

**To what extent does the usage of Educational Technology affect
student performance at a public secondary school in Ras Al-
Khaimah?**

إلى أي مدى يؤثر استخدام تكنولوجيا التعليم على أداء الطلاب في إحدى المدارس الثانوية
العامة في رأس الخيمة؟

by

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of the requirements for the degree of
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ABSTRACT

The study aimed to evaluate how the use of advanced school technologies can improve secondary student performance at the Ras Al-Khaimah Public School in the UAE. To achieve this objective, the study used a mixed-methods approach, which involved collecting both primary and secondary data. The primary data was collected using a questionnaire that was created using Google Forms, and it was shared online with research participants. The questionnaire used Likert Scale questions, which are easier for participants to answer and aid in the data processing. The secondary data was collected from published research and articles that had pertinent information or data sets. The study found that all participants answered the questionnaire, and the average response was '4' for satisfied, indicating that students were satisfied with the Ras Al-Khaimah UAE educators' use of digital technology, such as video streaming, presentations, online quizzes, discussion boards, online experiments, and vision exercises. These results suggest that technology improves pupils' academic achievement and that the use of advanced school technologies can positively impact student performance. However, the study also highlights that the educator's role is equally crucial for employing the proper resources for the right goal. Teachers must be skilled at using several technologies to help students achieve their goals and gain edifying skills. Along with this, it is recommended that the Ras Al-Khaimah Public School focus on curriculum development, in which the adaption of technology must be a priority. This is because technology has become an integral part of students' lives, and they are addicted to internet networks. Therefore, teachers must adapt to the changing times and integrate technology into their teaching methods to help students learn better. Overall, the study provides insights into how the use of advanced school technologies can improve secondary student performance and highlights the importance of teacher training and curriculum development in implementing these technologies effectively. The findings of the study can be useful for educators and policymakers in developing strategies for integrating technology into classrooms to enhance student learning outcomes.

المخلص

هدفت الدراسة إلى تقييم كيف يمكن أن يؤدي استخدام تقنيات المدارس المتقدمة إلى تحسين أداء طلاب المرحلة الثانوية في مدرسة رأس الخيمة الحكومية في الإمارات العربية المتحدة. لتحقيق هذا الهدف ، استخدمت الدراسة نهج الأساليب المختلطة ، والتي تضمنت جمع كل من البيانات الأولية والثانوية. تم جمع البيانات الأولية باستخدام استبيان تم إنشاؤه باستخدام نماذج Google ، وتمت مشاركته عبر الإنترنت مع المشاركين في البحث. استخدم الاستبيان أسئلة مقياس ليكرت ، والتي يسهل على المشاركين الإجابة عليها والمساعدة في معالجة البيانات. تم جمع البيانات الثانوية من البحوث والمقالات المنشورة التي تحتوي على معلومات أو مجموعات بيانات ذات صلة. ووجدت الدراسة أن جميع المشاركين أجابوا على الاستبيان ، وكان متوسط الإجابة "4" للرضا ، مما يشير إلى أن الطلاب راضون عن استخدام معلمي رأس الخيمة الإماراتية للتكنولوجيا الرقمية ، مثل بث الفيديو والعروض التقديمية والاختبارات عبر الإنترنت ، لوحات المناقشة والتجارب عبر الإنترنت وتمارين الرؤية. تشير هذه النتائج إلى أن التكنولوجيا تعمل على تحسين التحصيل الأكاديمي للطلاب وأن استخدام تقنيات المدارس المتقدمة يمكن أن يؤثر بشكل إيجابي على أداء الطلاب. ومع ذلك ، تسلط الدراسة الضوء أيضًا على أن دور المعلم مهم بنفس القدر في استخدام الموارد المناسبة للهدف الصحيح. يجب أن يكون المعلمون ماهرين في استخدام العديد من التقنيات لمساعدة الطلاب على تحقيق أهدافهم واكتساب مهارات التنوير. إلى جانب ذلك ، يوصى بأن تركز مدرسة رأس الخيمة العامة على تطوير المناهج الدراسية ، حيث يجب أن يكون تكييف التكنولوجيا من الأولويات. هذا لأن التكنولوجيا أصبحت جزءًا لا يتجزأ من حياة الطلاب ، وهم مدمنون على شبكات الإنترنت. لذلك ، يجب على المعلمين التكيف مع الأوقات المتغيرة ودمج التكنولوجيا في أساليب التدريس الخاصة بهم لمساعدة الطلاب على التعلم بشكل أفضل. بشكل عام ، توفر الدراسة نظرة ثاقبة حول كيفية استخدام تقنيات المدارس المتقدمة في تحسين أداء الطلاب الثانوي وتسلط الضوء على أهمية تدريب المعلمين وتطوير المناهج في تنفيذ هذه التقنيات بفعالية. يمكن أن تكون نتائج الدراسة مفيدة للمعلمين وواضعي السياسات في تطوير استراتيجيات لدمج التكنولوجيا في الفصول الدراسية لتعزيز نتائج تعلم الطلاب.

