## RESEARCH ARTICLE

## EFFECT OF TECHNOLOGY INTEGRATION AND STUDENTS` PERFORMANCE IN ENGLISH IN PUBLIC DAY SECONDARY SCHOOLS IN RWANDAA CASE OF RUTSIRO DISTRICT

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## Manuscript Info

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## Abstract

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Through the Ministry of Education, the Rwandan government seeks to improve the quality of education by emphasizing science, technology, and innovation. This study looks into how technology integration affects English language proficiency among students in public day secondary schools, particularly in the Rutsiro District. The Research aimed at evaluating the effects of technology integration on students' English performance in public day secondary schools across Rwanda, with a focus on Rutsiro District. Georges Siemens' 2005 idea of connectivism serves as the foundation for the theoretical framework of this investigation. Prior studies have demonstrated a favourable relationship between students' proficiency in English and the integration of technology. The researcher used the Yamane method to pick 122 respondents as a sample from the population of 542 informants who were the focus of this study. Data were collected for the study through the use of questionnaires, guided interviews, and educational material analysis. Both descriptive and correlational design were applied. The analysis of quantitative data was conducted with SPSS software, version 25. In this case, regression, correlation and descriptive analysis were established. Qualitative findings were analyzed using thematic analysis and lastly the data were presented and discussed thereafter. The findings indicate that 47.8% and 43.4% agreed and strongly agreed respective that computers, smartphones, audio files, sound recorder and projectors have a positive effect on students' English communication skills, participation in class, school progress-completion, ICT usage and academic performance. The mean for all variables were approximately 4 with standard deviation of 1 approximately. The beta coefficients for technology tools being integrated, smart phones, computers and audio files were 60.5%, 5.1% and 21.9% corresponding with p value 0.000, 0.581 and 0.002. The study concluded that the integration of technology, including smartphones, computers, and audio files, positively impacts students' performance in English at public day secondary schools in Rwanda. Recommendations were provided to stakeholders, including teachers, head teachers, and students, regarding the importance of digital skills in 21st-century education. Additionally, suggestions for areas for future research were presented.

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## Introduction:-

In the 21st century, the pervasive influence of technology is undeniable, permeating virtually every facet of human existence (Solak, 2015) . From the ubiquity of smartphones to the omnipresence of social media platforms and the increasing prevalence of cloud computing, technology has fundamentally reshaped social interactions, economic systems, and cultural norms (Polat Demir, 2016) . This phenomenon has led to a model shift where "change" itself has become the only constant in contemporary society.

Globally, the use of technology into education has transformed the processes of teaching and learning, especially in the English language classroom, where digital resources are now essential to improving student performance. The COVID-19 epidemic hastened the change by forcing educational systems all over the world to implement remote and hybrid learning methods. As a result, there has been a significant increase in expenditures in digital infrastructure and the EdTech industry, with programs like Microsoft Teams and Google Classroom turning into necessities in English classrooms. Leading nations in this digital revolution include the United States, the United Kingdom, and South Korea. They have done so by introducing technology that improve accessibility to information, encourage teamwork, and customize English language instruction. Studies indicate that incorporating technology has had a favorable effect on students' performance and engagement, particularly in the context of English language instruction (Alhumaid, 2019; OECD, 2020).

In United States, as noted by Prensky (2016), Today's students, commonly known as "digital natives," grow up in a world dominated by technology. From a young age, they are surrounded by devices like smartphones, tablets, laptops, and interactive media. As a result, teachers must adjust their teaching methods to cater to the demands of this tech-savvy generation (Chapelle, 2003).

In Germany, according to Himmelsbach (2019), the specific context of English language learning, technology offers a wealth of opportunities for enhancing instruction and facilitating language acquisition. The internet serves as a vast repository of linguistic resources, allowing learners to access authentic materials, engage with multimedia content, and participate in virtual language communities (Himmelsbach, 2019). Virtual environments such as Second Life provide immersive language learning experiences, enabling learners to interact with authentic language contexts and engage in communicative tasks with peers from around the world.

