resolving these issues is crucial to maximizing its beneficial effects on Rwandan students' academic performance.

Social Learning Theory

According to Albert Bandura's Social Learning Theory, people pick up new skills by seeing and copying the actions, attitudes, and feelings of others. This idea highlights the influence of social contact and group projects on students' academic performance in the context of education (Bandura, 2017). In Rwanda, where remote learning has become increasingly prevalent, the principles of Social Learning Theory offer valuable insights into the effectiveness of virtual educational environments. Research suggests that peer interaction and teacher-student relationships play crucial roles in facilitating learning experiences (Ngabonziza & Rugira, 2020).

This study evaluated the efficacy of remote learning platforms in promoting social learning processes and improving students' academic performance in Rwanda's educational system using a mixed-methods approach that included questionnaires, interviews, and observations.

iii. Conceptual Framework

By offering a framework for comprehending and interpreting occurrences within a certain field of study, a conceptual framework acts as the theoretical cornerstone that directs research activities (Creswell & Creswell, 2017). Scholars can contextualize their findings and further the body of knowledge in their field by firmly establishing theories and conceptual models as the foundation for their study (Gerring, 2017). To put it simply, the conceptual framework provides structure and flexibility for researchers building their researches in order to better comprehend complicated events.

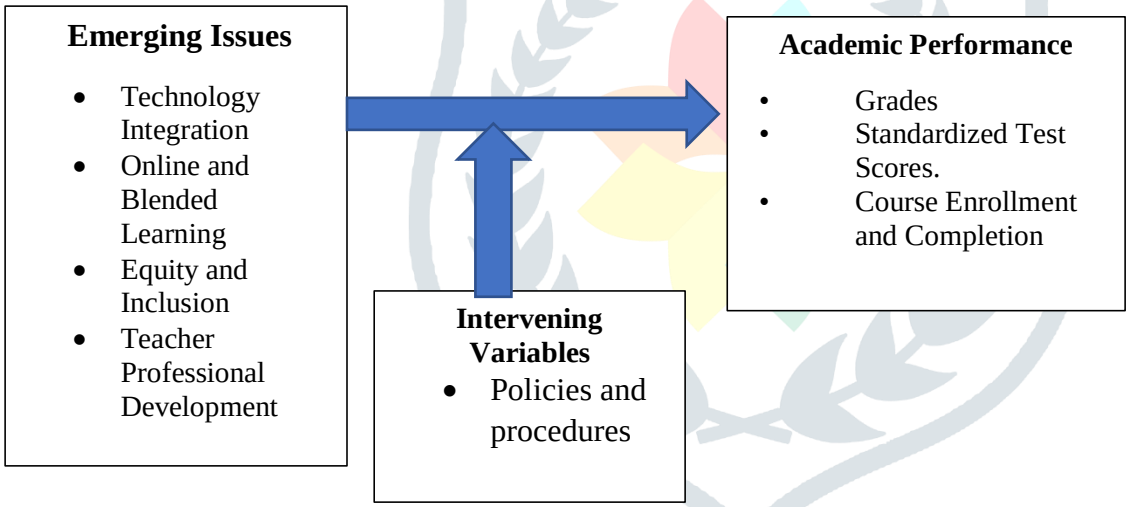

Figure 1: Conceptual Framework
Source: Researcher (2024)

The conceptual framework for this study draws on key theoretical perspectives and empirical research to investigate the multifaceted factors influencing students' academic performance in Rwanda. First, the effect of integrating technology into education is investigated, drawing on the sociocultural theory of learning (Vygotsky, 2018) and empirical research illustrating the advantages and disadvantages of using technology in the classroom (Nsengiyumva & Karema, 2020). Secondly, the effect of remote learning on academic performance is assessed, informed by literature on distance education and online learning environments (Tumwebaze, 2020), considering the socio-economic disparities and digital divide issues prevalent in Rwanda (Twagiramariya & Karangwa, 2021). Thirdly, the influence of equity and inclusion on academic achievement is explored, drawing upon socio-cultural factors (Gasana & Munyandamutsa, 2018) and policies promoting inclusive education in Rwanda (Rwanda Education Board, 2021). In conclusion, an analysis is conducted on how teacher professional development affects academic performance by fusing theories of instructional improvement and teacher effectiveness (Rwanda Education Board, 2020) with empirical findings about the relationship between student outcomes and teacher preparation (Nsengiyumva & Karema, 2020). Through this conceptual framework, the study aims to provide a comprehensive understanding of the interplay between these factors and students' academic success in Rwanda.

