

**Research Study to Explore Impact of Educational
Technology on Student Achievement**

دراسة بحثية لاستكشاف تأثير التكنولوجيا التعليمية على تحصيل الطلاب

by

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ABSTRACT

The use of educational technology has become increasingly prevalent in recent years, with many schools and educators integrating technology into their teaching practices. The purpose of this study is to explore the impact of educational technology on student achievement. The study will examine the various ways in which technology is being used in classrooms, including the use of online resources, interactive whiteboards, and mobile devices. The study will employ a mixed-methods approach, including both quantitative and qualitative data collection methods. Quantitative data will be collected through surveys and standardized test scores, while qualitative data will be collected through interviews with teachers and students, classroom observations, and document analysis.

The literature review will explore previous research on the use of educational technology in the classroom, including studies that have examined the impact of technology on student achievement. The review will also explore the various theories and models that underpin the use of educational technology in teaching and learning, including constructivism, connectivism, and the SAMR model.

The results of the study will provide insights into the impact of educational technology on student achievement, and will inform educators and policymakers on the most effective ways to integrate technology into their teaching practices. The study will also provide a better understanding of the challenges and opportunities that come with the use of educational technology in the classroom, and will identify areas for future research. This study will provide insight into how technology affects education and how it might boost student performance. This project will assist build evidence-based policies and practices to promote educational technology by studying how educational technology affects student accomplishment.

ABSTRACT (مختصرة نبذة)

الطلاب أداء وتحسين التعليم جودة تحسين على تساعد حيث، التعليم مجال في المهمة الموضوعات من التعليم تكنولوجيا تعد الأكاديمية للإنجازات الطلاب تحقيق على التعليم تكنولوجيا تأثير استكشاف إلى الدراسة هذه وتهدف

التعليم تكنولوجيا استخدام:العوامل هذه ومن.الطلاب على التعليم تكنولوجيا بتأثير تتعلق عوامل عدة بتحليل الدراسة ستقوم نتائج مقارنة وستتم.التعاوني والتعلم،النشط والتعلم،بعد عن والتعليم،التعليمية التطبيقات واستخدام،الدراسي الفصل في التعليم تكنولوجيا يستخدمون لا الذين الطلاب نتائج مع التعليم تكنولوجيا يستخدمون الذين الطلاب

مراجع على الاعتماد وسيتم.المشابهة للدراسات السابقة النتائج مع ومقارنتها إحصائية أدوات باستخدام النتائج تحليل سيتم دقيقة نتائج إلى للوصول ومنهجية موثوقة

،الأكاديمية للإنجازات الطلاب تحقيق على التعليم تكنولوجيا لأثر فهمنا تعزيز في الدراسة هذه تساهم أن المتوقع ومن تنفيذها يمكن التي الإجراءات بعض باتخاذ توصية سيتم كما.التعليم جودة لتحسين استخدامها يمكن التي النتائج وتوفير المستقبل في التعليم تكنولوجيا استخدام لتحسين

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Technological advances have significantly impacted almost every facet of human existence since their invention. Today's society and activities would not be complete without technology. People's need to keep up with the latest technology innovations becomes stronger by the day (Carrillo, Onofa, & Ponce, 2011). All fields of life are expected to benefit from technological advancements, while those who lack these skills will be pushed out of the workforce. Education has been a focal point for a number of policy initiatives aimed at helping students learn the fundamentals of technology while also allowing them to apply that knowledge in new contexts (Bello, 2014). It has become increasingly common for educational institutions to use technology to help students better understand concepts, increase student interaction, and serve as an educational tool.

The technological revolution has not spared schools and educational systems. In the last several years, there has been a lot of discussion on how technology may be used to enhance and improve traditional teaching methods (Bello, 2014). State-to-chalkboard and white-board transitions are included. Students use many of the most frequent technologies to allow for immediate and personal contact, such as radio, television, satellite, computer, and the Internet. Piper (1998) notes that five years ago, she would have spoken about TV in a technology and education chapter on technology and education. She would have discussed the advantages and disadvantages of using computers in the classroom for educational purposes. After using a word processor, she would have thought about how the writing process has changed and how it would

continue to change. Like most of us, Piper is skeptical about the benefits of using computers in the classroom, describing how computers supplement children's classroom work (Bello, 2014). Many parents and educators are concerned about the long-term effects of exposing young children to computers, especially given that many already spend four or more hours a day in front of the TV set.

The technology used in educational settings such as primary, secondary, and postsecondary institutions is referred to as "educational technology." Using technology for educational purposes while studying or doing other school-related tasks is another definition of educational technology (AlHattami and Al-Hariri 2017). We need to consider the increasing relevance of technology in all parts of our lives when discussing its influence on education. Schools need to be flexible and adaptable in order to meet the needs of today's technologically sophisticated society. Regarding the sorts and nature of employment that students will do in the future, things have changed dramatically since 2010 (Bello, 2014). The number of low-skill manual employment is steadily decreasing, while the number of positions requiring enormous expertise is steadily expanding.

There are two significant concerns about the use of technology in educational institutions: In the first place, how much technology is used, and why. In the second place the quality of technology usage, or how it is utilized and why it is used. Traditionally, the research on technology usage in schools has concentrated on the problem, i.e., how much technology is utilized in classrooms. "Under usage" of technology in schools is generally viewed as a lack of utilization rather than a lack of quality or effectiveness (Vigdor, Ladd, & Martinez, 2014). The problem of quantity has also been a common critique of the use of technology in classrooms ((Vigdor, Ladd, & Martinez, 2014)).

Because of this, research has shown that even while a certain amount of time is spent using technologies, not all of these uses are beneficial or productive. According to Callister and Burbules (2000), technology may be employed effectively or ineffectively, and it has both benefits and limits; thus, the most important question is how, by whom, and for what purpose technology is used. "In essence, the researchers concluded that technology may be important, but that this relied upon how it was employed." Additionally, McFarlane (1997) claims that computer usage alone has limited intrinsic value in the absence of well-defined goals and well-designed job assignments. As a result, educators must have a firm grasp on how technology is utilized in the classroom, including both "good" and "poor" examples of effective and non-effective applications.

Reducing the usage of technology "Technological usage" is the use of a technology function to address practical difficulties since the use of the same technology might be "good" or "bad" (Patel, Patel, & Scholar, 2016). There are some key differences between this and other specific technologies: A technology is, first and foremost, an item, a thing to be produced, and something to be used. Certain issues can be solved with it, but its full potential cannot be achieved until it is linked to other problems, and using technology involves doing just that: linking its potential with other problems. For example, Microsoft Word software can compose literary works, but only when it is used in particular situations to solve issues or accomplish certain objectives is it considered a technical use (Carrillo, Onofa, & Ponce, 2011).

While technology is a collection of autonomous and independent objects, it is used in a context linked to the people interacting with it. For example, "the same technology has different meanings in different contexts" (Cloete, 2017) is an accurate statement. Various individuals and situations may use it to address various issues or attain various objectives (Patel, Patel, &

Scholar, 2016). Email, online chat, video/audio conferencing, and posting comments to discussion boards are all examples of different ways to leverage the Internet's potential to enable communication.

A Wall product at a stagnant stage, while technology usage is constantly changing, is the third point to consider. It's possible for users to develop new technologies or adapt them to fit a new environment to address existing issues or better fit them into the overall context. The cycle of evolution is self-perpetuating. Using technology in conjunction with its surrounding environment may cause a cascade of changes, sometimes "far beyond what was initially envisioned" (Cloete, 2017).

At long last, there is a singular shape for technological advancements to take. One technology may take on various forms when it is employed in a variety of ways by different individuals and in different circumstances to address different issues or accomplish different aims. As a result, we may better understand the nature of different technology usage by looking at these technologies from a different perspective (Williams, 2013). In a nutshell, technology usage is the application of technology within a certain context.

The impact of technology on the workplace and the labour market is expected to grow in the coming years. To ensure that students are ready for the future, educational institutions must consider the impact of technology. Educators must ensure that their students can adjust to any changes in the dynamic. Technological advancements have accelerated globalization, transforming the globe into a little town (Williams, 2013). Organizing economic, social and political activities may now be done from anywhere globally without requiring a physical presence in the target region. For example, technology may improve online learning and eliminate geographical and other educational obstacles (Williams, 2013). Thanks to modern

technology, students may connect with programs and other students through digital television and video conferencing. Students from various parts of the world might benefit from one another's perspectives on various subjects by participating in such exchanges. As a result, it is clear that technology significantly influences education, and this publication focuses on this topic.

1.2 Significance of the study

Teachers, parents, students, and the general public now know how contemporary technology affects kids' academic performance in the classroom. Both the good and negative effects of these technologies are discussed.

Parents and society at large play a critical role in helping children navigate the complexities of contemporary technology. The education department will use this research to simplify the curriculum to better suit current technologies.

1. Education in schools will improve due to the government realizing the need to use the current technology to train teachers on how to utilize the tools effectively.
2. It will help in correctly ordering the educational tools, which shall be applied appropriately to enhance education.

1.3 Research questions

1. What is the impact of education technologies on student success?

2. What is the impact of education technologies on the student engagement and academic success?
3. What is the impact of education technologies on student creativity through digital features?

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This section will provide a literature study of what other people have said regarding the influence of contemporary technology on student accomplishment. Additionally, it will cover the ideas they've put out as potential remedies to the potential drawbacks of contemporary technology.

2.2 Strategy for a Literature Search

Libraries at the University utilized Google Scholar, ERIC, and Education Research Complete to do research. As part of the review process, Thoreau was utilized to locate relevant papers across several repositories. Some of the most popular search phrases are school technology, teacher technology integration, and student accomplishment. Peer-reviewed, academic papers were included in the literature review's scope. A few previous publications were also utilized to back up some of the study's findings. In remote classrooms in poor nations, few current dissertations were employed because of a lack of resources on technology integration.

2.3 Literature review finding

Three key areas were examined in the study of whether or not technology has a good influence on student achievement: high education, student motivation and learning, and instruction. They majorly affect high education, student motivation and learning, and

instruction. Evidence is provided to show that adopting a technology project will enhance student accomplishment in each of these categories. To be considered a part of a one-to-one technology effort, a student must have access to a computer device that can be carried home each day after school (Sauers & McLeod, 2012). To better comprehend how technology integration affects various courses, each part looks at the positives and negatives of technology in relation to the area in question and tries to understand how it eventually benefits students' academic performance. This literature study will evaluate the influence of technology on educational success. The first segment will analyze the sorts of technology being utilized in the classroom. This literature study's second component will examine whether technology promotes achievement. The final portion will analyze the influence of technology on engaging pupils. The last component will compare textbook teachings versus technology-based courses.

Technology may take the shape of "Assistive Technology" and a gadget to bring life to a classroom. It is defined as any item, piece of equipment, or product system that aids students with disabilities in enhancing, maintaining, or improving their functional skills (Riley, Beard, and Strain, 2001). Students with and without impairments may both benefit from Assistive Technology services. Students who lack fundamental arithmetic abilities might benefit from the use of this sort of technology. According to the report, there are a variety of technologies that may help students succeed in school. These pupils can't benefit from educational aids such as colored tiles and cubes. According to the report, virtual manipulatives are provided to instructors as a technological option. Students will be able to use on-screen manipulatives comparable to those used in the classroom. That way, all children will have access to the necessary technology to help them succeed in school.