However, Finland has made great progress in integrating technology into educational systems due to the size and effectiveness of its technology integration initiatives. Differences in the availability of digital resources and technology infrastructure, for example, have the potential to worsen already-existing inequities in educational prospects (Teras et al., 2020; Nuncio, 2020).

In Kenya, educational systems are increasingly embracing technology integration as a means of improving instructional efficiency, expanding access to educational resources, and fostering student engagement and collaboration (Murithi, J. & Yoo, J. (2021), (2021)) .The term "technology integration" encompasses a diverse array of tools, resources, and practices aimed at leveraging technology to enhance teaching and learning outcomes (Goldhaber, . (2021)). This includes hardware such as computers and projectors, software applications encompassing multimedia resources and interactive learning platforms, and information systems such as cloud computing and the internet.

In Rwanda, a country that has undergone rapid socio-economic transformation in recent years, educational reform efforts have been prioritized as a means of modernizing teaching practices and equipping students with the skills needed for success in the digital age (Rwanda Education Board, 2015) . As part of these initiatives, the integration of technology into classroom instruction has been identified as a strategic priority. However, the successful implementation of technology-enhanced learning initiatives faces numerous challenges, including limited access to technology infrastructure, inadequate teacher training, and disparities in technological readiness among students (Cuban, 2009) (Cuban, 2009; Ertmer, 2005; Mouza&Lavigne, 2012). Particularimportance are the attitudes and perceptions of educators toward technology integration. Research has shown that teacher beliefs, pedagogical practices, and comfort levels with technology can significantly influence the extent to which technology is utilized in the classroom and its impact on student learning outcomes (Ertmer, 2005 & , 2012)

The impact of technology integration on pupils' English proficiency in secondary schools in Rwanda hence requires empirical research. In order to provide useful insights that can guide policy and practice in educational technology integration, this study will look into the different kinds of technology tools being used, examine how technology affects students' English performance in Rwanda day secondary school, and identify implementation challenges.

**Problem Statement**

The use of technology in language instruction has changed significantly in today's technologically advanced and networked environment. With the rise of multimedia materials, e-learning applications, and computer-assisted language learning (CALL) platforms, the conventional boundaries of language learning inside the classroom have drastically expanded. In 2021, Sasnako. These advancements have not only revolutionized the methods and tools available for language instruction but have also redefined the very nature of language learning itself. Within the realm of English language teaching, the integration of technology offers a myriad of opportunities to enhance pedagogical practices and enrich learning experiences (Ahmadi, 2017).

In Rwanda, where the educational landscape is rapidly evolving, the integration of technology into English language instruction holds immense promise for enhancing learning outcomes and preparing students for success in a globalized world (Hockly, 2013). Despite the undeniable potential of technology in English language instruction, the effective utilization of these tools remains a significant challenge in many educational contexts  (Ertmer, 2005 & , 2012). This challenge is multifaceted and encompasses various dimensions, including technological infrastructure, teacher attitudes and beliefs, and pedagogical practices. The realization of this potential is hindered by a range of obstacles, including limited access to technology resources, inadequate teacher training, and cultural barriers to technology adoption (Ertmer, 2005; Mouza&Lavigne, 2012).

Nonetheless, a thorough analysis of how technology is now being integrated into English language instruction in Rwanda's day secondary schools is desperately needed. This study, which focuses on a few public day secondary schools in the Rutsiro District, aims to evaluate the relationship between students' English proficiency and the integration of technology. This study will undoubtedly be a helpful resource for all parties involved in education as well as future scholars, and it will contribute to the scant body of knowledge already available on the topic.

## Literature Review:-

Technology integration refers to the presence and utilization of various tools in educational settings. Nonetheless, these interpretations are quite limited. When technology integration is viewed merely as access to computers, software, and the internet, some critics argue that this approach simplifies a complex issue that schools face regarding effective technology implementation (Ahmadi, 2017).