iv. Research Methodology

1. Research Design

This study used a descriptive survey approach that combined quantitative and qualitative methods as part of its research design. Mixed methods research, as defined by Creswell and Plano Clark (2018), entails gathering, evaluating, and combining qualitative and quantitative data in a single study to enable a more thorough grasp of the research subject.

The quantitative phase involves administering structured surveys to a representative sample of students, teachers, and school administrators to collect data on socio-economic backgrounds, perceptions of infrastructure, and access to educational resources. Additionally, academic performance indicators such as grades and standardized test scores was analyzed. The qualitative phase with key stakeholders to explore their perspectives on the challenges faced by public secondary schools in Gasabo District and their recommendations for improvement. According to Hair *et al.* (2019), quantitative research involves collecting and analyzing numerical data to test hypotheses and answer research questions.

2. Target Population

In a given subject, a population is a set of universal elements or objects. According to Mugenda and Mugenda (2017), the population consists of all the people for whom the researcher hopes to generalize the study results. There are 42 public schools in the Gasabo District overall, according to a 2019 Ministry of Education report. There were 126 participants in all for this study—three stakeholders from each of these schools. Table 1 displays the distribution of the responders.

Table 1: Target Population

Category	Population
Head Teacher	43
Director of Studies	43
Dean of Students	43
Total	**126**

3. Sampling Procedures and Techniques

Following recommendations by Krejcie and Morgan (1970), a stratified random sampling approach is utilized to select representative samples of students from public secondary schools across Gasabo District, Rwanda. Stratification is based on school size, academic performance, and geographical location to ensure adequate representation of diverse student populations.

Sample Size

For this study, a sample size of 96 respondents was selected from the target population of 126, following guidelines for determining sample size in mixed-methods research (Creswell & Plano Clark, 2018). According to Krejcie and Morgan (1970), a sample size of 100 to 500 respondents is generally considered adequate for surveys aiming for a representative sample within a heterogeneous population. Additionally, Hair *et al.*, (2019) suggest that a sample size of at least 100 respondents is sufficient for conducting regression analysis to examine relationships between variables. Therefore, a sample size of 96 respondents was selected to ensure adequate representation across different categories.

$$n = \frac{N}{1+N\,(e)^2} \quad \text{..... (Equation 3.1)}$$

In the context of a population size of 126, the sample size can be calculated using Slovin's' formula. Assuming a desired margin of error (e) of 5%, which is commonly used in many research studies, the calculation would be as follows:

$$n = \frac{126}{1 + 126(0.05)^2} \approx 95.8 = 96$$

Therefore, for a population of 126, the sample size determined using Slovin's' formula with a 5% margin of error would be approximately 96.

Sampling Technique

The research utilized a stratified random sampling methodology to guarantee that the sample fairly reflects the heterogeneous student body of public secondary schools in the Gasabo District. By using particular criteria such school size, location (rural vs. urban), and performance levels, the population is divided into discrete groupings, or strata, according to this method. To guarantee that every subgroup is fairly represented in the final sample, a proportionate random sample was taken from each stratum. This methodology improves the study's validity and reliability by mitigating sample bias and guaranteeing a thorough examination of the variables influencing academic performance in various school contexts (Creswell & Creswell, 2017; Fraenkel, Wallen, & Hyun, 2019).