2.3.1 Types of Technology Used in the Classroom

Not every technology can be utilized in the classroom. The technology must have a function, and kids must be able to utilize it. A frequent website utilized by government instructors is icivics.org. This website contains fascinating games that pupils like. Web-based apps are being utilized increasingly in school since the outcomes demonstrate better accomplishment for the kids (O'Bannon & Britt, 2012). Google Earth is another digital technology utilized in the classroom (Hirsch, 2018). Using this may interest kids in learning about various locations of the globe.

Some online-based applications may negatively influence student teaching (Ozonoff, 2014). If the internet learning tools selected are challenging or distracting for kids, their success lowers. Students' accomplishments also will not grow if the online web-based learning tool is too immature or simple for them. When paired with good lesson planning, appropriate, quality web-based learning tools lead to improved student accomplishment. Web-based learning tools that allow students to design their questions are the most beneficial for student accomplishment. Students were more engaged when they were allowed to utilize a student response system (Achen, Lumpkin, & Dodd, 2015). Students were allowed to answer questions anonymously and hence would not be frightened to respond verbally in fear of rejection. This helped students feel more comfortable in class and led to stronger conversations.

However, interactive whiteboards are another new sort of technology employed in schools, with varied success. The pros noticed from interactive whiteboards were that the classroom atmosphere was judged to be better in classrooms with interactive whiteboards than in classes that did not (Schipper & Yocum, 2016). The interactive whiteboards were able to be employed to address the many bits of intelligence that may enhance the learning environment.

When utilized successfully, the technology's characteristics were demonstrated to be engaging the pupils and foster engagement and cooperation. The downsides of interactive whiteboards were that school districts are spending thousands of dollars on procuring these whiteboards, but little result is being witnessed. The usage of interactive whiteboards does nothing to affect student progress. While interactive whiteboards enhance the classroom experience, the fundamental issue is whether schools should be spending on a product that does not display student progress. It is also reasonable to query how instructors employ this technology. Some senior instructors may not know how to utilize the interactive whiteboards and have very little instruction on how to use them effectively (Carrillo, Onofa, & Ponce, 2011).

In today's culture, technology is essential since it allows individuals to do difficult activities with simplicity and efficiency. Teachers may now use technology to quickly and effectively distribute information to students in the field of education. Students and instructors working on diverse online platforms may achieve high levels of effective student engagement (Revere & Kovach, 2011). The Vocational Education Act of 1963 in the United States was the first step toward integrating technology into classrooms (Revere & Kovach, 2011). Students began studying programming languages and using computers in the classroom as a result of this legislation. The introduction of computer-aided training in the United States was delayed until the 1980s. During this time, the US government set up exercises and practices to provide instructors and students exclusive access to classrooms (Revere, & Kovach, 2011). A variety of educational technology policies have subsequently been developed, established, and implemented by lawmakers, presidents, educators, and administrators.

2.3.2 Technology's Place in the Classroom

Thanks to the power of technology, students may communicate with students from across the globe through online learning. Thanks to technological advancements, students may take virtual field excursions to learn about geography (Wagner, 2010). As a result, these pupils are more likely to succeed than their peers exposed to regular classrooms. The sharing of knowledge and experiences is made easier by virtual exchanges, which help students achieve their educational objectives. In spite of the fact that educational technology's use has grown in recent years, educators still face significant challenges when it comes to integrating it into the classroom. Technology in education is still a significant difficulty for educators since they don't know what to do when it comes to using the proper technique (Pamuk, 2012). One problem is that there aren't enough instructors who know how to use technology to help students learn. Unfavourable policy environments that ensure the effectiveness of both teachers and pupils are also significant obstacles. Nevertheless, despite these difficulties, technology continues to play an important role in the field of education.

Globally, more than 1.5 million new digitalized employments are expected to be created between now and 2022; 66% of kids who started school in 2017 are expected to get a job that doesn't exist now (Pamuk, 2012). The importance of technology in today's educational attempts may be seen in these figures and facets of the educational process. As a result, more than 90% of businesses and other organizations are struggling to fill IT positions. The existing technical system does not provide students with the necessary abilities to work as IT professionals, according to 75% of education stakeholders (Pamuk, 2012).

The smooth transfer of knowledge from professors to students is made possible in large part by technological advancements. Students from all around the globe may access the same

set of educational resources thanks to modern technology (AlHattami and Al-Hariri 2017). When kids can access the same study resources online, they have a better chance of obtaining a well-rounded education. Before the advent of modern technology, students relied heavily on textbooks published by a variety of writers, many of whose works were difficult to access due to distance and the passage of time. Thanks to technological advancements, students may now have access to information previously out of reach to them due to educational disparities. Students are given equal opportunities to succeed in life since they have access to the same educational curriculum and sources of information. Students that study in Europe, for example, may be able to work in the United States with relative ease, thanks to the simplified curriculums on the two continents. As a result, it is essential to examine how technology affects education (Lai and Bower, 2019).

The scientific use of technology in education may be explained using three different notions or methods. The first is Edwin Hutchins' distributed cognition technique. People, objects, and the environment are all described as a single cognitive instrument by Hutchins. According to the notion, students may take online classes and face-to-face courses and participate in online discussions (AlHattami and Al-Hariri 2017). Second, the zone proximal development model is used to describe the influence of technology in education, which portrays education as a supplier of skills beyond the mastery and comfort of a learner by compressing tutoring, games, quizzes and directions. In this technique, instructors may organize their educational progression by adhering to all of the prerequisites for learning abilities, thanks to technology (AlHattami and Al-Hariri 2017).

Increased use of technology allows teachers and students to engage in more hands-on learning activities (AlHattami and Al-Hariri 2017). For example, education allows students to

examine geographical areas, terrains, and video games and engage at various levels, thereby acquiring more skills digitally. On the other hand, the formative evaluation focuses on humans' capacity to learn by doing.

Learners had few options for obtaining information outside of the classrooms before the increase in technology in schools (Lai and Bower, 2019). However, technology has fundamentally transformed the learning environment since kids may get information from many channels. With the expanding dynamics and sources of information for learners, schools must be reviewed to identify how they might benefit from an education outside the school setting (Pamuk, 2012). Technology offers a favourable setting where learners may acquire great education from varied origins. Technology improves interaction, which is a crucial factor in the school environment. Through interactive environments, students may express their ideas, therefore acquiring more knowledge from one another (Pamuk, 2012). Technology also allows the simple and convenient flow of information as students' brains grow more efficient from the support they acquire from technology.

The internet gives learners a round-the-clock connection, exchange of knowledge with educators and learners, and finding easy lessons for their education programs (Mumin, 2019). Technological equipment like graphics and projectors play a crucial role in moulding how students learn. Studies highlight the relevance of visual representations in learning, wherein pupils obtain more information through visuals than when utilizing words. Today, most top schools depend on PowerPoint presentations to guarantee their learners obtain visuals for increased learning experiences (Mumin, 2019). Visuals make the learning experience more dynamic and exciting for learners, thereby helping them to obtain more information. Enticing graphics, graphs, and videos may be employed in teaching, thereby helping pupils learn better.

The digital footprint or media influences schooling to a significant degree. Students may access round-the-clock learning offerings on online platforms. Through social media such as Twitter, Facebook, and Youtube, students may communicate with learners from various worldwide forums. For instance, YouTube provides direct contact between learners and their instructors via live broadcasts (Jwayyed et al., 2011). Through such platforms, students may study from their homes, thereby saving both time and resources. Technology allows learners to get online degrees and qualification certifications. Online degrees are highly widespread in the present world since all schools have put out numerous courses for studying online degrees (Jwayyed et al., 2011). Graduation ceremonies are also conducted through online platforms, allowing students to access education from distant states, regions, nations, or continents. Such technologies are vital as they give students with options to progress in their education even when confronted with tremendous hurdles.

Technology is substantially employed to enrich school information (Jwayyed et al., 2011). Technology is integrated into the education program as part of the instructional delivery systems and helps instructors convey their material to pupils. Before the advent of technology in education, learning was a reactive and passive activity; now, with technology, education has become a more aggressive and interactive activity, allowing teacher-student and student-student exchanges. Technology assists in raising a learner's curiosity, enhancing their urge for learning. Students may now comprehend things better via increased research enabled by technological developments.

Various variables impact technology in education. The usefulness of technology relies on the instructors' ability to utilize it successfully to meet teaching and learning objectives. Modern technologies require that instructors understand how to efficiently utilize them for the

student's advantage. Therefore, teachers' training is a key component that impacts technology in education (Nepo, 2017). For efficient technology implementation in education, instructors must have high levels of technical understanding. Through expanded research, instructors may grasp how to leverage developing technology to enhance their teaching experiences (Jwayyed et al., 2011). Notably, instructors may have unfavourable attitudes regarding computer-based education, which may impact how they educate learners. Time is a significant aspect that must be addressed when addressing the effect of technology in education. Technological instructions compel instructors to spend more time teaching and utilizing them. The direct teacher-student connection enables the distribution of knowledge within a restricted period. However, with technology, efficacy can only be accomplished by spending more time teaching skills, enabling students to participate online, and assuring the supply of a visual aide to grasp the ideas. Accessibility to technology should equally be addressed while addressing this critical problem (Jwayyed et al., 2011). While most schools in the US have access to electronic tools, other institutions lack the needed technology. The issue is worse in underdeveloped nations where internet access and literacy levels are low. Before integrating technologies in an institution, it is, therefore, to assess whether the institution has access to the internet, knowledge, support, and other resources needed to succeed when utilizing technology in education.

2.4 Technology's Beneficial Effects on Education

Considering the effects on children with special needs should be given while evaluating the educational impact of technology. It has been difficult for lawmakers and education stakeholders to adopt an effective plan to ensure that kids with special needs have access to high-quality education during the last several decades (Nepo, 2017). However, the advent of

assistive technology has made special education more effective. Assistive technology refers to goods or equipment that may be utilized to preserve or enhance the functional skills of persons with special needs to facilitate learning." When used in the classroom, assistive technology allows teachers to have more meaningful interactions with these children. Teachers can better meet the requirements of their pupils by tailoring their instruction with the aid of technology.

Student growth and performance are greatly influenced by technology. Students benefit from enhanced knowledge and grasp of subjects because of technology in the classroom. Studies have shown that students participating more actively in classroom activities are more likely to succeed academically (Wagner, 2010). To illustrate this point, studies have shown that technology-enabled kids outperform their peers in conventional educational settings. Understanding of ideas might be improved if technology were included in technical courses like engineering, physics or chemistry. Students benefit from visual representations of the movement of the particles and other components in technical disciplines that may be vividly illustrated utilizing technology.

As a consequence of technological advancements, a wider range of background information is now readily available. As the Internet connects a large number of individuals, it may be utilized to exchange information. Users simply need to type in a few words to get a wealth of data from which to choose when doing an online search for a particular piece of information (Higgins, Xiao, & Katsipataki, 2012). Additionally, several online directories and information sources on the Internet cover a broad range of subjects. Students who want to learn more about a certain subject may quickly find more material on the Internet, enhancing their grasp. Students and instructors have the opportunity to connect, resulting in a stronger sense of

community. As a result of these relationships, students' confidence grows, allowing them to study more effectively.