Defining technology solely as electronic devices places excessive importance on the mere presence of digital tools in educational settings. This perspective frames technology integration as simply having and utilizing this equipment in the classroom. However, such definitions are limiting. Viewing technology integration merely as access to computers, software, and the internet has led some critics to argue that the push for technology integration in schools is an oversimplified response to a more complex challenge (Bahrampour, 2006; Cuban, 2006a; Warschauer& Ames, 2010).

The technology itself is the first element of technology integration, and it can be found in many different forms in educational settings. The most popular kinds are the following: Web 2.0 technologies (like Google Classroom, Google Drive, Google Hangouts, Teams, Zoom, Dropbox, etc.); hardware (like desktop and laptop computers, digital cameras and camcorders, digital microphones, DVD players, tablets, mobile phones, projectors, smart interactive whiteboards), and communication tools (like email, instant messaging, and audio/video conferencing systems, as well as the Internet). The second element consists of technology-related tactics and mindsets that make it easier to integrate technology into a topic or field of study.

Technology integration, in Almalki's words, is "enhancing the educational environment with technology." Stated differently, it enhances the educational process because teachers are charged with "selecting and utilizing technology appropriately within a lesson or unit to support or enhance students' understanding of the content" (Almalki,                                                                                                      2020).

According to F. MitaNurAflah in Multimedia, integrating technology into the classroom greatly enhances student engagement and cognitive processes while also contributing to a student-centered teaching and learning

environment. Furthermore, integrating technology increases students' enthusiasm and self-confidence, according to Ghavifek (2016). Moreover, technology integration improves students' technological proficiency and boosts their involvement in the classroom (Kirkwood & Price, 2016). According to other research, integrating technology into the classroom can help students' cognitive skills (Santhosh&Meenakshi, 2015). All of these findings point to the transformation of educational processes and instructional approaches by technology.

Language teaching and learning can be significantly improved, according to many educators and researchers, if consistent attempts are made to integrate technology for language learners who are studying a foreign language (Hamilton, 2015). This is primarily due to the tools and capabilities that technology offers, which improve students' language acquisition (Izzah et al., 2014). These tools should help language teachers design more successful lesson plans as a result of ongoing research and technological advancements (Summaka, Samancioglu, &Baglibel, 2010). Furthermore, studies show that technology improves learning and makes the classroom more fun and engaging for students (Parvin& Salam, 2015).

Several studies have investigated the tools integrated into English language instruction in Rwanda's day secondary schools. For instance, Rugema and Mukamana (2019) conducted a survey among teachers in various schools across Rwanda, revealing that common tools included interactive whiteboards, educational software, and language learning apps. Similarly, Niyomugabo et al. (2020) found that online resources, such as multimedia content and language learning platforms, were widely used to supplement traditional teaching methods.

Among the many tools that can be used in English language training are computers, radios, televisions, overhead projectors, and language phones (McAlan, 2015). The computer is a key component of modern human life and the most important tool in information and communication technology.

It helps with fact gathering, organization, storing, and preparation for communication. It also enhances speaking and listening skills in the English language (Mc Alan, 2015). Throughout employee education and training, a sizable percentage of People can watch computer data and operations simultaneously on an overhead projector. Using Lingua Phones, a large number of students can practice speaking and hearing drills to enhance their listening and speaking abilities in the English language (Dang, 2011).

In rural areas, radio is a particularly useful teaching and training tool since it helps students improve their hearing and listening comprehension. Many programs that involve remote and open learning are made possible via radio. It is also useful for audio conferences. Listening to radio shows helps you become more fluent in the language, especially when it comes to drama and discussion. (Alcan, Mc).

TV is also beneficial for teaching situational language, enhancing English listening comprehension, and motivating English language learners. It is quite helpful for understanding the language that is used in the media. TV shows have the power to help a lot of kids all at once. Television is an important medium for English-language audio-visual conferencing because so many secondary schools, distant learning centers, and open universities broadcast their curricula on it, according to Fanney (2014). This television broadcasts live training sessions and talks.