4. Data Collection Methods

The present study utilized a combination of quantitative and qualitative methods for data collecting in order to thoroughly examine the factors that impact academic performance in public secondary schools located in the Gasabo District of Rwanda. Quantitative data was collected through structured surveys administered to students, teachers, and school administrators, focusing on variables such as socio-economic background, infrastructure availability, and educational technology integration. These surveys were designed based on validated instruments used in previous studies (Gasana & Munyandamutsa, 2018; Niyonsenga & Mushi, 2019) to ensure reliability and validity. Additionally, qualitative data was gathered through semi-structured interviews and focus group discussions with key stakeholders, including education policymakers, community leaders, and representatives from non-governmental organizations.

Data Collection Instruments

The primary data collection instrument for this study is a structured questionnaire designed to gather comprehensive information on various aspects of students' academic performance in Rwanda. Developed through a thorough review of existing literature, the questionnaire targets key variables with questions formulated to assess participants' perceptions, experiences, and opinions. This approach allows for a detailed analysis of the factors impacting academic outcomes. The questionnaire includes both closed-ended questions, using rating scales or Likert-type items for quantitative data, and open-ended questions for qualitative insights through participants' narratives. To ensure clarity and relevance, the instrument was pilot-tested at Lycée de Kigali with 10 participants, following the recommendation by Kothari and Garg (2014) to sample approximately 10% of the population for pilot studies, as supported by Babbie (2016). Additionally, document analysis was conducted, reviewing government publications, educational policies, and school records to triangulate data and provide a comprehensive understanding of the research problem. This mixed-methods approach ensures the collection of rich and varied data sources for an in-depth examination of the study issues.

v. Research Findings and Discussions

Background information of the Respondents

The demographic characteristics aim to gather background information about the respondent's gender, age group, education level and Respondents years of Experience in teaching profession.

Gender of the Respondents

In order to guarantee a thorough grasp of the sample population, the study gathered demographic information on the gender of respondents. This data is essential for examining how gender may affect views and experiences on new problems in education and academic achievement in Gasabo District public secondary schools. Table 2 displays the gender classification of the respondents, indicating the percentage and frequency distribution of male and female study participants.

Table 2: Classification of Respondents by Gender

Gender of the respondents	Frequency	Percent
Male	50	53.2
Female	44	46.8
Total	**94**	**100.0**

Source: **Primary data, (2024)**

The gender distribution of the 94 respondents to the survey is shown in Table 2, with 53.2% of them being men and 46.8% being women. This gender distribution reflects a relatively balanced representation, which is crucial for ensuring the inclusivity and diversity of perspectives in research findings (Krefting, 2021). Studies exploring gender differences in educational outcomes often emphasize the importance of balanced gender representation to capture nuanced differences in experiences and perspectives (Aragon & Dovidio, 2018). The near-equal distribution observed in this study aligns with current literature on gender representation in educational research, where efforts to ensure gender parity contribute to more comprehensive and inclusive findings (Shields, 2018). This balanced representation enables researchers to analyze potential gender-related influences on variables such as academic performance or attitudes toward educational interventions.

2. Presentation of Findings

Three primary goals of the study were covered in the presentation of the results. First, in Rwanda's educational system, the study determined important elements pertaining to technology integration and its effect on students' academic performance. It also looked at how equity and inclusion programs affected academic results, emphasizing how important they are in creating a welcoming atmosphere for all children to learn in. Finally, the study examined the complex relationships that exist between a range of new challenges in education and how they affect academic performance in Rwandan public secondary schools. These issues include curricular revisions, teacher professional development, and socioeconomic disparities.

1. Descriptive Results on Technology integration

The descriptive results on technology integration, as presented in Table 4.8, illustrate the perspectives of respondents regarding various statements related to the integration of technology in education. The table provides a comprehensive view, depicting the distribution of responses across different categories: Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA). Each statement is assessed for its mean score and standard deviation, offering insights into the level of consensus or divergence among participants. These findings serve to elucidate the prevailing attitudes and perceptions towards technology integration among stakeholders in the educational context, crucial for understanding the current landscape and potential areas for improvement in enhancing educational practices.