Globalization has also been accomplished via the availability of technology in educational institutions. The aspect of globalization refers to utilizing the Internet to engage with individuals from varied backgrounds. The globalization tendency is widespread in the corporate world. However, with the increased use of technology, instructors and learners have embraced globalization by developing regulations that enable interactive education from diverse places. In the US, students may access education from various locations using video conferencing (Higgins, Xiao, & Katsipataki, 2012). Globally, comparable patterns are employed to guarantee connections in the field of education. One typical example is the use of online platforms to study other languages, which would be impossible for overseas students to attain (Higgins, Xiao, & Katsipataki, 2012). Technology also allows students to attend professional courses in other nations and work in such places. For instance, an African student desiring to work as a nurse or in any engineering sector must take examinations from these professions' regulating organizations. Technology has made such challenging activities simpler, allowing international students to study and work in distant places.

Learning in educational settings may be made more effective and efficient via the use of social and machine technologies, which is what ET aims to do (Cheung & Slavin, 2013). As a method of media, Cloete (2017) see Education Technology as having four distinct foci: enquirer, communicator, constructor, and expressor. For many instructors, technology provides an instrument for enhancing content presentation, making courses more engaging for students, and streamlining administrative processes. Teachers and students alike believe that educational technology (ET) can improve current methods of instruction and teaching (Kessler & Hubbard,

2017). The teaching and learning processes are, therefore, more closely linked as a result. Education Technology has the biggest influence on boosting student learning and accomplishing educational goals (Kessler & Hubbard, 2017). This also empowers instructors and students, shifting teaching and learning from a teacher-centric to a student-centred approach (Xiao, 2013). Students will benefit from this change in both the quantity and quality of information they receive in the classroom. Either way, it's possible that Education Technology will provide kids with marketable skills. As a result, Education Technology offers students the chance to improve their cognitive abilities, critical thinking skills, and ability to make sense of and communicate knowledge (Chigona and Chigona, 2010). Access to a wide variety of tools and information and the ability to contact experts may enable students to go outside the four walls of the classroom and discover new things for themselves (Xiao, 2013). As stated by Domingo & Garganté (2016), good technology enables students to take charge of their own education. The outcomes of a forum attended by 70 US educational decision-makers and practitioners were reported by Ercan (2010). The forum discussed and prioritized the benefits and issues associated with educational networking. Networking technology has been shown to be a strong communication tool that, when used to promote creative teaching and encourage active learning, may ease instructors' professional isolation and empower consumers to become engaged researchers and learners.

Various constraints to schooling have been eliminated via the use of technology. The most prevalent hurdle is geographical limitations, wherein students cannot attend school in other nations. Online degree programs have reduced the requirement for being physically present in classroom contexts. Foreign and state institutions allow students to study online coursework and graduate online, reducing any restrictions on their education (Smith, 2010). Limitations to resources and money have also been addressed via technology in education. For instance,

students may study from their homes, thereby removing the requirement of leasing a house and the travel and lunch expense. Through technology, students may learn from home while only physically participating in the most necessary courses. Distance and online are, thus, key features in the present education industry. The existence of technology in the modern schooling system has also reduced political limits. For instance, some nations have antagonistic ideological differences that restrict students from attending education in such countries (Smith, 2010). However, technology allows learners from such nations to join online activities that ensure research exchange. Those in political exile may also continue their studies via online and distant learning initiatives.

Technology increases students' capacity to think for themselves since it supplies them with knowledge upon which they reflect and share their thoughts (Bransford et al., 2012). After obtaining material from the Internet, learners may use their critical thinking abilities to grasp the subject better. Reflective education helps learners develop their knowledge, therefore generating concrete products for their educational needs; as such, pupils develop greater inventiveness via technology. Enhanced teaching and learning have been accomplished via the use of technology. Students can quickly perceive classroom situations through technology breakthroughs, including computers, projections, cameras, and 3D representations (Higgins, Xiao, & Katsipataki, 2012). Teachers also receive greater motivation while teaching using demonstrative aids, helping their pupils understand knowledge successfully. Visualization of information improves the learning process interesting and entertaining, thereby helping learners to absorb more knowledge.

Integrative learning is a key achievement that can only be attained by employing technology in education. In the conventional education system, more emphasis is focused on

one approach, such as practical or theoretical. However, with technology, instructors may blend theoretical techniques with practical ways, thereby offering learners a more advanced comprehension of the studied themes (Bransford et al., 2012). Comprehension becomes simpler by integrating these two methodologies since students can rapidly link the theoretical parts to practical factors observed via visual representations. Integrative learning also entails reducing the barrier between learners in various locales (Bransford et al., 2012). Through technology, the pupils who cannot achieve practical education may benefit tremendously by viewing the practical components in their computers. Racial, regional, religious, and ethnic gaps in education may be overcome via the use of technology.

Evaluative learning is feasible via the employment of technologies in schools. Technology enables student-centred education, where the major emphasis is on the student as opposed to the instructors. As such, technology may be seen as playing a significant part in the actualization of evaluative learning. Evaluation of student achievement is one such feature that is facilitated by technology (Bransford et al., 2012). Instant assessment is facilitated since records are preserved for ease of analysis, assessment, and student interaction in discussing their performance.

Student research is facilitated through the use of technology in education. Before introducing technology, learners relied on school and neighbourhood libraries and printed resources. However, with technology, there is a large range of sources from which students may pick their references (Smith, 2010). Video, music, photos, and encyclopedias are accessible on the Internet, allowing learners to access any knowledge that they desire. Both primary and secondary materials can readily be accessible using the Internet, a feat impossible to attain without the Internet.

Student curiosity is a vital feature enabled by the use of technology in education. Educational reforms imply that education must evolve into an authentic method for students, wherein technology involves students in real-world tasks. Science students profit greatly from technology since they can obtain exact data rather than depend on theoretical numbers (Bransford et al., 2012). Through technology, the students may digitally evaluate the data and identify any important patterns in their data. For example, spreadsheets, graphing, and calculator software allow students to view scientific data and statistics. Authentic student inquiry entails enabling students to research problems or concerns of concern. Through technology, students may contact specialists and readily gain their thoughts on various issues. Virtual field visits help students to study tangible facts that would have been impossible to comprehend from theoretical viewpoints.

Technology boosts the capacity of pupils to develop fresh knowledge in their particular professions. Students accomplish metamorphosis, wherein they become producers rather than knowledge consumers. Oral reports and written presentations give an excellent example for learners to discuss their freshly learned and evaluated facts (Pamuk, 2012). Using audio, video, and texts, the students may do excellent work for publishing worldwide, local, national, and state levels. Media fairs may promote interactive projects, movies, pictures, and images, which students have generated. In the previous decade, students earned prizes for their excellent research projects and presentations on web platforms.

2.5 How Can Technology Increase Student Achievement?

The primary objective of school districts all around the globe is for their pupils to accomplish and surpass the districts' objectives. Baltimore County High Schools are using

computers to provide a learner-centered environment where students may improve their education. When implemented properly, studies have shown that technology boosts student success. According to Romero et al. (2013), students who participated in Online Discussion Forums scored better on their final tests. Digital courses, instead of traditional lessons, have been shown to improve student success and retention in classrooms (Erdogan and Ozerbas, 2016). Students are more engaged and more likely to complete assignments while using digital curricula. Possibly, pupils' familiarity with computers was a factor in their success. In a study by Yaratan and Eyyam (2014), children who used a digital curriculum saw a rise in their arithmetic results.

Students' academic performance was not affected by the use of technology in the classroom, according to Berry and Wilder (2016). After employing a software application, history students saw minimal posttest performance variation (Kingsley & Boone, 2006). The software-using group had an increase of 13% in their scores, whereas the control group saw just a 6% increase. A study by Berry and Wilder (2016) indicated that, despite student results being the same across groups, students who utilized the digital curriculum retained more information.

Technology has been shown to favor student success and performance, as well as major improvements and changes in all areas (Han et al., 2015). For example, Stronge et al. (2011) compiled 500 studies of computer-based training of pupils. According to the tally, students in the computer-based education group outperformed those in the control group who did not have access to a computer. Because of the emergence of computers, students were able to absorb more information in less time (Stronge et al., 2011). Another research indicated that kids who studied in a technologically advanced setting scored higher on tests across the board, had a more positive attitude toward education and learning, and were better able to produce new ideas and

boost their self-esteem. Research by Shin et al. (2012) investigated the influence of technology on student accomplishment using two kinds of measures: one that rated reading achievement and one that assessed math achievement. The test results of the kids demonstrated a considerable influence. The employment of an intelligent tutor for algebra was also studied in Pittsburgh, where it was employed as part of the normal curriculum (Skryabin et al., 2015). More than 400 students in the experiment classrooms fared 15% better on a standardized exam than students in the comparison groups, according to the findings of the research (Skryabin et al., 2015). According to Banerjee et al. (2017), the fourth-grade pupils in Vadodara, India, saw an improvement in their arithmetic results as a result of incorporating ET into their math curriculum. The results of an educational pre-algebra and algebra curriculum in the United States were also examined by Vigdor et al. (2014). An investigation by Vigdor et al. (2014) looked at the influence of instructional technology on the optimization of learning styles and processes. They discovered that supplementing the classroom experience with online information increased student success.

A technology-based program was utilized as a study instrument to establish the extent to which technology has an influence, as was the case (Bergman, & Chan, 2021). Preservice teachers' perceptions of technology's role in student learning and teaching were explored (Bergman & Chan, 2021). With the launch of WebSTAR, the writers concentrated on program assessment rather than research. Teaching and learning in today's digital age require a system that considers all of these factors, instructors' perspectives on technology usage, and their own perceptions of their worries and requirements (ICT).

Researchers (Bergman, & Chan, 2021) used a mixed-methods approach to find that the use of computers facilitated group learning. Students' perspectives of the distinction between

utilizing technology for teaching and students using technology for learning were altered by their involvement in the WebSTAR program. Technology also had a good influence on society, surpassing the bad impact. Students were pleased with their WebSTAR experiences and said they would have appreciated the chance to connect with other courses digitally as well as in person. Student performance was shown to have a significant influence on the use of technology.

Professional development (PD) fidelity may influence instructors' grasp of the program's basic principles, according to (AlAmmary, 2012). Teachers who participate in a less complete professional development program have more time with instructional experts devoted to lesson design, reflective practice, and problem-solving than those who participate in a more thorough program. Generally speaking, AlAmmary, (2012) failed to demonstrate technology's influence. The usage of PD, on the other hand, was determined to be beneficial to both students and instructors.

Research by Hegedus et al. (2016) explored the influence of student and school characteristics on student progress in a technology-enhanced learning environment. Individual student variables, critical in a conventional learning environment, are equally critical in a blended learning environment enhanced by technology. When it comes to achieving academic success, kids who are proficient with computers also tend to do better than those less skilled in these areas. An important factor in students' academic success was their willingness and eagerness to learn via the use of new technologies. It is possible, however, to reduce the accomplishment difference between these two groups of pupils by combining centralized resources with local face-to-face teachings.

There have been 40 years of research on the impact of computer technology usage in educational environments described by Kolb, Boyatzis, & Mainemelis (2014). In contrast, Kolb, Boyatzis,

& Mainemelis (2014) looked at the influence of technology in the classroom from a different angle than the previous studies had done. Results demonstrated that technology considerably impacted the experimental group compared to a control group that didn't utilize it. Compared to direct teaching, the average impact size of the two substantive moderator factors (subject matter and kind of technology) was greater for support instruction. There was a larger average effect size in K-12 uses of computer technology compared to post-secondary classroom applications, indicating a favorable influence on classroom practice.