Finney (2011) asserts that a few ICT technologies can improve and facilitate the teaching and development of writing and reading skills. These resources include, for instance, blogs, wikis, e-books, online journals, and discussion boards. Online portfolios and digital assets can be created via blogs, wikis, and e-books. These are places where students collaborate on projects. They can also be used to summarize students' work or for professional development. E-books are very functional as well. They can be used by students to improve their reading abilities. E-books, for example, come with built-in dictionaries, interactive chores, and audio. The fact that students may use this application on multiple devices, including computers, tablets, and smartphones, is another benefit.

Tony (2009) listed projects, portfolios, and performances as the three main methods of performance evaluation. With alternative assessment instruments, students must "produce evidence of accomplishment of curricula objectives." This is the main way that these types of evaluation differ from regular, standardized examinations. This evidence can be finished and utilized as a compilation of proof to demonstrate accomplishment when further learning is gained. It could be presented as a project, performance, or portfolio.

**The effects of technology integration on students' English language performance**
Studies have indicated that the incorporation of technology has a favourable effect on the English language proficiency of pupils in secondary schools in Rwanda. After implementing an online English language curriculum, pupils' writing and reading comprehension significantly improved, according to a study by Uwitonze and Uwamariya (2018). Additionally, students who used interactive language learning software had higher levels of English competence than those who just used traditional textbooks, according to Kabalisa and Uwamahoro (2021).

Integrating technology into English language instruction in Rwanda's day secondary schools offers a multitude of benefits. Firstly, technology provides students with access to a diverse array of digital resources, including e-books, educational websites, and language learning apps, thus supplementing traditional learning materials (Warschauer& Healey, 2008). Moreover, technology fosters interactive learning experiences through multimedia resources and educational games, enhancing student engagement and motivation (Rahimi&Yadollahi, 2011). This interactive engagement is particularly valuable in Rwanda's day secondary schools, where traditional teaching methods may predominate.

In the context of Rwanda's day secondary schools, where physical resources may be limited, technology serves as a crucial tool for bridging this gap and ensuring equitable access to educational materials. The availability of these resources exposes students to authentic English language content, including texts, videos, and audio recordings, enriching their learning experience and broadening their understanding of the language. This access empowers students to engage with English language materials beyond the confines of the classroom, facilitating self-directed learning and exploration. As a result, students develop a deeper understanding of English language concepts and enhance their language proficiency levels

Enhanced communication skills are a significant benefit of technology integration in improving students' English language performance in Rwanda's day secondary schools. Zarei and Khabiri (2018) discuss how technology facilitates communication and collaboration among students, both locally and globally, providing opportunities for authentic English language practice. Their study emphasizes the importance of online forums, video conferencing tools, and collaborative writing platforms in enabling students to interact in English with peers from diverse backgrounds and cultures. In the context of Rwanda's day secondary schools, where exposure to native English speakers and English-speaking environments may be limited, technology offers invaluable opportunities for students to engage in real-world communication experiences. Through these interactions, students develop their English language speaking, listening, reading, and writing skills in meaningful contexts, thereby enhancing their overall language proficiency. Additionally, technology-enhanced communication fosters intercultural understanding and collaboration, preparing students for success in an increasingly globalized world.