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1 CHAPTER 1 – INTRODUCTION

1.1 Background

With the emergence of technologies in virtually every field of life, learning procedures have additionally evolved into other forms of cognition. The process of learning consists of several types, such as web-predicated learning, technology-predicated resources, and others. Specifically, the involvement of technology has transformed education systems. Academic accomplishment is the most widely used variable, which helps understand how ICT technologies affect how a student learns. In the early 20th century, the introduction of computer systems significantly impacted the education systems. At that time, the teachers had never used computer systems in their teaching approaches, and very few incorporated it into their routine work. Using the technologies like that in the classrooms is not connected with academic activities but for unconnected tasks (Priti, et al., 2022). Many different types of research done in the past have displayed minimal improvement in the performance of schools using ICT services.

E-learning has revolutionized the education system by providing innovative ways of teaching and learning. It enables teachers to use various Internet-based technologies and multimedia resources to enhance the learning experience of students. E-learning is flexible and convenient, which is why it has gained popularity among people living in rural areas or who cannot attend traditional universities due to their jobs. With the help of e-learning, they can easily access higher education and improve their skills and knowledge.

Moreover, e-learning has the potential to improve the quality of cognition, as it offers a range of multimedia resources that help students to better understand the concepts. These resources, such as online videos, interactive animations, and quizzes, provide a stimulating learning environment that makes learning more enjoyable and effective. Additionally, e-learning enables teachers to utilize their instructional efficiency by providing access to a vast range of online resources, allowing them to teach complex topics easily.

Furthermore, technology-based tools and resources offer the possibility of learning anytime, anywhere. Students can access e-learning platforms from their homes, libraries, or even coffee shops, making it more convenient for them to learn. This means that students can learn at their own pace and time, which is highly beneficial for individuals with diverse learning styles and preferences. Overall, e-learning has positively impacted education systems worldwide, making learning more accessible, engaging, and effective.

Abrami, Bernard, Bures, Borokhovski, and Tamim (2011) argue e-learning technologies have made education more facile and accessible to every individual. Now, people can avail of distance education while sitting miles apart from the universities. Furthermore, e-learning technologies have facilitated teachers to design lectures that are more interactive and engaging for students. The use of multimedia resources, such as videos, animations, and interactive simulations, not only make the content more interesting but also enhance students' understanding of the subject matter. By incorporating different e-learning tools and resources, teachers can create a learner-centric environment that encourages students to participate in the learning process actively.

Moreover, e-learning technologies have also made education more accessible to students with different learning styles and abilities. For instance, students who are visual learners can benefit from the use of videos and animations, while students with hearing impairments can use closed captioning or sign language interpretation to understand the content. Similarly, students with disabilities, such as dyslexia, can use e-learning tools like text-to-speech software to improve their reading comprehension.

In conclusion, e-learning technologies have revolutionized the way of classroom instruction, making it more accessible, engaging, and learner-centric. These technologies have provided educators with new tools and resources to enhance their instructional effectiveness, and students with different learning styles and abilities have benefited greatly from this transformation. It has enabled the students and learners to interact via technology, utilizing images, verbalizations, or presentations (Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011).

1.2 Education Techniques in UAE

The innovation and technological revolution 4.0 in the last few years have changed the educational landscape around the world. The advancement in the communication technology and information disciplines has caused a resurgence in technological education (Maya, et al., 2017). The ubiquity of technology has greatly influenced the way education is delivered and accessed. With the advent of tablets, smartphones, and video game consoles, students of all ages now have access to vast amounts of information and educational resources. However, the increased use of technology has also raised concerns about its impact on learning.

Despite these concerns, technology has the potential to revolutionize education and create opportunities for students who may not have had access to quality education in the past. Educational software developers are creating programs and applications that enable educators to deliver engaging and interactive learning experiences to students. This is particularly important in rural and remote areas, where access to quality education can be limited.

With the help of technology, students can now connect with people outside of their local communities and gain exposure to a wider range of perspectives and ideas. This has the potential to create more well-rounded and informed individuals who are better equipped to navigate the complexities of the modern world.