Table 3: Respondents views on Technology integration

Statement on technology integration	SD	D	N	A	SA	Mean	Std Dev.
Technology resources (e.g., computers, internet access) are readily available in my school.	0.0%	0.0%	2.0%	39.0%	59.0%	4.57	.537
I have easy access to technology devices (e.g., laptops, tablets) for educational purposes.	0.0%	2.0%	6.0%	37.0%	55.0%	4.45	.702
Teachers effectively integrate technology into classroom instruction.	0.0%	1.0%	7.0%	25.0%	67.0%	4.58	.670
The use of technology enhances my understanding of academic concepts.	0.0%	2.0%	8.0%	27.0%	63.0%	4.51	.732
Technology use encourages active participation and engagement in learning activities.	0.0%	0.0%	2.0%	45.0%	53.0%	4.51	.541
Technology facilitates collaboration and interaction with classmates and teachers.	0.0%	0.0%	5.0%	42.0%	53.0%	4.48	.594

Source: **Primary data, (2024)**.

Table 3 showcases respondents' perceptions of technology integration in education, indicating strong agreement and positive attitudes overall. A significant portion of respondents acknowledge the availability of technology resources in their schools (59.0%) and easy access to devices for educational use (55.0%), corroborating studies that emphasize the necessity of infrastructure for effective technology integration (Ertmer, Ottenbreit-Leftwich, & Tondeur, 2015). Additionally, a majority believe that teachers successfully incorporate technology into their teaching (67.0%) and that it aids their understanding of academic concepts (63.0%), which reflects its positive impact on learning outcomes (Rashid & Asghar, 2016). The agreement that technology fosters active participation (53.0%) and facilitates collaboration (53.0%) highlights its role in promoting student and educator engagement (Means et al., 2023). These findings underscore a strong endorsement of the educational benefits of technology, suggesting potential for further enhancement of teaching practices through ongoing integration and support.

2. Descriptive Results on Online and Blended Learning

This study presents descriptive results on respondents' views regarding online and blended learning, as captured in Table 4. The table outlines participants' perceptions across various statements related to remote learning, measured on a Likert scale from strongly disagree (SD) to strongly agree (SA). The mean and standard deviation are reported to provide insights into the distribution and intensity of opinions among the respondents. These findings illuminate the diverse perspectives and experiences of stakeholders concerning the efficacy, accessibility, and challenges associated with online and blended learning environments, offering a nuanced understanding crucial for informing educational policies and practices in contemporary educational settings.

Table 4: Respondents views on Online and Blended Learning

Statement on Remote Learning	SD	D	N	A	SA	Mean	Std Dev.
Remote learning has been effective in facilitating my understanding of course materials.	2.0%	6.0%	18.0%	39.0%	35.0%	3.99	.980
I feel motivated to actively participate in remote learning activities.	0.0%	6.0%	16.0%	42.0%	36.0%	4.08	.872
The availability of online resources (e.g., videos, textbooks) has enhanced my learning experience during remote learning.	1.0%	1.0%	7.0%	39.0%	52.0%	4.40	.752
I have encountered technical difficulties (e.g., internet connectivity issues, device	0.0%	6.0%	16.0%	42.0%	36.0%	4.08	.872

compatibility) during remote learning sessions.							
Remote learning has provided me with sufficient access to educational materials (e.g., textbooks, online resources).	0.0%	12.0%	17.0%	33.0%	38.0%	3.97	1.020

Source: **Primary data, (2024)**.