Personalized learning is a critical benefit of technology integration in enhancing students' English language performance in Rwanda's day secondary schools. Hockly (2017) emphasizes the role of technology in providing personalized learning experiences tailored to individual students' needs and preferences. According to Hockly, adaptive learning platforms use algorithms to deliver customized instruction and practice activities, allowing students to progress at their own pace and receive targeted support. In the context of Rwanda's day secondary schools, where classrooms may be diverse in terms of students' English language proficiency levels, personalized learning through technology ensures that each student receives the appropriate level of challenge and support. This individualized approach empowers students to take ownership of their learning and progress more effectively toward their language learning goals. Furthermore, personalized learning fosters a sense of autonomy and self-efficacy among students, leading to greater engagement and motivation in their English language studies.
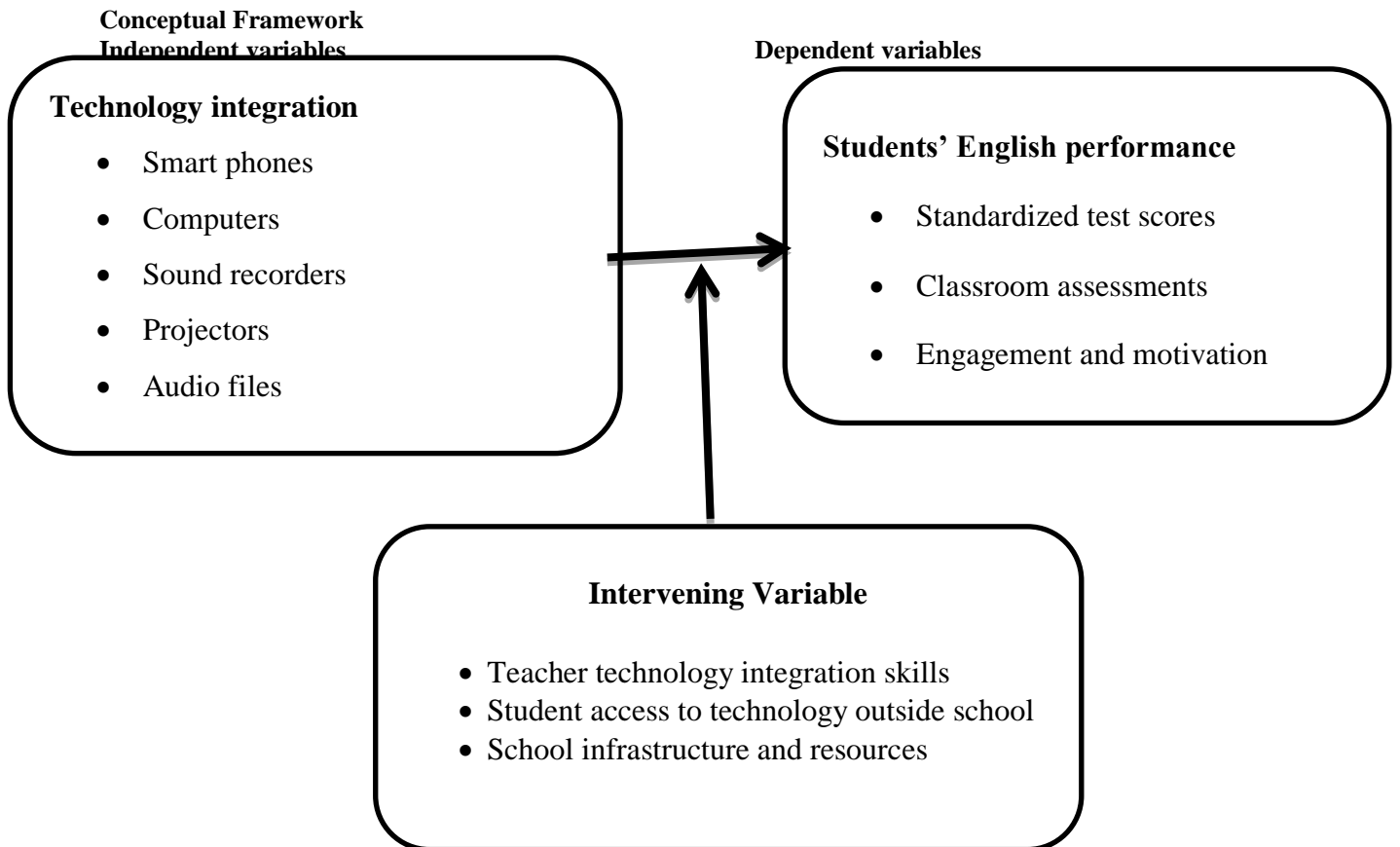
The efficiency with which information, communication, and technology (ICT) are used improves student achievement and school productivity. By integrating technology into the classroom, educators can implement cutting-edge teaching strategies that improve student learning outcomes and guarantee accessible for all community members.In a 2017 study, Hamilton-Hankins examined the effects of technology on the engagement levels of ten second-grade students in an English language arts classroom. The study looked at how different technological tools were used in the classroom to achieve learning objectives and assessed how they affected student engagement as perceived by the teacher and students. The findings demonstrated a positive correlation between student involvement and instructional technology-enhanced teaching practices. According to the study, using technology in the classroom allows teachers to achieve goals that were previously unachievable, which enhances the significance,

relevance, and interactive nature of learning. One of the numerous advantages that the participants cited was the increased degree of learner interaction that technology enabled.