Overall, the integration of technology into education has the potential to improve learning outcomes and make education more accessible to all. However, it is important to strike a balance between the use of technology and traditional teaching methods, as both have their own unique benefits and limitations.

The earliest form of education in the sheikdoms of the Arabian Gulf was the Katateeb extensions of education provided in the mosques and the key focus was on Islamic teachings and the basics of writing and reading. Since the development starts in the UAE, the education systems improvement was the key focus of the government. Huge investments were made in this sector to ensure the educational needs of people are met on time. The education system of

UAE comprises public and private schools, and some of them are semi-government. Figure 1 displays the number of Emirati and expatriate school ratios in different regions of UAE while Figure 2 effectively displays the division of public and private schools in Ras-Al-Khaimah specifically.

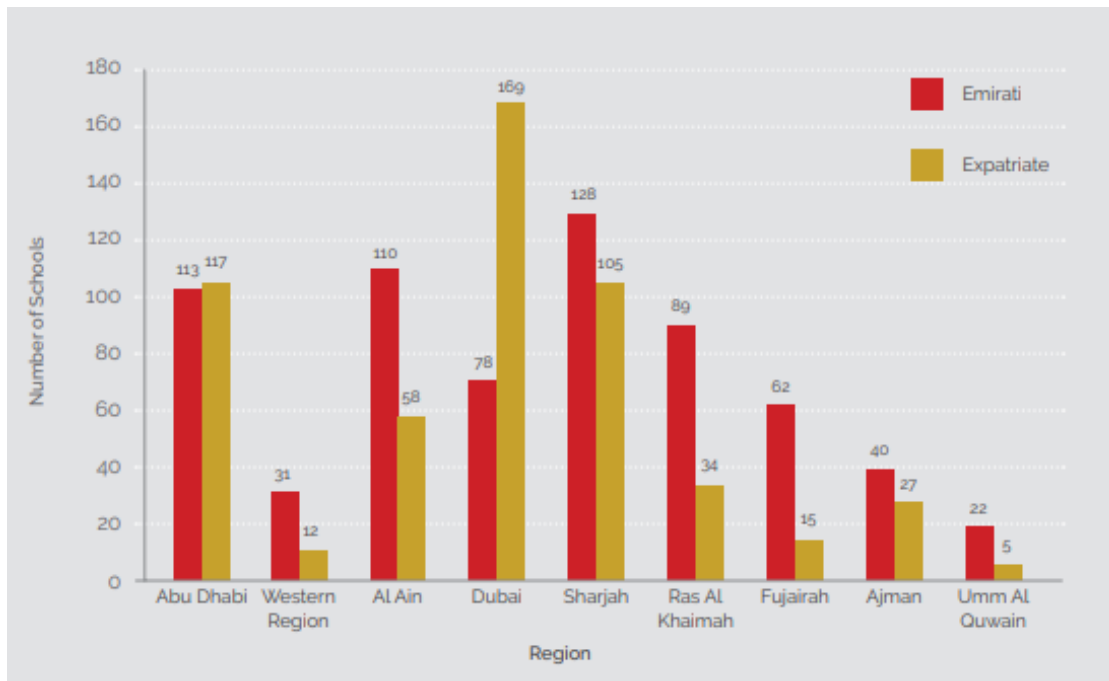


Figure 1 School Types across UAE (2014-2015)

(Ridge, Kippels, & ElAsad, 2015)