Preparing preservice teachers to be excellent instructors in the classroom is ideal. However, difficulties have arisen when making conceptually challenging material simpler to acquire, understand, and remember. According to this study, preservice teachers' ability to learn and instruct has been positively affected by the usage of technology. In a constructivist learning environment, Solvie and Kloek (2007) employed digital tools to engage students with a variety of learning styles. Researchers Solvie and Kloek (2007) employed extensive experience, abstract conceptualization, active experimentation, and reflective observation to measure the efficacy of technology to accommodate diverse learning styles. Students with the strictest study habits scored worse on tests than those who were more flexible in their study habits. Finding the right technologies for each student's learning style is essential to determining how technology affects their learning ability. In a constructivist classroom, instructors and students must agree on using and assessing digital resources (Solvie & Kloek, 2007). Students' success is unaffected by technology usage in schools of any location, according to the findings of Hegedus et al. (2016).

An investigation into the impact of a statewide educational technology program, Tennessee EdTech Launch (TnETL), on student achievement, teachers' knowledge and attitudes toward

technology integration, students' skills in using technology as a tool, and the use of research practices were conducted by Wu, & Chen, (2017). Twenty-six schools participated in this quasi-experimental research. Direct classroom observation, focus groups, student performance evaluations, student achievement analyses, and questionnaires were used as data gathering tools. Findings showed that instructors in the program had much more confidence in integrating technology and in utilizing technology to educate. Students in the program utilized computers as tools to collaborate in centers and work on projects (Wu & Chen, 2017).

Computer-assisted instruction (CAI) in math and language arts was examined by Neill and Mathews (2009). They divided the pupils into two groups: those who were academically at-risk and those who were not. A sample of at-risk pupils was studied to see whether technology interventions improved their math and language arts grades. According to the study's results, at-risk kids who received computer-assisted learning interventions performed as well academically as students who received conventional education. Students who met or surpassed state-mandated growth objectives increased significantly following the first year of technological intervention.

Alege and Afolabi (2011) polled secondary school teachers in the southwest to examine their literacy profiles, attitudes toward computers, and incorporation of ICT into their teaching. Five hundred and sixty-two instructors from private and high schools were chosen randomly, with women making up 58 percent of the teachers and men accounting for 42 percent of the teachers. Teachers' knowledge, computer literacy, attitudes, integration into the classroom, and hurdles to integration formed the basis of the study topics. Results showed that 87 percent of participants, regardless of gender or educational level, do not utilize computers in teaching.

Among the impediments were a lack of experience in using ICT, a lack of infrastructure to support it, a fear of technology, and a lack of incentives and support (Alege and Afolabi (2011).

A study by Almaghlouth (2008), which involved 120 teachers, and 120 students, completed a questionnaire assessing their degree of familiarity with ICT in secondary schools as part of the research. Computers were available to participants for 15 hours a week, in addition to Internet and email use. ICT use was limited by a lack of technical assistance and the experience of the instructors (Almaghlouth, 2008). Several additional studies have shown that teachers require training and professional development to use technology effectively (Hegedus et al., 2016).

Many study methodologies and designs were used in the various studies on successful technology integration into classroom education, and their results were interconnected. Several studies have shown that students' academic performance improves when they use technology Hegedus et al., (2016). Students' learning was enhanced thanks to the use of various techniques in the classroom (Solvie & Kloek, 2007). While technology integration is important, it must concentrate on student-centered teaching to achieve greater results. Teachers' use of technology and adoption, as well as their views and practices, have been shown to improve the teaching and learning process in other research Kolb, Boyatzis, & Mainemelis, (2014). There aren't enough studies on integrating technology effectively in rural classrooms yet.

2.6 Student Involvement and Technology

Schools widely accept technology as a way to engage kids better. As a result of using materials, kids are more interested in the concepts they are teaching (Kingsley & Boone, 2006). Because they are more engaging, these applications provide more stimulation for pupils than traditional worksheets. Students may demonstrate their mastery of subject matter in a variety of ways thanks to the advancement of technology. In order to be evaluated, they may set up a blog or wiki (Heafner and Friedman, 2008). One of the most important responsibilities of a teacher is to keep their students engaged and interested in the material they are studying. Students were more engaged and learned more when they worked on projects independently, utilizing technology as a learning tool. As a result of implementing technology-based courses, students are more likely to work together (Schipper & Yocum, 2016). Students engage in peer-to-peer learning by exchanging ideas and asking each other questions about concepts they don't fully grasp. Students will not be able to succeed unless the technology being utilized is relevant and on pace with their cognitive capacities.

Students might also be engaged by studying current events. Students may use technology to investigate current events and compare them to the environment in which they live (Tang et al., 2021). Another strategy to get children excited about technology is to make the information relevant to their lives. Students may use web-based technologies to participate in educational material. Students also expect engaging classes rather than ordinary lectures (Tang et al., 2021). Instead of being forced to sit through hours and hours of lectures, today's students would like to use technology to enhance their learning experience and make it more fun. According to (Ma, & Lee, 2019), many students disliked participating in conversations until they were compelled to break out of the usual lecturing of huge courses. Classroom response systems and video

snippets have been utilized to keep pupils interested. These technologies may enrich and extend learning (Tang et al., 2021). Students who have been polled say that technology in the classroom keeps them more focused.

It's unrealistic to assume that any technology in the classroom will function. Student-friendly technology must also have a function (Tang et al., 2021). In order for kids to grasp the technology, it must be relevant and understandable (Ma, & Lee, 2019). There is no need to utilize the most cutting-edge technologies. It's possible to employ PowerPoint to boost student engagement and academic performance (Tang et al., 2021).

2.7 Comparison of Traditional and Technology-Based Instruction

Schools throughout the globe are only getting started with using digital technology in the classroom. Schools are moving away from textbooks in favor of digital learning as a replacement. Today's teachings are almost exclusively derived from textbook material or digital resources that the instructor has included in the curriculum. Teachers increasingly use Plickers and Kahoot to provide official assessments (García, 2022). In order to determine which teachings contribute to greater accomplishment, it is necessary to compare them.

In order to employ a reliable evaluation, it must be compared to how the student really mastered the material. The outcomes of a standard exam must be compared to those of digital vs. textbook teachings when making such a comparison. Digital classes are preferred by pupils over textbook lessons when comparing the two (Yildirim & Demir, 2013). When compared to learning from a textbook, students report that digital courses and exams are "stress-free." When compared to a textbook lesson, students reported higher satisfaction with their progress after

completing a digital session. As long as both teachings and evaluations are delivered, it is vital. Compared to traditional textbooks, students gained more knowledge quicker and better when using digital resources. In order to find material in a textbook, students must know how to do it. It's unlikely that everything students accomplish in school will translate well to the digital world. Using a digital textbook seems to be more popular with pupils than using a printed textbook (Jhangiani et al., 2018). For the first time, students could listen to primary and secondary materials rather than just reading them. Many students preferred to look up information by clicking on various links rather than reading from a textbook. Students may engage with information more deeply thanks to digital technologies. It appeals to a wide range of learning methods since they may interact with images and music by clicking and listening.

CHAPTER 3: METHODOLOGY

3.1 Introduction

The study's facts are collected according to this chapter's operational structure. You'll find information on everything from sample size and composition to data collecting methods and statistical analysis in the many sections on the study's design, environment, and participants. This research aimed to determine whether or not the usage of technology would have a statistically significant influence on student success.

The study will conduct qualitative and quantitative analysis techniques to collect relevant data.

3.2 Research design

A research design is a roadmap for how data on a particular issue will be gathered and evaluated in a study. It lays forth the steps necessary to carry out any inquiry. The researcher will choose a representative sample since it is not feasible to get all the data in all districts. Using a convenience sample, a quasi-experimental approach was utilized to see whether the technology courses had an effect on academic performance.

3.3 Participants

The study will use a sample size of one student and ten teachers and professors from two universities and three high schools around the area. Students who attend high school were eligible to participate in this convenience sample research. Both of the courses were selected

since they are both high school level classes. The control group had 25 students, whereas the treatment group included 22 students. The researchers selected these volunteers because they felt they could give the necessary information to meet the study's objectives. They are chosen if the school has a history of employing technology to help kids learn.

3.4 Instrument

The Qualitative techniques include well-structured interviews and classrooms observations for a standard classroom environment. The quantitative techniques include questionnaires issued to students and teachers. In order to collect data for this study, the researchers draft a questionnaire. Personal information, such as name, gender, and age, is collected in the first section; the second section includes a checklist of questions to determine how good responders are at using technology to help pupils learn. During the pretest, there were 16 multiple-choice questions and one short-answer question (BCR).

The test items utilized were legitimate in terms of topic coverage since the assessment boundaries of the schools were aligned with the Curriculum. In addition, a documentary evaluation guide was used. In order to answer the research questions, we shall construct the necessary equipment. In order to prove the dependability, the test-retest approach was used. Students initially administered the instrument of schools. Those who weren't participating in the research were purposefully chosen. The correlation coefficient was used to calculate the findings.

3.5 Procedure

For this research, two conventional Government courses were selected. Because only high school students they were selected. The demographics and pre-government exam results of the students in each class were quite comparable. In this experiment, only technology-based teachings were employed as an independent variable as a control group; the other class was picked at random to receive no therapy. That another class was being compared to the kids wasn't clear to the students. The judicial branch was the subject of this course. The indications were the subject of a pretest given to students at the start of the course. During this time, one group received lessons created by high school teachers. Technology was not used in any of the changes to accommodate an eighty-five-minute lesson. Participants in the experimental group completed all of their work alone on a computer, without assistance from the curriculum guide or textbooks. An interactive whiteboard and several films integrated into PowerPoint were utilized for the student's benefit. Students were instructed to use the bored builders I built to access the day's information. The researcher might utilize the boards to display images, papers, films, and other materials related to the day's subject. In addition to I Civics.org, the researcher had access to various games relevant to the material we were studying. Toward the lesson's conclusion, videos and interactive whiteboards were utilized to review the topic. The researcher utilized Kahoot! as a formative assessment tool to track her students' progress.

Each student completed a posttest to see how much they had improved from their pretest grade. Students in both the control and treatment groups were assigned the dependent variable. The paired t-test was performed to see whether there was a statistically significant change in mean test scores from before to after the intervention.

3.6 Ethical consideration

When conducting research on the impact of educational technology on student achievement, it is important to consider the ethical implications of the study. Researchers should ensure that they are following ethical guidelines and principles to protect the rights and welfare of participants.

One ethical consideration is informed consent. Participants should be fully informed about the study, its purpose, potential risks and benefits, and what their involvement will entail. This includes obtaining informed consent from all participants or their legal guardians if they are minors.

Privacy and confidentiality are also important considerations. Researchers should ensure that any personal information collected is kept secure, and that participants' identities are kept anonymous where possible. This includes taking appropriate measures to prevent unauthorized access, use, or disclosure of participants' personal information.

Fairness and equity are also crucial ethical considerations. Educational technology can sometimes exacerbate existing educational inequalities. Researchers should strive to conduct the study in a way that is fair and equitable to all participants, and ensure that any findings are interpreted in a way that does not further perpetuate educational disparities.

Data integrity is another important ethical consideration. Researchers should ensure that any data collected is accurate and reliable, using appropriate research methods and tools, and analyzing the data correctly. Any findings should be reported accurately and honestly.