Table 4 illustrates respondents' perceptions of online and blended learning, showing diverse experiences with remote education. The data reveals a generally positive sentiment towards the effectiveness of remote learning in helping students understand course materials, with 35.0% strongly agreeing and 39.0% agreeing, highlighting the potential of online platforms to enhance learning outcomes (Means et al., 2023). Additionally, many participants feel motivated to engage in remote learning activities, with 36.0% strongly agreeing and 42.0% agreeing, which underscores the significance of intrinsic motivation in maintaining engagement during online education (Deci & Ryan, 2020). The availability of online resources is also viewed positively, with 52.0% strongly agreeing and 39.0% agreeing that it enriches the learning experience, indicating that diverse educational materials contribute to improved learning (Picciano, 2017). However, a notable proportion of respondents (36.0% strongly agree, 42.0% agree) report technical difficulties, such as internet connectivity issues, that impede seamless learning experiences (Baker, 2020). These findings highlight the complex dynamics of online and blended learning environments, emphasizing the need to address technical challenges while leveraging digital resources to enhance educational outcomes.

3. Descriptive Results on Equity and Inclusion

The descriptive results on equity and inclusion, as depicted in Table 5, highlight respondents' perspectives on various statements regarding these crucial educational principles. The table categorizes responses from strongly disagree (SD) to strongly agree (SA) across different statements related to equity and inclusion. Through mean scores and standard deviations, the data illuminate the degree of consensus or divergence among respondents on these issues. This analysis provides a comprehensive view of how stakeholders perceive equity and inclusion within the educational context under study, offering insights into areas of consensus, concern, and potential areas for improvement in fostering a more inclusive and equitable learning environment.

Table 5: Respondents views on Equity and Inclusion

Statement on Equity and Inclusion	SD	D	N	A	SA	Mean	Std Dev.
All students in my school have equal access to educational resources (e.g., textbooks, learning materials).	0.0%	1.0%	10.0%	30.0%	59.0%	4.47	.717
Students from diverse backgrounds (e.g., socio-economic, cultural) are treated fairly by teachers and peers.	0.0%	0.0%	1.0%	31.0%	68.0%	4.67	.493
School policies promote inclusivity and respect for all students, regardless of their differences.	0.0%	0.0%	5.0%	39.0%	56.0%	4.51	.595
Teachers play a crucial role in fostering an inclusive classroom environment that supports all students' academic growth.	0.0%	1.0%	2.0%	35.0%	62.0%	4.58	.589
Teachers should receive training and support to effectively address diversity and promote inclusivity in their classroom	0.0%	0.0%	10.0%	31.0%	59.0%	4.49	.674

Source: **Primary data, (2024)**.

Table 5 highlights respondents' perceptions of equity and inclusion in education, indicating generally positive views on resource accessibility and inclusivity in school settings. A significant majority, as noted by Sirin (2015), believe in equal access to educational resources for all students, with 59.0% strongly agreeing and 30.0% agreeing. This emphasizes the importance of equitable resource distribution to cater to a diverse student population. Additionally, respondents feel that students from varied backgrounds are treated fairly by teachers and peers (68.0% strongly agree, 31.0% agree), underlining the role of inclusive practices in creating a supportive learning environment (Gay, 2020). School policies are also positively perceived in fostering inclusivity and respect (56.0% strongly agree, 39.0% agree), highlighting the impact of institutional frameworks in cultivating inclusive cultures (Kozol, 2015). The crucial role of teachers in promoting inclusive classrooms is widely acknowledged, with 62.0% strongly agreeing and 35.0% agreeing on the need for teacher training to address diversity effectively (Banks & Banks, 2014). Overall, these findings stress the importance of promoting inclusive educational environments through policies, practices, and professional development.

4. Descriptive Results on Teacher Professional Development

Table 6 displays the descriptive results that show how respondents felt about professional development for teachers. The table displays information on a range of statements pertaining to this subject, with replies that range from strongly disagree (SD) to strongly agree (SA). The effectiveness and effects of current professional development programs on teachers in the public secondary schools of the Gasabo District are illuminated by these findings. A more nuanced perspective of how teacher training programs are viewed and appreciated in the particular educational setting under investigation is provided by the mean and standard deviation values, which show the central tendency and distribution of respondents' opinions.