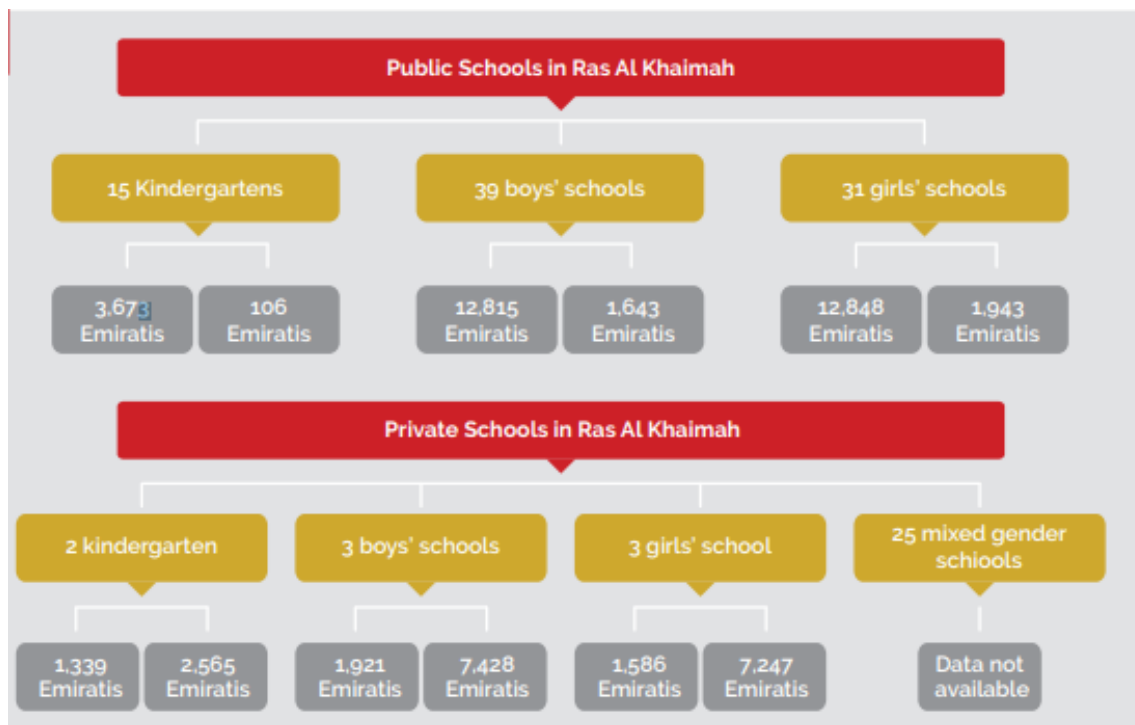


Figure 2 Division of Public and Private Schools

(Ridge, Kippels, & ElAsad, 2015)

However, making the education system advance is the motto of each institute, in the 20th century computer systems becomes the staple of education and currently, advanced tools and instruments are crucial to educating students as without learning about these technologies there is no scope for such students in the professional world. The pandemic started in 2019 and played an effective role in the acceptance of technology-based education in the UAE region. The shift from the traditional learning experience to online learning has changed the teaching practice which demands that educators and institutions develop the innovative teaching approach in supporting the students to grow effectively even in the growing crisis (Jamal, et al., 2021).

The COVID-19 pandemic has undoubtedly had a significant impact on the education sector, with the sudden shift to online learning highlighting the need for advanced teaching technologies and innovative approaches to education. The pandemic has accelerated the

adoption of e-learning and other digital technologies, and educational institutions have had to adapt quickly to ensure that students can continue their education without interruption.

The pandemic has shown that technology can play a crucial role in providing education, especially in the face of crises such as pandemics, natural disasters, or other emergencies. It has allowed students to continue their education from anywhere, even in areas that may have limited resources or face other challenges.

The acceptance of technology-based education in the UAE region has increased dramatically due to the pandemic, and it has become clear that advanced tools and instruments are crucial to educating students effectively. The pandemic has highlighted the importance of developing innovative teaching approaches that can support students to grow and learn even in challenging circumstances.

Furthermore, the COVID-19 pandemic has had a significant impact on the education sector, and it has accelerated the adoption of e-learning and other digital technologies. Educational institutions must continue to develop innovative teaching approaches that can support students' learning, and advanced tools and instruments must be integrated into the education system to ensure that students can effectively compete in the professional world.

1.3 Research Questions

To what extent does the usage of Educational Technology affect student performance at a public secondary school in Ras Al-Khaimah?

1.4 Aims and Objectives of Research;

In the last few years, many international firms have been published to analyze the influence ICT has on the process of teaching and learning at the global level. The key aim of this research is to analyze how advanced technologies at school may be helpful to enhance the performance of students at the secondary level. The following are some objectives that must be followed to accomplish the research goals:

- To analyze the advanced technologies used in schools at Ras Al-Khaimah to keep the students allied with the international education systems
- To examine the impact ICT, have on the performance of students in schools
- To analyze the role of teachers and the effective adoption of ICT

1.5 Structure of Report

The complete thesis will be based on five chapters. The first chapter of the proposed thesis provides an overview of the research topic, background, key aims, and objectives of the research. This section is important as it sets the context for the entire study and helps the reader understand the significance of the research. The research topic is clearly stated, and the key aims and objectives of the study are identified, which helps to focus the research and guide the direction of the investigation. Furthermore, the background information provided offers a rationale for why this research is important and relevant.

The second chapter of the proposed thesis is dedicated to a detailed analysis of the literature published relevant to the research topic. This section is essential as it provides a comprehensive understanding of the existing research in the field and helps to identify gaps in the literature that can be addressed by the proposed study. The literature review should be critical and analytical, evaluating the strengths and weaknesses of the studies reviewed. This section is also used to develop the theoretical framework for the study, which will guide the research methodology and data analysis.