Finally, researchers should respect the rights and dignity of participants, ensuring that they are not subjected to any harm or discomfort as a result of their involvement in the study. Participants

should have the right to withdraw from the study at any time without penalty. By following these ethical considerations, researchers can ensure that their study is conducted in a responsible and ethical manner, with the welfare of participants as the top priority.

3.7 Limitation of the study

When conducting a study on the impact of educational technology on student achievement, it is important to consider the potential limitations of the study. Limitations can affect the validity and generalizability of the findings, and researchers should strive to minimize these limitations as much as possible. One potential limitation is sample size. If the study has a small sample size, it may not be representative of the broader population, which can limit the generalizability of the study findings. Increasing the sample size can help to improve the validity and reliability of the study results.

Selection bias is another potential limitation. Participants may not be representative of the broader population, which can bias the study findings. Researchers should try to minimize selection bias by using appropriate sampling techniques and recruiting participants from a diverse range of backgrounds. Technology implementation can also be a limitation. The implementation of educational technology can vary widely depending on the context and resources available. This can limit the comparability of different technology interventions and the ability to draw definitive conclusions about the impact of educational technology on student achievement.

Self-selection bias is another potential limitation. Students who are more interested in technology may be more likely to participate in the study, which can bias the findings towards positive results.

Outcome measures used to assess student achievement may also be a limitation. The measures used may not be comprehensive or sensitive enough to capture the full range of student learning and development. Finally, time constraints can be a limitation. The study may have limited time to follow up with participants to determine long-term outcomes, which can limit the ability to assess the sustained impact of educational technology on student achievement. By being aware of these potential limitations and taking steps to address them, researchers can ensure that their study results are as valid and reliable as possible.

CHAPTER 4: RESEARCH FINDING

4.1 Introduction

This action research project aims to see whether the usage of technology by students studying Government has a statistically significant effect on their performance. Based on this, the researcher devised pre and post-unit examinations to evaluate students' progress. According to the study's findings, there was no significant difference between the control and treatment groups.

4.2 Finding and interview

A convenience sample of two standard-level classes was employed in a quasi-experimental approach. When it came to class size, academic level, and demographics, the two courses were almost identical; the therapy (technology) was randomly assigned to one class, while the control (control) was assigned to the other (non-technology). If students are in the control or treatment group, their posttests are the same. This supports the null hypothesis.

Tests for statistically significant mean pretest scores between the control and treatment samples were conducted using the two-sample independent samples t-test. There was no statistically significant difference in the results of the pretest. Next, we looked for a statistically significant difference in the mean posttest scores using the two-sample t-test. There was no statistically significant difference between the pre-and post-test results. A p-value of 5% was employed as the standard to determine if the observed differences were statistically significant. Without making the null hypothesis hard to reject, p.05 is used to limit the probability of a false

positive. A false positive rate of 5% is a good middle ground between false negatives and false positives.

4.2.1 Interviews

The following questions were presented by the researcher

Q1. What are your thoughts on the use of educational technology in the classroom, and how do you think it affects student learning?

Answer: As an educator, I believe that educational technology can be a powerful tool for enhancing student learning. When used appropriately, it can engage students, facilitate personalized learning, and provide access to a wider range of educational resources.

Q2. In your experience, what are some of the benefits and challenges of integrating technology into classroom instruction?

Answer: Some of the benefits of integrating technology into classroom instruction include improved student engagement, more personalized learning experiences, and increased access to educational resources. However, there can also be challenges, such as ensuring that all students have access to technology, addressing technological issues and glitches, and ensuring that technology use does not distract from learning.

Q3. How do you think educational technology can be used to support student achievement in specific subject areas, such as math or science?

Answer: Educational technology can be used in a variety of ways to support student achievement in specific subject areas. For example, in math and science, technology can be used to provide

interactive simulations and models that help students visualize abstract concepts and apply their knowledge in real-world contexts.

Q4. How do you ensure that educational technology is used effectively and in a way that enhances student achievement, rather than simply being a distraction or a "tech for tech's sake" approach?

Answer: To ensure that educational technology is used effectively, it is important to start with clear learning goals and objectives, and to carefully select and integrate technology tools and resources that align with those goals. Educators should also provide clear instructions and guidance to students on how to use the technology, and monitor its use to ensure that it is contributing to student learning.

Q5. What are some of the most effective strategies or practices you have seen for integrating educational technology into classroom instruction in a way that supports student achievement?

Answer: Some effective strategies for integrating educational technology into classroom instruction include providing clear learning goals and objectives, selecting appropriate technology tools and resources, providing guidance and support to students on how to use the technology, monitoring its use, and providing opportunities for students to collaborate and communicate with their peers and teachers using technology. Additionally, integrating technology into a broader pedagogical approach that emphasizes active, student-centered learning can help to maximize its impact on student achievement.

4.3 Statistical Data Analysis

This section deals with statistical data analysis to support our project or research, this work deals with the data set of 30 students who spend their time learning with the digital method as well as audio-visual aids and get maximum marks, in most schools such type of exercise is considered and students get the best score in academic, in simple words technology impact student study and using these tools they improve their performance. To complete this task, we discuss a questionnaire with different questions, and after responding we analyze this data (the data set is available in SPSS format), The main variables we discuss are “study hours” and time spent in the study which lies between 2 to 7 hours, as we know that student learns from two sources from the internet, searching items or material or notes related to their subjects and other way is to learn is YouTube (watching video tutorials). In our data set, there is the following categorical variable “interesting subject”, and we have four main subject’s physics, chemistry, geography, and mathematics, students responded in question when we asked their source of knowledge by the book, internet, and by watching YouTube, further, we asked teaching method in your school either audio video aids or by other methods, finally we analysis or compare before and after test score using technology.

4.4 Organization of Research

We divide our work into the following section, in section one we obtain a summary or descriptive statistics of quantitative variables study hours, internet usage time, and YouTube usage time with the graphical presentation, histogram, boxplot, and QQ-Normal plot, in section two we produce frequency distribution as well as pie and bar plots of qualitative variables, further, we discuss correlation study with scatter plot matrix, Multiple linear regression analysis using the score in test after using

technology as response variable while all other variables as the independent variable, finally we study independent and paired t-tests.

4.5 Descriptive Statistics

This section deals with a summary or descriptive statistics including central tendency, dispersion, the measure of kurtosis, and skewness to check the shape of the distribution

Table 1: Descriptive Statistics

Table 1: Descriptive Statistics				
		Study Hours	Internet Time	YouTube Time
N	Valid	30	30	30
	Missing	0	0	0
Mean		5.70	3.83	3.37
Std. Error of Mean		.276	.250	.182
Median		6.00	4.00	4.00
Mode		5 ^a	4	4
Std. Deviation		1.512	1.367	0.999
Variance		2.286	1.868	0.999
Skewness		.037	.148	-.161
Std. Error of Skewness		.427	.427	.427
Kurtosis		.275	-.069	-1.149
Std. Error of Kurtosis		.833	.833	.833
Range		7	6	3
Minimum		2	1	2
Maximum		9	7	5
Percentiles	10	4.00	2.00	2.00

	20	4.20	3.00	2.00
	25	5.00	3.00	2.00
	30	5.00	3.00	3.00
	40	5.00	3.40	3.00
	50	6.00	4.00	4.00
	60	6.00	4.00	4.00
	70	6.00	4.70	4.00
	75	7.00	5.00	4.00
	80	7.00	5.00	4.00
	90	8.00	5.90	4.90
a. Multiple modes exist. The smallest value is shown				

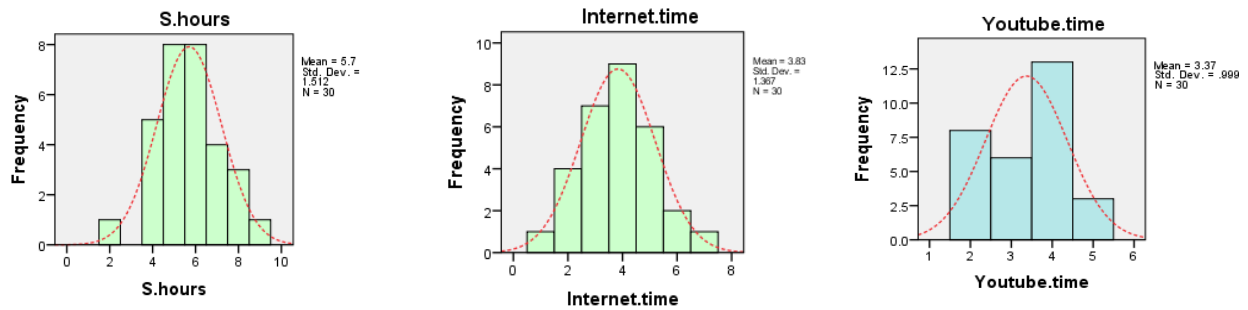


Figure 1: Histogram of all continuous variables

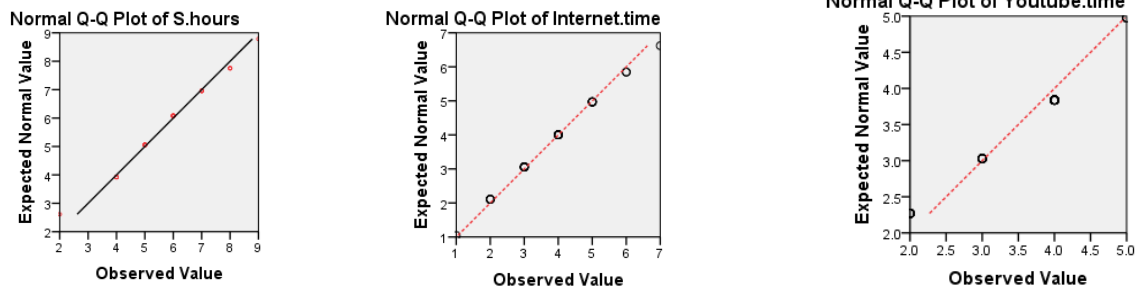


Figure 2: QQ-Normal plots of all continuous variables

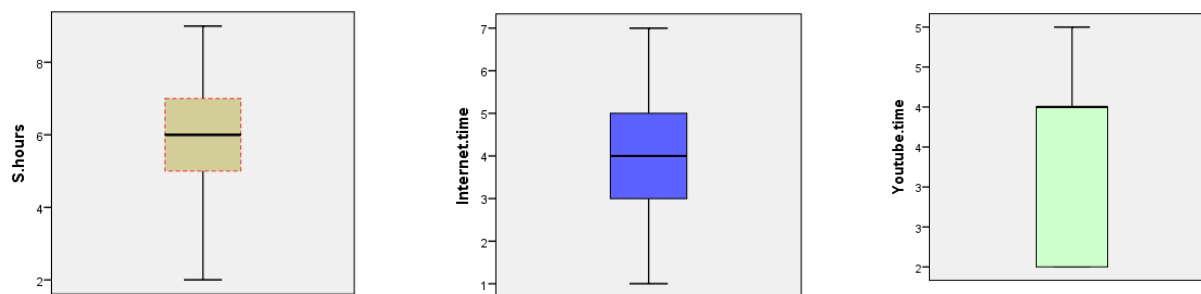


Figure 3: Boxplots of all continuous variables

Students spend their precious time at 5.70, 3.83, and 3.37 on the average study, internet, and YouTube respectively. Study time they utilize in their study is between 2 to 9 hours, while on the internet or searching material books or notes they spend between 1 to 7 hours and similarly they utilize their time in watching video tutorials between 2 to 5 hours out of 24 hours, this analysis summarizes that students spend maximum time in book reading instead of other sources. 10% or below students out of 30 or 3 students spend 4 hours in their book reading, similarly 2 hours they spend internet as well YouTube (watching YouTube tutorials). 75% or below or almost 23 students spend 7 hours, 5 hours on the internet, and 4 hours watching YouTube (video tutorials).