**Connectivism Theory**
Connectivism Theory, introduced by George Siemens in 2005, is a learning theory that emerged in response to the rapid advancements in digital technologies and the proliferation of online information networks (Siemens, 2005). At its core, Connectivism posits that learning is not confined to individuals but is distributed across networks of people, resources, and technology. In today's interconnected world, learners have access to a vast array of information sources and digital tools, enabling them to navigate, filter, and make sense of knowledge within complex networks.

When we apply Connectivism Theory to the research topic, technology integration serves as a catalyst for networked learning experiences in Rwandan public secondary day schools. With the adoption of digital tools and online resources, students have unprecedented access to English language materials and interactive learning platforms. Through technology-mediated activities such as online discussions, collaborative projects, and multimedia presentations, students engage in networked learning environments where they connect with diverse sources of information and interact with peers locally and globally (Siemens, 2005).

**Conceptual Framework**
**Independent variables**                                                        **Dependent variables**

**Technology integration**

- Smart phones
- Computers
- Sound recorders
- Projectors
- Audio files

**Students' English performance**

- Standardized test scores
- Classroom assessments
- Engagement and motivation

**Intervening Variable**

- Teacher technology integration skills
- Student access to technology outside school
- School infrastructure and resources

**Research Methodology:-**
In order to investigate the various effects of technology integration and students' performance in English, this study employed a descriptive survey research design in addition to a correlation research design to demonstrate the relationship between variables in public day secondary schools in the Rutsiro area.

The target group for this research included 542 participants, consisting of school head teachers and teachers and students from selected day public secondary schools in the Rutsiro district.

The researcher used the Yamane method to pick 122 respondents as a sample from the population of 542 informants who were the focus of this study.In this research, a stratified sampling approach was utilized to select respondents,

categorizing them into two groups (school head teachers and teachers). Additionally, simple random sampling was applied within each group.

As per Oso and Onen (2016), the tool utilized for gathering data is designed to collect the results of the study to address the research questions. As a result, two instruments were used in this study to collect data: a questionnaire and an interview guide with two sections each. Background information about the participants was provided in Section A of the questionnaire and interview guide. In Section B, teachers were asked to answer closed-ended questionsin a few public secondary schools in the Rutsiro district about their thoughts on the use of technology in the classroom and how it has enhanced students' English skills. Open-ended questions were incorporated into Section B of the school head teacher interview guide to gather a diverse range of data pertaining to the research variables. To indicate the frequency of occurrence, dummy numbers 1 through 5 were used in the questionnaire's design.

In order to obtain frequencies and percentages, the acquired data were analysed using SPSS software to assess quantitative findings. The correlation between the study variables was shown using the Pearson coefficient of correlation. The respondents' perceptions were categorized based on the corresponding themes in a thematic analysis of the qualitative data gathered from interview schedules.

### Research Findings Interpretation and Discussion:-
The research objective was to evaluate the effect of Technology Integration on Students' Performance in English in Public Day Secondary Schools in Rwanda, particularly Rutsiro district.After determining the various tool types being integrated and gauging the extent to which these technological tools have impacted students' performance in the language, the researcher started examining the impacts of technology integration on students' English proficiency. The table below displays the descriptive data.