Chapter three of the proposed thesis discusses the research philosophies and methods to collect and analyze data. This section is crucial as it outlines the methodology of the study and explains how the research questions will be addressed. The research philosophy and methodology should be appropriate to the research topic, and the chosen research methods should be reliable and valid. The data collection methods and data analysis techniques should be appropriate to the research questions and should be outlined in detail. This chapter should provide a clear and concise methodology for the proposed research.

2 CHAPTER 2: LITERATURE REVIEW

The purpose of the current study is to investigate the potential impact of advanced technologies on student performance in secondary schools. To support this investigation, the second chapter of the proposed thesis will provide a detailed analysis of the existing literature on the topic. This section will examine scholarly articles, books, and peer-reviewed publications to identify trends, gaps, and areas of controversy in the literature.

The literature review is a critical component of any research study as it provides a foundation for the study and helps to identify research questions that have not been addressed or require further investigation. By analyzing the literature, the researcher can identify the strengths and weaknesses of previous studies and develop a theoretical framework for the current study. The literature review also helps to establish the significance of the research topic and the potential impact of the study on the field. Overall, the literature review is a crucial part of the research process that allows the researcher to build upon the existing knowledge in the field and contribute to the advancement of the field.

2.1 Importance of Technology in Education

Technologies are of different types, which may help education in various ways to educate children and improve their academic performance. Now, online education, institutional dashboards, the use of gadgets in classrooms, and advanced visions through technology help educators keep the students engaged in better learning. Most specifically, technology has removed the barriers to learning by giving exposure to things that are never possible to explain through traditional teaching methods.

The impact of technology on education has been enormous in recent years, with the emergence of digital devices, e-learning platforms, and various software tools. The integration of technology in education has revolutionized the way students learn and teachers teach, enabling a more personalized and effective learning experience. One of the primary benefits of technology in education is that it allows for distance learning, which has become increasingly

popular in recent times. With the use of online platforms, students can now access educational resources from anywhere in the world, eliminating the need for physical classroom attendance. This has made education more accessible and flexible, enabling students to learn at their own pace and on their own time.

Another significant advantage of technology in education is that it enhances the quality of education. With the use of interactive and multimedia tools, teachers can engage students in a more exciting and immersive way, making learning more enjoyable and memorable. Furthermore, technology has enabled the use of advanced analytics and data visualization tools, allowing educators to track students' progress and identify areas that require improvement. The use of technology has also made education more inclusive, eliminating traditional barriers to learning. For example, students with disabilities can now use assistive technology tools such as text-to-speech software or screen readers to access educational resources that were previously inaccessible. Additionally, online translation tools have made it easier for students who speak different languages to learn and communicate with their peers and teachers.

Moreover, technology has enabled teachers to create more interactive and collaborative learning environments, promoting active participation and critical thinking. With the use of virtual classrooms and collaborative tools, students can work together on projects, share ideas and feedback, and develop valuable teamwork and communication skills. In conclusion, technology has revolutionized education by making it more accessible, personalized, and engaging. It has removed traditional barriers to learning and enabled students to learn and succeed in ways that were previously impossible. The integration of technology in education is essential to prepare students for the digital world and equip them with the necessary skills to succeed in the 21st-century workplace.

Kearney, Schuck, Burden, and Aubusson (2012) examined the influence that mobile technology has on the education of pupils. The writers explored how learning environments such as academies, schools, and colleges might be altered and modified by the utilization of technology such as mobile learning. Examining the meteoric rise in popularity of social

networking platforms across the world is a good way to illustrate the influence that technology has had. The purpose of this study was to shed light on the significance of social networking as well as its use in the formation of knowledge (Kearney, Schuck, Burden, & Aubusson, 2012). The instructors can engage the students in academic activities by utilizing a variety of social media platforms and online portals, and they can improve the students' cognitive abilities by utilizing mobile technology. Even while mobile learning is a relatively new idea, and its theoretical foundation has not yet been established, it nevertheless has the potential to be used as an effective means of providing students with improved educational opportunities. Authenticity, collaboration, and the ability to tailor one's education to specific needs are the three pillars of mobile learning. Because of this, it is possible for every instructor to maintain communication with every student and to make themselves available to the students at any time. The research looked at a variety of previously published works as well as programs that had already been put into action related to mobile learning all around the world. In the findings, Mobagogy and the Bird in the Hand Projects were discussed as two excellent initiatives. An Australian institution decided to execute the Mobagogy Project to strengthen the relationship between students and faculty. On the other hand, The Bird in the Hand Project was carried out in the United Kingdom to investigate how student educators and their supervisors make use of smartphones. According to the findings of the study, mobile learning is the most effective method for enhancing the interaction between students and professors and for providing excellent academic support to students whenever it is required (Kearney, Schuck, Burden, & Aubusson, 2012).