Table 2: Frequency Distribution of Interesting Subject Variable

Table 2: Frequency Distribution of Interesting Subject Variable					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chemistry	8	26.7	26.7	26.7
	Geography	4	13.3	13.3	40.0
	Mathematics	9	30.0	30.0	70.0
	Physics	9	30.0	30.0	100.0
	Total	30	100.0	100.0	

Table 3: Frequency Distribution of Source of Knowledge Variable

Table 3: Frequency Distribution of Source of Knowledge Variable					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Book	9	30.0	30.0	30.0
	Internet	11	36.7	36.7	66.7
	YouTube /Video Tutorial	10	33.3	33.3	100.0
	Total	30	100.0	100.0	

Table 4: Frequency Distribution of Teaching Methods used in your School

Table 4: Frequency Distribution of Teaching Methods used in your School					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Audio Video Aids	16	53.3	53.3	53.3
	No Audio Video Aids	14	46.7	46.7	100.0
	Total	30	100.0	100.0	

Table 5: Frequency Distribution of Digital Learning in your School

Table 5: Frequency Distribution of Digital Learning in your School					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	16	53.3	53.3	53.3
	Yes	14	46.7	46.7	100.0
	Total	30	100.0	100.0	

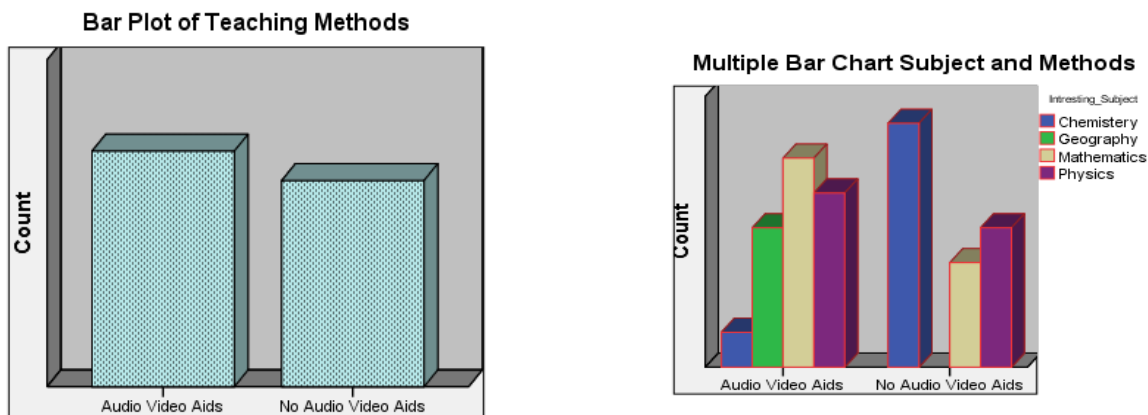


Figure 4: Bar plots of Study methods and Subjects

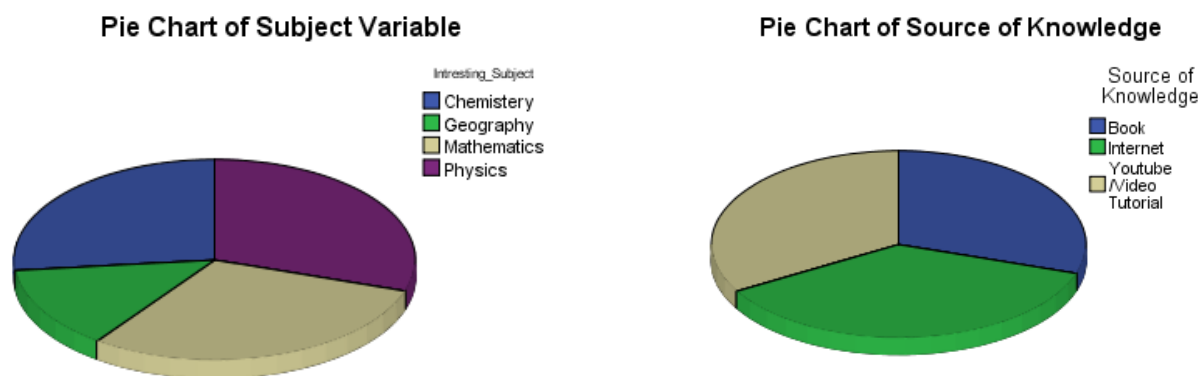


Figure 5: Pie Chart of Subjects and Source of Knowledge

In our data set 8 students like chemistry, 4 are interested in geography while 9 like both physics and mathematics, similarly 9 get knowledge from a book, 11 from the internet and 10 watch YouTube tutorials to enhance their knowledge, out of 30 only 16 learn from audio-video aids and 14 are those who do not use such type of facilities in their learning.

4.5 Correlation Study

This section deals with correlation study, by correlation we mean the degree of relationship between two variables, now we are going to discuss the strength or relationship between continuous variables.

Table 6: Correlations

Table 6: Correlations						
		Study Hours	Time Spend on Internet	Time Spend on YouTube	Score Before	Score After
Study Hours	Pearson Correlation	1	-0.108	0.189	0.557**	0.355
	Sig. (2-tailed)		0.568	0.316	.001	.054
Time Spend on Internet	Pearson Correlation	-.108	1	.072	-.053	-.221
	Sig. (2-tailed)	.568		.707	.780	.241
Time Spend on YouTube	Pearson Correlation	.189	.072	1	-.138	.039
	Sig. (2-tailed)	.316	.707		.468	.837
Score Before Using Technology	Pearson Correlation	.557**	-.053	-.138	1	.331
	Sig. (2-tailed)	.001	.780	.468		.074
Score after using Technology	Pearson Correlation	.355	-.221	.039	.331	1
	Sig. (2-tailed)	.054	.241	.837	.074	
**. Correlation is significant at the 0.01 level (2-tailed).						

We conclude that the study hours are positively correlated with time spent on youtube and both exam scores, which means as study hours increase these variables also increase, and the exam

score will increase, further study hours and internet spend time are negatively correlated which means if students spend maximum time in the study they do not spend their time in internet, Further YouTube time and time spent in the internet are positively correlated but weak, and this variable is negatively correlated with all other variables. YouTube time is positive with study hours, internet, and exam score. Further, all tests are insignificant with the p-value approach.

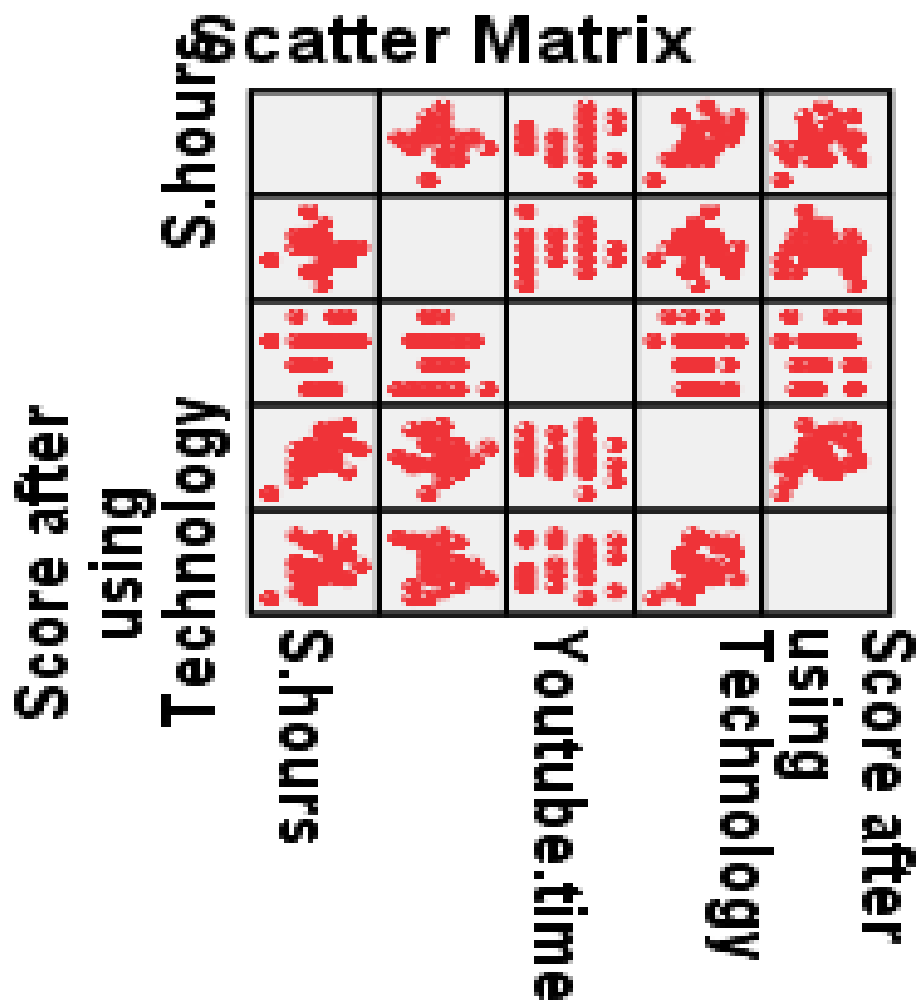


Figure 6: Scatter Matrix of Continuous Variables

4.6 Regression Analysis

In this section, we are going to run multiple linear regression using “score after using technology” as a response variable while study hours, internet time, YouTube time, and the dummy variables, digital methods, teaching methods, and source of learning. It is important to note here digital variable is a categorical variable with two responses “yes” and “No” and we assign “1” as yes and “0” for “No”, similarly method is also categorical and we assign a number as “1” and “0” for “Audio Video aids” and “Non-Audio video aids” respectively, and a further source of knowledge are three “book”, “internet” and “YouTube” we assign a number as “1”, “2” and “3” respectively.