Table 6: Respondents views on Teacher Professional Development

Statement on Teacher Professional Development	SD	D	N	A	SA	Mean	Std Dev.
Participating in ongoing professional development programs has enhanced my teaching skills.	0.0%	0.0%	5.0%	43.0%	52.0%	4.47	.594
The training and workshops I attend as part of professional development have provided me with valuable resources and strategies to improve student learning outcomes.	0.0%	0.0%	2.0%	47.0%	51.0%	4.49	.541
Engaging in professional development activities has positively influenced my ability to create a conducive learning environment for my students.	0.0%	0.0%	2.0%	38.0%	60.0%	4.58	.535
I have observed a noticeable improvement in my students' academic performance since participating in teacher professional development programs.	0.0%	0.0%	6.0%	42.0%	52.0%	4.46	.610
I believe that the knowledge and skills gained through professional development have positively impacted my students' ability to comprehend and apply course material.	0.0%	0.0%	5.0%	47.0%	48.0%	4.43	.590
Students' engagement and motivation in learning have increased as a result of teacher professional development initiatives.	0.0%	0.0%	1.0%	34.0%	65.0%	4.64	.503

Source: **Primary data, (2024)**.

Table 6 displays respondents' perspectives on teacher professional development, illustrating widespread positive views on its impact on teaching effectiveness and student outcomes. A significant majority of participants agree that ongoing professional development programs have improved their teaching skills (52.0% strongly agree, 43.0% agree), emphasizing the importance of continuous learning in enhancing instructional practices (Desimone, 2019). Furthermore, professional development activities are seen as valuable for providing effective resources and strategies to enhance student learning outcomes (51.0% strongly agree, 47.0% agree), highlighting their role in equipping educators with effective teaching methods (Guskey, 2023). Respondents also note positive effects on creating conducive learning environments (60.0% strongly agree, 38.0% agree) and observing improved student academic performance (52.0% strongly agree, 42.0% agree) following their participation in professional development initiatives (Yoon et al., 2017). Educators additionally perceive that professional development contributes to enhancing students' understanding and application of course content (48.0% strongly agree, 47.0% agree) and increases student engagement and motivation (65.0% strongly agree, 34.0% agree), highlighting the critical role of ongoing professional development in improving teaching quality and student outcomes in educational contexts (Darling-Hammond *et al.*, 2019).

5. Descriptive Results on Students' academic performance

Table 7, provides responses regarding various statements related to students' academic performance, ranging from strongly disagree (SD) to strongly agree (SA). These statements encompass diverse aspects such as students' comprehension levels, engagement in class activities, and overall achievement. The mean and standard deviation values offer insights into the central tendency and dispersion of opinions among respondents, reflecting their collective assessments of students' academic capabilities and performance within the study context.

Table 7: Respondents views on Students' academic performance

Statement on Students' academic performance	SD	D	N	A	SA	Mean	Std Dev.
Students' feel confident in my ability to understand and grasp the concepts taught in my classes.	0.0%	1.0%	3.0%	51.0%	45.0%	4.47	.594
Students' consistently complete my assignments and homework on time.	0.0%	0.0%	1.0%	45.0%	54.0%	4.40	.603
Students' actively participate in class discussions and activities.	0.0%	0.0%	5.0%	42.0%	53.0%	4.53	.521
Students' effectively manage my time to balance academic responsibilities and other activities.	0.0%	0.0%	2.0%	56.0%	42.0%	4.48	.594
Students' seek help from teachers or peers when I encounter academic challenges.	0.0%	0.0%	1.0%	45.0%	54.0%	4.40	.532
Students 'actively participate in class discussions and activities.	1.0%	2.0%	12.0%	33.0%	52.0%	4.53	.521

Source: **Primary data, (2024)**.