In 2007, Resta and Laferriere brought attention to the collaborative learning outcomes that were caused by technological advancements. According to the findings of the study, pupils' access to technology improves their ability to comprehend the material in its entirety. It makes it easier for teachers to describe every topic in detail and to incorporate the students' creative experiences wherever possible. The educators or teachers make use of a variety of technologies to demonstrate the visual actions that are related to the topic. For instance, the idea of gravity was not all that lot simpler to explain when there was no such thing as technology. The notion of gravity may now be explained to the pupils through the use of a variety of movies, which the teachers can show them. Learning that is dependent on

technology fosters higher-order mental processes, greater depth of understanding, and the production of new knowledge. This is not achievable using the conventional approaches to education (Resta & Laferriere, 2007).

Bozalek et al. (2013) provided a study that was supported by evidence about the use of technology by the South African Higher Education department. According to the study that was conducted, learning that is based on the use of technology is an effective method that may promote and support professional development. With the help of modern technology, educators can enhance the quality of the instructions they provide during class lectures, make use of reliable and genuine information sources to help students achieve a deeper level of comprehension of the material and design authentic and life-changing educational opportunities for their students. Students benefit in this way from learning that is based on technology, which helps them attain better academic results (Bozalek, et al., 2013).

2.2 The Role of Educators & Edification Institutions

Educators, instructors, or teachers play an efficacious role in the concept-building of the students. They require developing different teaching techniques to mitigate the needs and requisites of the students. Current education is demanding, for which educators require appropriate support and technology-predicated teaching methods. Misra (2010) highlighted the same requisites in his study. He thought, efficacious edifying without utilizing technology is not possible. With the advancement in the era, students are now addicted to a virtual community in almost every field of life. This era is a technology-predicated era, in which the students start their day with technology-predicated alarms, and start their days with blinking screens on their mobiles (Misra, 2010). He further suggests that teachers need to become efficient and E-excellent with the adaption of technologies to achieve their objectives and acquire edifying competencies.

Ryan & Fraser (2010) perpetuated the discussion regarding technology-predicated learning and the role of educators. According to the study, the technology-predicated learning system is incipient and different from the traditional methods, thus it additionally requires fresh

instructors with consummate cognizance of technology (Ryan & Fraser, 2010). This is because some traditional instructors do not feel comfortable in the adoption of technology-predicated methods and feel overwhelmed and nervous about implementing the transmutations.

According to Kukulska-Hulme (2011), students desire advanced learning, which can avail them of their shining future and can bring great vacation opportunities. Now, studies do not mean the only development of understanding with theories, but it is about its practical implantation. Teachers have great resources available on Internet, via which they can find material to guide the students in an efficacious way and to develop an understanding of the theories along with their practical implementation in the authentic world (Kukulska-Hulme, 2011).

The recent generation prefers interactive learning situations, due to which they do not find traditional teaching methods as utilizable for their learning. They demand instructors more technologically savvy than anterior generations. Mentis (2008) called this gap in technology an e-lag. According to mention, teachers need to tailor their edification methods according to the recent demand of the students and the requisite of technology (Mentis, 2008). As said by Paulson:

“Educators should be technologically skilled, schooled in various pedagogical approaches, and sufficiently anchored in the disciplines to be credible with mainline faculty” (Paulson, 2002)

In 2014, Ender, Rohall, & Mathew published a book regarding education and teaching strategies. They discussed that with the advancement in the era, the requisites of education have been transmuted. The fighters, who were previously utilizing swords, are utilizing machine guns now. With the advancements in weapons and war strategies, now it is essential to transmute the edification pattern and teaching approaches at colleges (Ender, Rohall, & Mathews, 2014). Now, the traditional teachers need training sessions, and further teachers with advanced edifying techniques need to be hired. The students at colleges expect something different from their edifier. There was a time when students were edified about war strategies via maps, and theories. Current students expect something different. In this era, students are vigilant of the utilization of GPS, navigation, technology, and practice. Thus, students demand

advanced edifiers, equipped with technologies to guide them the better war practice and expeditious decision-making in emergency conditions. Although the implementation of rapid transmutation in the edification techniques is not possible, however, the regime and institutions are working on this task (Ender, et al., 2014).