Table 7: Model Summary

Table No 7: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.666 ^a	0.443	0.298	6.270
a. Predictors: (Constant), Dummy.source, Youtube.time, Dummy.method, S.hours, Internet.time, Dummy.digital				
b. Dependent Variable: Score after using Technology				

Table 8: Coefficients

Table No 8: Coefficients							
	Model						
	1						
	(Constant)	S.hours	Internet.time	Youtube.time	Dummy.digital	Dummy.method	Dummy.source

Unstandardized Coefficients	B	65.660	1.177	.526	.115	-5.077	-1.604	3.420
	Std. Error	7.253	.873	.992	1.204	2.972	2.749	1.792
Standardized Coefficients	Beta		.238	.096	.015	-.344	-.109	.370
T		9.053	1.348	.530	.095	-1.708	-.584	1.908
Sig.		.000	.009	.009	.025	.101	.565	.069
95.0% Confidence Interval for B	Lower Bound	50.656	-.629	-1.526	-2.377	-11.225	-7.292	-.288
	Upper Bound	80.665	2.983	2.579	2.606	1.071	4.083	7.127
a. Dependent Variable: Score after using Technology								

Table 9: Residuals Statistics

Table No 9: Residuals Statistics					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	66.79	86.31	78.50	4.980	30
Residual	-14.895	9.529	.000	5.584	30
Std. Predicted Value	-2.351	1.568	.000	1.000	30
Std. Residual	-2.375	1.520	.000	.891	30

Table 10: ANOVA

Table No 10: ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	719.222	6	119.870	3.049	.024 ^b
	Residual	904.278	23	39.316		
	Total	1623.500	29			

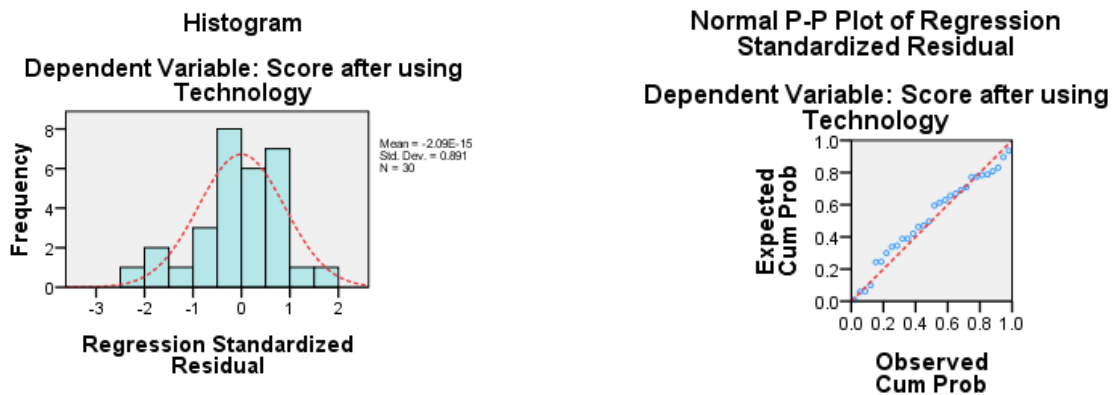


Figure 7: Diagnostic Plots

We conclude that overall regression is significant because the p-value of the F-test is close to zero, hence overall regression is significant at 5% level of significance, or all slopes are not equal to zero, R-square is 0.443 which means 44.3% variation in response variable is explained by this model, as R-square is not large enough therefore model is not better fit to the given data set, increasing the independent variables the Adjusted R-square is 0.298 which means response variable is 29.8% explained by this model and its better explanation. Further, we see that constant terms and slopes of study hours, internet time, and youtube time are significant because the p-value of the t-tests is close to zero. The maximum and minimum predicted values are 86.31 and 66.79 with residuals of 9.529 and -14.895 respectively. The standard error of the

regression is 6.270 which means the squared difference between observed and estimated are close.

Statistical Inference: Paired and Independent t-test: This section deals with the testing of hypotheses in both paired t-test and independent t-test, in paired t-test we test scores before and after using technology in the learning process, while in the independent t-test we test the statistical difference between teaching methods (Audio video aids and Non- Audio Video aids).

Table 11: Group Statistics

Table No 11: Group Statistics					
	group	N	Mean	Std. Deviation	Std. Error Mean
Significant test between Audio Visual ads	1	14	80.07	6.900	1.844
	2	16	77.13	7.915	1.979

Table 12: Independent Samples Test

Table No 12: Independent Samples Test			
		Significant test between Audio Visual ads	
		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.821	
	Sig.	.373	
t-test for Equality of Means	T	3.425	3.425
	Df	28	28.000
	Sig. (2-tailed)	.002	.002
	Mean Difference	2.946	2.946

	Std. Error Difference		2.730	2.705
	95% Confidence Interval of the Difference	Lower	-2.647	-2.594
		Upper	8.540	8.487

Test Score is significantly different using Audiovisual Aids and Non- Audio Visual aids

$$H_0: \mu_1 - \mu_2 = 0$$

$$H_1: \mu_1 - \mu_2 \neq 0$$

Level of significance: To reject the true null hypothesis we use a level of significance $\alpha = 0.05$

Comments: To test the independent t-test we test the equality of two population variances, and by Levene's test we conclude that both population variances are equal hence we run an independent t-test assuming equality of variance. The t-value is 3.425 with a p-value of 0.002 which is smaller than the level of significance hence we reject the true null hypothesis and accept the alternative which means both means are not equal and the test score is statistically significant at 5% level of significance.

Table 13: Paired Samples Statistics

Table No 13: Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Score before using Technology	55.27	30	6.491	1.185
	Score after using Technology	78.50	30	7.482	1.366

Now we are going to test whether the test scores before and after are the same or not, we use audio-visual aids and scores will different by the paired t-test we test whether both test scores are the same or not.

$$H_0: \mu_{Before} - \mu_{After} = 0$$

$$H_1: \mu_{Before} - \mu_{After} \neq 0$$

Table 14: Paired Samples Correlations

Table No 14: Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Score before using Technology & Score after using Technology	30	0.331	0.024

Table 15: Paired Samples Test

Table No 15: Paired Samples Test			
			Pair 1
			Score before using Technology - Score after using Technology
Paired Differences	Mean		-23.233
	Std. Deviation		8.123
	Std. Error Mean		1.483
	95% Confidence Interval of the Difference	Lower	-26.266
		Upper	-20.200
T			-15.667
Df			29
Sig. (2-tailed)			.000

With the p-value approach, we have to reject the true null hypothesis which means test scores before using audio-visual aids and non-using audio-visual aids are different, which means audio-visual aids affect education scores.

This work deals with the data set of 30 students who spend their time learning with the digital method as well as audio-visual aids and get maximum marks, in most schools such type of exercise is considered and students get the best score in academic, in simple words technology impact student study and using these tools they improve their performance. To complete this task, we discuss a questionnaire with different questions, and after responding we analyze this data (the data set is available in SPSS format), The main variables we discuss are “study hours” and time spent in the study which lies between 2 to 7 hours, as we know that student learns from two sources from the internet, searching items or material or notes related to their subjects and other way is to learn is YouTube (watching video tutorials). In our data set, there is the following categorical variable “interesting subject”, and we have four main subjects physics, chemistry, geography, and mathematics, students responded in question when we asked their source of knowledge by the book, internet, and by watching YouTube, further, we asked teaching method in your school either audio video aids or by other methods, Finally we analysis or compare before and after test score using technology, the descriptive statistics suggest that Students spend their precious time at 5.70, 3.83, and 3.37 on the average study, internet, and YouTube respectively. Study time they utilize in their study is between 2 to 9 hours, while on the internet or searching material books or notes they spend between 1 to 7 hours and similarly they utilize their time in watching video tutorials between 2 to 5 hours out of 24 hours, this analysis summarizes that students spend maximum time in book reading instead of other

sources. 10% or below students out of 30 or 3 students spend 4 hours in their book reading, similarly 2 hours they spend internet as well YouTube (watching YouTube tutorials). 75% or below or almost 23 students spend 7 hours, 5 hours on the internet, and 4 hours watching YouTube (video tutorials). The categorical study provides us knowledge that in our data set 8 students like chemistry, 4 are interested in geography while 9 like both physics and mathematics, similarly 9 get knowledge from a book, 11 from the internet, and 10 watch YouTube tutorials to enhance their knowledge, out of 30 only 16 learn from audio-video aids and 14 are those who do not use such type of facilities in their learning. Further, we obtain a correlation matrix and through this study, we come to know that We conclude that the study hours are positively correlated with time spent on youtube and both exam scores, which means as study hours increase these variables also increase, and the exam score will increase, further study hours and internet spend time is negatively correlated which means if students spend maximum time in the study they do not spend their time in internet, Further YouTube time and time spent in the internet are positively correlated but weak, and this variable is negatively correlated with all other variables. YouTube time is positive with study hours, internet, and exam score. Further, all tests are insignificant with the p-value approach. Regression analysis provides us following that overall regression is significant because the p-value of the F-test is close to zero, hence overall regression is significant at a 5% level of significance, or all slopes are not equal to zero, R-square is 0.443 which means 44.3% variation in response variable is explained by this model, as R-square is not large enough, therefore, the model is not better fit to the given data set, increasing the independent variables the Adjusted R-square is 0.298 which means response variable is 29.8% explained by this model and its better explanation. Further, we see that constant terms and slopes of study hours, internet time, and YouTube time are

significant because the p-value of the t-tests is close to zero. The maximum and minimum predicted values are 86.31 and 66.79 with residuals of 9.529 and -14.895 respectively. The standard error of the regression is 6.270 which means the squared difference between observed and estimated are close, and finally, both independent and paired t-tests are significantly different with the p-value approach.

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussion OF Research Finding

Using technology in the classroom has been shown to boost student productivity by providing favorable learning settings that make teaching more effective and efficient, according to the findings of this research. Students in science classes are more likely to use technology because it fosters autonomous, collaborative, and self-directed learning experiences. The survey found that only a small percentage of teachers use technology to teach their pupils. Students struggle in this situation since they must be directed by their teachers utilizing technology to better grasp physiology. Students are more likely to be motivated to study when their professors use cutting-edge technology in the classroom. The Government HSA was used to see whether technology affected student test performance. The pre-and post-tests were based on questions from the Government Health Savings Account (HSA). The study's findings confirm the study's initial null hypothesis. The tech group had a 0.5 item edge in the pretest, translating to an impact size of .06 as a benchmark. The paper group had a 0.1-item edge on the posttest, which had a .01 standard effect size. Both the pre-and posttests yielded the same findings, and there is no indication of significant changes between the two. In this research, technology did not affect student performance.

The findings show that students' academic performance suffers when educational technology is used to assist in teaching and learning. Students are more engaged, energetic, and enthusiastic as a result. In addition, educational technology helps students improve their interpersonal and collaborative communication abilities, affecting their attitude toward learning.

Experiment results show that using effective technology, such as a smart board and a PowerPoint presentation, may be both fun and successful in maximizing lecture time and cutting down on student interruption.

Because of the ease with which Educational Technology may be accessed and used, most academic staff and teachers utilize it in their classes. They are mostly using teaching support technology in the form of Moodle, LMS (Blackboard), PowerPoint, and Microsoft Groove. There are several benefits to adopting these technologies, including better communication with students, reducing the stress of course material preparation, and allowing students to access lecture materials at any time. They will be able to improve their teaching abilities and performance due to their integration with educational technology.

Students and teachers alike have challenges in embracing Educational Technology, despite the fact that its usefulness has been recognized. The university's inability to implement Educational Technology is hampered by a lack of computer resources and infrastructure, a lack of adequate technology budgets and IT investments, a lack of technical assistance, and an overreliance on budgets and resources for training programs.

The study's findings showed that students' performance differed significantly among learning contexts. Those who went to technology schools outperformed those who went to non-technical schools. Alfadda & Mahdi (2021) found that students' TAKS results were positively correlated with having access to and making use of technology. According to other studies, the one-on-one efforts also influenced student academic attainment and proficiency (Dunn & Kennedy, 2019). Students' arithmetic and language arts scores rose with technology-enhanced instruction, as Neill and Mathews (2009) reported. Technology school students outperformed non-technology schools (Dunn & Kennedy, 2019). According to several studies, technology in

the classroom has a favorable effect on student success (Alfadda & Mahdi, (2021). Research suggests that technology's effect on student accomplishment may be influenced by instructors' use of it and by students' excitement and drive (Norris & Soloway, 2021). Perhaps there are additional environmental elements that contribute to better student performance.