**Table 1:-** The Effects of Technology Integration on Students' English Performance.

| Statement: | SD | D | N | A | SA | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| There is standard level of reading and listening English academic information to students. | 6.6% | 4.9% | | 49.2% | 39.3% | 4.10 | 1.086 |
| There is an improved active participation of students in classroom discussions. | 5.7% | 5% | | 43.4% | 45.9% | 4.19 | 1.071 |
| Students make effective school progress through the use of English language. | 3.3% | 7.4% | | 51.6% | 37.7% | 4.13 | .979 |
| Students of this school experience an improved school completion. | 5.7% | 7.4% | | 38.5% | 48.4% | 4.16 | 1.131 |
| There is an improved ICT usage by students in this school while studying English language | | 3.3% | | 53.3% | 43.4% | 4.37 | .658 |
| There is an improved level of students' English academic performance in this school. | 0.8% | 2.5% | | 50.8% | 45.9% | 4.39 | .698 |

**Source:** Primary Data 2024.

The findings related to the effects of technology tools on students' English performance presented in the table 7.6 indicate that 96.7% confirmed the improved ICT usage and improved level of students' academic performance in English while 3.3% disagreed on these indicators. Secondly, 89.3% confirmed the improved active participation of students in classroom discussion and effective school progress while 10.7% rejected these indicators. These were followed by the standard level of reading and listening academic information in English language that presents 88.5% of the respondents agreements and 11.5% disagreements. Lastly, 86.9% confirmed the improved school

completion rate among the students is due to the integration of technology tools, and 13.1% denied the influence of these technology tools on the school completion.

During the interview, the head teachers were asked to explain how technology integration affected their students' academic performance in English. They said that the tools had an impact on students' communicative competencies, their ability to use technology tools properly, their ability to critically analyze digital content, their standard English skills (reading, speaking, listening, and writing), and, most importantly, their highest academic performance in the English subject. These results are in line with Hamilton-(2017) Hankins' investigation of how technology integration affects ten second-grade students' levels of engagement in an English language arts classroom.

Research examined the use of different technology tools to achieve learning objectives and aims in the classroom and assessed how this affected student engagement as reported by both the instructor and the students. The findings showed a positive relationship between student engagement and instructional strategies incorporating educational technology, and they came to the conclusion that incorporating technology into instruction gives teachers the chance to accomplish things that were previously unthinkable and enhances learning by making it more interactive, relevant, and meaningful. The study's findings show that participants recognized a wide range of advantages, including how using technology could improve student engagement.

## Conclusion:-
On the basis of the findings, the study withdrew conclusions in regard to objective of the research. First of all the study concluded that there are; audio, visual, and audio-visual namely computers, smartphones, projectors, audio files and sound recorder at low rate ; types of technology tools being integrated into teaching English subject in public day secondary schools in Rwanda, particularly Rutsiro district.

Secondly, the study concluded that there is positive significant performance in English among the students whenever technology tools are integrated into their teaching. This contributes to students' motivation, regular attendance, active participation in communicative activities, and improved grades in English exams.

Finally, the study found that the incorporation of digital tools has a favourable and significant impact on students' English skills. The calibre of reading, listening, speaking, and writing in English is raised anytime smartphones, laptops, projectors, audio files, and sound recorders are used in the classroom. With the use of these technological resources, students enhance their engagement in class, their use of ICT, their academic achievement in English, and their completion of school in public day secondary schools in Rwanda, Rutsiro district.

## Recommendations:-
After concluding on the findings of the study, the following recommendations were given.

The study recommends education stakeholders for their role in education area they should emphasize the integration of technology into teaching for students' English performance in public day secondary schools in Rwanda and seek to invest in technology tools required for the students' and teachers' accessibility and success.

The study recommends head teachers and teachers to take on leadership roles and become catalysts for innovation within their schools and communities. Teachers who are knowledgeable about the benefits of technology integration should advocate for its adoption, share best practices with their colleagues, and collaborate on initiatives to enhance teaching and learning through technology. By serving as role models and mentors, these teacher leaders should inspire their peers to embrace technology as a powerful tool for advancing student learning success.

The study recommends students as well should ensure that they are adequately prepared for the demands of the 21st-century economy. They should seek to learn new digital knowledge and become flexible to teaching methods that foster the development of digital skills, communication abilities, and critical thinking capabilities that are necessary for success in the modern world.

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