Richardson (2017) withal highlighted the consequentiality of advancement in education techniques to increment the student's learning and achievements. Richardson discussed the strategies being utilized in Scotland, to update its education system. Currently, the student expects something different from teachers, they demand strong interaction, technical capabilities, and a discussion-based education system, where they can explore new concepts in an efficacious way. Richardson highlighted the lack of teaching techniques is associated with a lack of funding supply to the scholastic institution. Every institute is concerned with a better learning environment for the students, but the high expenditure of training sessions and installments of technologies requires great budgeting. For this purpose, the regime must arrange different training sessions for the teachers and must make them prepared to utilize technology-based resources to enhance students' learning. Furthermore, the regime must provide enough budget to the scholastic institutions to implement the technology-based system in the schools and colleges (Richardson, 2017). This is also true for military colleges, which demand a technology-based structure to provide a better learning environment to the students. In military colleges, students demand practical implementation of defensive theories and actions. Now, technology has made the defensive students able to experience the war situation, in which they can be edified to utilize their skills to assail the enemy, develop expeditious war strategy, and avail the soldiers to proceed to assail. This learning is all dependent on practice, and cannot just be edified by utilizing board, and books.

2.3 Theoretical Framework through Gagne's Model

Many authors (Bozalek, et al., 2013; Ghavifekr & Kunjappan, 2021; Jefferson & Flanagan, 2022) presented different frameworks, and models to enhance the learning environment of the students of secondary school. Secondary education demands a practical approach along with a better knowledge of concepts and their practical implications in real life. For this purpose, educators can play a significant role and help the students their better performance. The

teachers can show different videos, images, and resources to students by utilizing technology, such as mobiles, tabs, iPods, and laptops. Now, the government of UAE has introduced several policies, according to which every institution is emboldened for technology-based learning and edifier's technical training. For this purpose, the institutions have installed projectors in classrooms, and have arranged laptops and iPods for the students, wireless contrivances for students, internet facilities for the faculty, and a digital library for the students (Carlson & Andress, 2009). These digital technologies avail the students to access any book or resource anytime and anywhere. Now, students have 24/7 access to the digital database. Further, teachers are available for online discussions, via which students are encouraged to discuss any quandary they face during learning. Additionally, the teachers encourage the students to participate in online portal discussions to show their cognizance regarding content, and to complete their online assignments to show their active participation in the learning process (Misra, 2010). However, this process and implementation of digital technologies is not a facile task, instead, it demands students' attention, learning, material, and guidance.

Gagne, Briggs, & Wager (1992) presented a model based on nine steps, to enhance the student-edifier relationship as well as students' learning (Gagne, et al., 1992). These nine steps were further discussed as the model in 1998, in their book, *Principles of Instructional Design*. This book or model aimed to present and present the teaching methods to enhance the teachers' instructional efficiency and students' achievements. Currently, the main issue is the students' attention, for which teachers are working hard. Students are more fascinated to utilize social networking websites instead of focusing on their books. For this purpose, there is a requirement to introduce an incipient way of edifying, in which the students can get the digital environment of learning. Students enjoy utilizing portals to participate in the discussion, and thus there should be digital portals, where the students can enjoy a learning-based discussion with each other. Students enjoy online interactions, thus there must be online blogs where students can interact with their instructors as well as fellows to discuss their course contents. Further, students relish visually examining videos, teachers can utilize different video-based resources to distribute the lecture prosperously (Gagne, et al., 1998).

Based on all the requirements of the present era, Gagne introduced a nine steps base model, also known as Gagne's model. The defined nine steps of the model are:

2.4 Gaining Attention

Jefferson & Flanagan (2022) discussed the importance of students' attention in the learning process. They argue that without students' attention towards the teacher's instructions and the course content, effective learning cannot take place. This is particularly important in secondary school classrooms where teachers are responsible for guiding students through complex subject matter, such as scientific experimental techniques. However, traditional teaching methods often fail to capture students' attention and as a result, student achievement suffers. Jefferson and Flanagan suggest that the solution to this problem is the incorporation of digital technologies into the classroom, which have been shown to engage students and promote active learning.

The traditional teaching methods, such as lecturing, may not always engage students and fail to address the diverse learning needs of the students. Therefore, incorporating digital technologies, such as interactive simulations, virtual labs, and multimedia resources, can offer various learning experiences to students and facilitate active learning. Digital technologies provide students with a more dynamic learning experience and help them engage with the subject matter in new and exciting ways. For instance, virtual labs can enable students to practice scientific experiments in a controlled environment, thereby reducing the cost and potential hazards of conducting experiments in the physical lab. Similarly, interactive simulations can allow students to observe complex phenomena and manipulate variables to better understand the underlying principles. Additionally, multimedia resources, such as videos and animations, can help explain abstract concepts and visualize the content, making it easier for students to understand.