According to the present research findings, educational technology has a good influence on student performance and the entire teaching and learning process. However, educational institutions should be aware that acquiring new software and technology will not be sufficient to accomplish their intended learning effectiveness and results (Rahiem, 2020). Suppose educational technologies are deployed without proper alignment with the nature of the course, course goals and learning outcomes, lecture type and content, students' learning styles, and teaching styles. In that case, they might be less effective and even ineffective teaching support aids. Because of this, educational institutions must do strategic planning before deciding whether or not to use new Educational Technology, in which their vision and goal, as well as the requirements of the teaching and learning processes, are recognized.

Q1. What is the impact of education technologies on student success?

Analysis of research findings suggests that educational technology can have a positive impact on student success. Studies have found that technology tools such as online resources, adaptive learning software, and gamification can increase student engagement and motivation, leading to improved academic performance. However, the effectiveness of educational technology can depend on several factors, including the quality of the technology tools, the level of teacher support and training, and the socio-economic background of the students.

Q2. What is the impact of education technologies on the student engagement and academic success?

Research on the impact of educational technology on student engagement and academic success suggests that technology can be an effective tool for promoting student engagement and motivation. Studies have found that technology tools such as online collaboration platforms, gamification, and multimedia content can enhance student interest in learning and improve academic outcomes. Additionally, technology can provide new opportunities for personalized learning and support, which can be especially beneficial for students who may struggle in traditional classroom settings.

Q3. What is the impact of education technologies on student creativity through digital features?

Research on the impact of education technologies on student creativity through digital features suggests that technology can be a powerful tool for promoting creativity and innovation in the classroom. Studies have found that technology tools such as digital media creation platforms, coding programs, and virtual reality can provide new opportunities for students to express their creativity and develop their problem-solving skills. Additionally, technology can help students to collaborate with peers and experts from around the world, fostering a global perspective and promoting cross-cultural communication. However, it is important to ensure that technology tools are used in an ethical and responsible manner, with a focus on promoting student learning and success.

5.2 Recommendations

As technology advances, so does the need for educational institutions to keep pace. The use of technology in the classroom may help students better comprehend subjects, promote engagement, and put it to good use in the classroom. The technology significantly influences education, which is why its complete deployment must be carefully considered. The teaching and learning process may be improved by the use of a variety of technologies. There are a variety of technologies that teachers may utilize to help students learn and improve their education. Involved parties should provide their help where it is needed. Learning resources should be easy for students to access, questions should be easier to answer, and information should be easier to convey.

Determining which technology is the most beneficial for pupils has to be identified. It is uncertain how well the pupil's recalled information from Kahoot! or any online lectures. The baseline knowledge pupils have of computers should be examined before doing comparable research. Other technological tools that may be considered include Quizziz and Plickers.

5.3 Conclusion

The use of technology in the classroom is a critical component of today's educational landscape. The term "educational technology" refers to the use of technology in educational settings. Technology-assisted instruction allows students to better understand subject matter via television, computers, and other electronic devices. The association between improved student performance and technological advancements is good. Students who have access to technology aids in the classroom do better academically. Students and teachers can communicate more

effectively because of the use of technology. Students from all around the world may connect over the internet. With online and distant learning, students may get their degrees without ever having to set foot in a classroom again. The use of technology in education may break down societal divides based on geography, politics, ethnicity, and religion, to name just a few.

Before the introduction of technology into the classroom, surveys were conducted to gather data. The survey results were a good indication of where students' levels of comprehension and knowledge of the different forms of technology in the world were (not in the classroom). The survey results also provided some ideas for the educator to keep students engaged and excited about learning. For the upcoming school year's principal, these recommendations will also be brought to the attention of researchers. Students were also tested at the end of each unit, and the results of those assessments were compared to see if the technology had improved student performance. Student grades improved after the technology was implemented, according to those reports. Student achievement and motivation in math classes were found to be positively impacted by the use of technology, as evidenced by this study.

Thanks to the use of technology, students are more likely to participate in class activities when they are passionate about learning. Students may learn valuable skills via technology that will serve them well in the future. Students who are pressed for time may still get an education if they give up part of their extracurricular pursuits. In spite of this, technology's overuse may lead to pupils being more reliant on it. The ethical and legal consequences of technology necessitate that institutions have procedures to ensure compliance with federal and state laws while respecting ethical standards.

Students who have access to and employ educational technology have been proven to have higher academic performance rates than students who do not use educational technology. According to the findings, integrating instructional technology into the classroom may boost student motivation in various ways. Students' interest and sense of ownership in their education are boosted thanks to educational tools. For one thing, kids who use technology in the classroom are more motivated and engaged in their studies than those who do not. In addition, numerous instructional technologies have been shown to positively influence students' academic progress across the literature in this study. When students can use technology to obtain and finish their assignments, they are more likely to stay engaged. Students are more likely to finish their work and accomplish their academic goals when they are actively involved in their studies.

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<https://youtu.be/vII22ZnFOP0>

<https://www.youtube.com/watch?v=djBtLpW0Bvk>

APPENDICES

STATEMENT OF INFORMED PERMISSION FOR CHILDREN

Students are being asked to participate in a study to see how technology affects their academic performance. Specifically, we're interested in determining whether technological advancements positively or negatively impact students' capacity to perform academically in the classroom. The researcher is a college student. Your kid will be asked to complete a questionnaire regarding his or her technological knowledge inside and outside the math classroom if you agree to have them participate in this research. Students can access various technological resources, including calculators, laptops, and math-related websites, during their investigation. Testing devices for determining the impact of technology on your student's classroom performance will also be provided. The findings will be anonymously presented in spreadsheets, tables, and graphs. Graphing Systems of Equations and Solving Systems of Inequalities by Graphing will be the subject of a refresher exam for the students. Testing tools and students' use of graphing calculators will assist researchers in establishing whether or not technology in the classroom improves student progress.

A possible advantage of participating in this study is that teachers will learn how to better assist students in the classroom because of the presence of technology. Teachers will benefit in the future from the findings of this study when making improvements to their classrooms.

Taking part in this study is entirely at your discretion. Your participation or non-participation will not impact your grades and class standing. You can leave the study anytime if you want to change your mind.

Appendices 1

Questionnaire

Question	Responses
Name	Student Name:
Your Study Hours	
Subject in which you are interested	1. Chemistry 2. Physics 3. Geography 4. Mathematics
Source of Knowledge	1. Books 2. Internet 3. YouTube/Video Tutorials
Teaching Methods (in the institute)	1. Audio-Visual Aids 2. Non-Audio-Visual Aids
Digital Learning (in the institute)	1. Yes, 2. No
How much time do you spend to search material on the internet?	
How much time do you spend watching youtube tutorials?	
Your test score before using technology?	(...../100)
Your test score after using technology?	(...../100)

Appendices 2

"The Impact of Educational Technology on Student Achievement: A Review of the Evidence" by Sivakumar, et al. (2019)

- Comprehensive review of literature on impact of ed tech on student achievement
- Examines various types of ed tech and analyzes their effects on learning outcomes

"The Effects of Educational Technology on Student Achievement" by Zhonggen Su (2017)

- Overview of impact of ed tech on student achievement, focusing on digital devices and learning management systems
- Discusses potential benefits and drawbacks of using technology in the classroom

"The Impact of Educational Technology on Student Achievement: What the Most Current Research Has to Say" by Melissa Venable (2016)

- Summary of most current research on impact of ed tech on student achievement
- Discusses effectiveness of various types of ed tech and challenges/opportunities associated with integration into the classroom

"The Impact of Educational Technology on Student Achievement: A Meta-Analysis" by Hsin-Kai Wu and Yuan-Hsiang Ko (2017)

- Meta-analysis of impact of ed tech on student achievement across a wide range of studies
- Finds that ed tech can have positive effect on learning outcomes, particularly in blended learning approach

"The Impact of Technology on Student Achievement in K-12 Classrooms: A Meta-Analysis" by Sharon E. Paulson and Andrew P. Daire (2018)

- Meta-analysis of impact of ed tech on student achievement in K-12 classrooms
- Finds that effectiveness of technology varies depending on factors such as type of tech used and instructional practices of teachers

Title and Author	Focus of Study	Findings
"The Impact of Educational Technology on Student Achievement: A Review of the Evidence" by Sivakumar, et al. (2019)	Comprehensive review of literature on impact of ed tech on student achievement	Examines various types of ed tech and analyzes their effects on learning outcomes
"The Effects of Educational Technology on Student Achievement" by Zhonggen Su (2017)	Overview of impact of ed tech on student achievement, focusing on digital devices and learning management systems	Discusses potential benefits and drawbacks of using technology in the classroom
"The Impact of Educational Technology on Student Achievement: What the Most Current Research Has to Say" by Melissa Venable (2016)	Summary of most current research on impact of ed tech on student achievement	Discusses effectiveness of various types of ed tech and challenges/opportunities associated with integration into the classroom
"The Impact of Educational Technology on Student Achievement: A Meta-Analysis" by Hsin-Kai Wu and Yuan-Hsiang Ko (2017)	Meta-analysis of impact of ed tech on student achievement across a wide range of studies	Finds that ed tech can have positive effect on learning outcomes, particularly in blended learning approach
"The Impact of Technology on Student Achievement in K-12 Classrooms: A Meta-Analysis" by Sharon E. Paulson and Andrew P. Daire (2018)	Meta-analysis of impact of ed tech on student achievement in K-12 classrooms	Finds that effectiveness of technology varies depending on factors such as type of tech used and instructional practices of teachers

Appendices 3

Interview question and Answers

Q1. What are your thoughts on the use of educational technology in the classroom, and how do you think it affects student learning?

Answer: As an educator, I believe that educational technology can be a powerful tool for enhancing student learning. When used appropriately, it can engage students, facilitate personalized learning, and provide access to a wider range of educational resources.

Q2. In your experience, what are some of the benefits and challenges of integrating technology into classroom instruction?

Answer: Some of the benefits of integrating technology into classroom instruction include improved student engagement, more personalized learning experiences, and increased access to educational resources. However, there can also be challenges, such as ensuring that all students have access to technology, addressing technological issues and glitches, and ensuring that technology use does not distract from learning.

Q3. How do you think educational technology can be used to support student achievement in specific subject areas, such as math or science?

Answer: Educational technology can be used in a variety of ways to support student achievement in specific subject areas. For example, in math and science, technology can be used to provide interactive simulations and models that help students visualize abstract concepts and apply their knowledge in real-world contexts.

Q4. How do you ensure that educational technology is used effectively and in a way that enhances student achievement, rather than simply being a distraction or a "tech for tech's sake" approach?

Answer: To ensure that educational technology is used effectively, it is important to start with clear learning goals and objectives, and to carefully select and integrate technology tools and resources that align with those goals. Educators should also provide clear instructions and guidance to students on how to use the technology, and monitor its use to ensure that it is contributing to student learning.

Q5. What are some of the most effective strategies or practices you have seen for integrating educational technology into classroom instruction in a way that supports student achievement?

Answer: Some effective strategies for integrating educational technology into classroom instruction include providing clear learning goals and objectives, selecting appropriate technology tools and resources, providing guidance and support to students on how to use the technology, monitoring its use, and providing opportunities for students to collaborate and communicate with their peers and teachers using technology. Additionally, integrating technology into a broader pedagogical approach that emphasizes active, student-centered learning can help to maximize its impact on student achievement.