Table 7 illustrates the viewpoints of participants regarding students' academic performance, demonstrating favorable assessments across various measures. A significant majority of respondents indicate that students exhibit confidence in comprehending and mastering concepts (45.0% strongly agree, 51.0% agree), implying a nurturing educational environment that enhances student self-efficacy (Bandura, 2017). Furthermore, respondents observe high rates of punctual completion of assignments (54.0% strongly agree, 45.0% agree) and active engagement in class discussions (53.0% strongly agree, 42.0% agree), suggesting robust student involvement and dedication to learning (Finn & Rock, 2017). Additionally, respondents believe that students effectively manage their time (42.0% strongly agree, 56.0% agree) and seek assistance when facing academic challenges (54.0% strongly agree, 45.0% agree), underscoring students' proactive approach toward achieving academic excellence (Gonzalez-DeHass & Willems, 2023).

Discussion of the Findings

1. Technology Integration

Technology integration has a considerable favorable impact on students' academic performance ($\beta = 0.773$, $p < 0.001$), as seen by the findings presented in Table 3. The present findings are consistent with a wealth of research suggesting that proficient integration of technology into the classroom can augment academic achievements through the provision of interactive instructional resources, encouragement of student involvement, and easier accessibility to educational materials (Means et al., 2023; Ertmer, Ottenbreit-Leftwich, & Tondeur, 2015). Personalized learning experiences that are catered to each student's unique needs and learning preferences are made possible by technology integration, which also helps conventional teaching approaches (Picciano, 2017). According to Misra and Koehler (2016), the results also indicate that educators and educational institutions should keep looking for creative ways to incorporate technology into curriculum in an efficient manner, making sure that it complements rather than replaces conventional teaching techniques.

The favorable link observed between the integration of technology and academic performance highlights the revolutionary potential of this tool in contemporary education. It is recommended that educators and policymakers allocate resources towards professional development initiatives that furnish educators with the requisite competencies and expertise to proficiently incorporate technology into their pedagogical approaches (Ertmer *et al.*, 2015). By leveraging technology to support collaborative learning environments and promote critical thinking skills, educational institutions can better prepare students for success in a digitally connected world (Koehler & Mishra, 2019). Thus, continued research and investment in technology integration initiatives are crucial for advancing educational practices and maximizing student learning outcomes.

2. Online and Blended Learning

The findings regarding online and blended learning, as indicated in Table 3, show a positive but modest impact on students' academic performance ($\beta = 0.157$, $p = 0.021$). This is consistent with recent research (Means et al., 2023; Picciano, 2017) that shows how online and blended learning settings can improve flexibility, accessibility, and student engagement. It has been discovered that blended learning models—which integrate traditional in-person training with virtual elements—support individualized learning experiences and meet a range of student demands (Picciano, 2017). Furthermore, a plethora of interactive tools and instructional resources are accessible through online platforms, which can enhance learning experiences outside of conventional classroom settings (Means *et al.*, 2023).

It is crucial to remember that although blended and online learning have many advantages, there are drawbacks as well, including maintaining student motivation and engagement and providing fair access to technology (Picciano, 2017; Darling-Hammond et al., 2020). To optimize these techniques' potential benefits, effective implementation necessitates a close

examination of instructional design principles and continuous support for educators and students (Darling-Hammond et al., 2020; Hodges et al., 2020). To maximize the influence of online and blended learning environments on educational results, ongoing research and assessment are necessary to improve best practices and address new difficulties.

3. Equity and Inclusion

The findings regarding equity and inclusion, as depicted in Table 3, suggest a positive yet marginally significant impact on students' academic performance ($\beta = 0.126$, $p = 0.063$). This emphasizes how crucial it is to continue creating inclusive learning settings in which all students, regardless of circumstances or background, have equal access to opportunities, resources, and support (Darling-Hammond et al., 2020; Picciano, 2017). According to research, inclusive practices help students from different backgrounds feel engaged and like they belong, which improves learning results in addition to advancing social justice (Artiles & Trent, 2014; UNESCO, 2017). Effective strategies to enhance equity and inclusion in education include culturally responsive teaching, differentiated instruction, and supportive policies that address systemic barriers to learning (UNESCO, 2017).

However, challenges such as implicit bias, resource disparities, and inadequate support for marginalized groups continue to hinder efforts toward achieving equitable education outcomes (Darling-Hammond et al., 2020; Artiles & Trent, 2014). Addressing these challenges requires a multifaceted approach that involves collaboration among educators, policymakers, and community stakeholders to implement evidence-based practices and policies that promote inclusive education for all learners (Artiles & Trent, 2014; UNESCO, 2017).

4. Teacher Professional Development

Table 3 presents the findings pertaining to teacher professional development, which show a statistically significant favorable influence on students' academic achievement ($\beta = 0.380$, $p < 0.001$). This is consistent with a wealth of research highlighting the vital role that continuous professional development plays in improving student outcomes and teaching efficacy (Darling-Hammond et al., 2019; Guskey, 2022). Good professional development programs give educators the chance to master new teaching techniques, expand their subject matter expertise, and apply research-based techniques that enhance student learning (Darling-Hammond et al., 2019; Guskey, 2022). According to research, long-term professional development programs work best when they support teachers' needs, are in line with school objectives, and offer chances for reflection and cooperation (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2019).

Additionally, Wei et al. (2019) found that there is a positive association between teacher professional development and student results, which emphasizes the significance of providing educators with thorough and ongoing assistance. Professional development initiatives help create a dynamic and supportive learning environment that promotes student engagement and achievement by improving teachers' pedagogical skills, understanding of educational technologies, and capacity to meet the needs of a diverse student body (Darling-Hammond et al., 2019; Guskey, 2022). Promoting educational quality and equity in schools requires ongoing study and the application of practical professional development techniques.

vi. Conclusion

1. Technology integration

In conclusion, the findings on technology integration underscore its significant positive impact on students' academic performance, highlighting its role in enhancing learning outcomes through improved access to educational resources, active engagement in classroom activities, and effective collaboration among students and teachers. These results align with current literature emphasizing the transformative potential of technology in education, where its thoughtful integration not only supplements traditional teaching methods but also supports personalized and interactive learning experiences. Moving forward, continued investment in professional development for educators and strategic implementation of technology-enhanced instructional practices are crucial for maximizing the benefits of technology integration in educational settings, ensuring that it remains a cornerstone for fostering innovative and effective learning environments.

2. Online and Blended Learning

In conclusion, online and blended learning models have demonstrated a positive impact on students' academic performance, albeit with considerations for both benefits and challenges. The findings underscore the importance of effective instructional design and ongoing support to maximize the benefits of online and blended learning environments. However, challenges such as technical issues, equitable access to technology, and maintaining student motivation and engagement necessitate careful planning and continuous improvement. Moving forward, further research and strategic implementation of best practices are essential to harnessing the full potential of online and blended learning in enhancing educational outcomes and preparing students for future challenges in a digital age.

3. Equity and Inclusion

In conclusion, the findings underscore the critical importance of equity and inclusion in fostering positive educational outcomes. While the impact on students' academic performance was marginally significant in this study, the broader literature consistently highlights that inclusive educational practices contribute significantly to students' sense of belonging, engagement, and overall achievement. Effective strategies include ensuring equitable access to resources, implementing culturally responsive teaching practices, and fostering a supportive school climate where all students feel valued and respected. Addressing systemic barriers, promoting diversity in curriculum and teaching staff, and providing ongoing professional development for educators are essential steps toward achieving educational equity.

4. Teacher Professional Development

In conclusion the finding highlights the critical role of ongoing training and support for educators in improving teaching practices, fostering a conducive learning environment, and ultimately, facilitating better student outcomes. Effective professional development programs not only equip teachers with new instructional strategies and subject knowledge but also enhance their ability to address diverse student needs and utilize educational technologies effectively. Investing in tailored, continuous professional development initiatives aligned with school goals and supported by collaborative learning opportunities is essential for sustaining educational excellence and promoting equitable learning outcomes across diverse educational settings.

vii. References

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