Furthermore, incorporating digital technologies in the classroom can also benefit teachers. It can help them create a more interactive and engaging learning environment, which can lead to improved student engagement and academic performance. Teachers can also use digital technologies to track and analyze students' progress and tailor their teaching to address the

individual needs of each student. Incorporating digital technologies in the classroom can help capture students' attention and promote active learning, which can lead to improved academic performance. It can also help teachers create a more engaging and interactive learning environment and address the diverse learning needs of the students.

The authors further argue that digital technologies have become an integral part of students' lives and can be used to their advantage in the learning process. Students are now more interested in short segments of TV shows, videos, online portals, social networking websites, movies, audio, mobile online apps, and digital resources than in traditional teaching methods. Therefore, teachers must adapt their teaching methods to incorporate digital technologies to grab students' attention and involve them in the learning process. The use of digital technology in education has been found to increase student motivation, engagement, and achievement. Therefore, it is essential that teachers use digital technologies in their teaching methods to make learning more interesting and engaging for students.

2.5 Informing the learner of the objective

According to the study (Ender, et al., 2014), without the establishment of an objective, nothing can be achieved. Thus, every teacher must be vigilant of the objectives for which he is edifying the students, and every student must be cognizant of the objective of why he is learning that concept. Gagne's model emphasizes the importance of a systematic and organized approach to teaching, with a focus on the learning objectives of each lesson. This involves careful planning and preparation by the teacher, as well as consideration of the students' needs and abilities.

Digital planners can be particularly useful tools for teachers to plan and organize their lessons. These planners can include a variety of features, such as a calendar for scheduling lessons, a task list for assigning homework or other assignments, and a resource library for storing and sharing teaching materials. One of the key advantages of using digital planners is the ability to easily share lesson plans and resources with other teachers. This can help to foster

collaboration and sharing of best practices among educators, which can ultimately lead to better teaching outcomes for students.

Another important aspect of effective teaching is the use of assessment and feedback to monitor student progress and adjust teaching strategies as needed. Teachers can use digital tools such as online quizzes, surveys, and interactive assessments to evaluate student learning and provide timely feedback to students. Overall, the use of digital technologies in lesson planning and teaching can help to promote a more organized and effective approach to education, while also engaging students and enhancing their learning outcomes. This will avail them in defining learning objectives for the students, selecting appropriate teaching strategies as well as digital resources, and plan for evaluation methods in terms of the online assignment and portal discussions (Gagne, Briggs, & Wager, 1992).

2.6 Recalling Prior Knowledge

Ghavifekr & Roddy (2015) discussed the significance of effective teaching techniques in the classrooms. The authors highlighted that recalling prior knowledge is important to refresh the students' knowledge. Recalling prior knowledge is an essential part of effective learning as it helps students to connect new concepts with the existing knowledge they already have. It is also an important step for educators as it helps them to assess the student's level of understanding and identify any misconceptions they may have before proceeding with the new material.

To recall prior knowledge efficiently, educators can use different techniques, such as quick PowerPoint Presentation slides, to refresh students' memory regarding the previous lesson. These slides can include images, diagrams, and charts to make the recall process more effective. After this, a quick quiz can be given to students to recall what they have learned previously. This quiz can be in the form of multiple-choice questions, true/false questions, or short-answer questions, depending on the topic and the level of the students.

Moreover, this approach can also be extended to incorporate technology into the learning process. Educators can use various digital tools such as educational apps, online games, and interactive simulations that help students recall previous knowledge while making the process engaging and fun. By using such techniques, educators can help students recall previous knowledge efficiently and effectively, leading to better comprehension and retention of new concepts.

The teacher must be able to first recall the prior knowledge, then integrate more details over the pillars, in spirit students to reflect their mental conceiving, and motivate learners in active participation of knowledge-predicated discussion. This makes the learners astute enough to understand incipient concepts expeditiously and efficiently (Gagne, Briggs, & Wager, 1992; Gagne, Briggs, & Wager, 1998).

2.7 Presenting the Stimulus Material

Gagne, while creating a theoretical framework, specifically focused on the presentation of material. In the past, the traditional methods of teaching only involved using a blackboard, books, and a duster. However, with the advancement of technology, teachers now have access to a wide range of tools to enhance the learning experience of their students. Projector boards, for instance, provide a better visual aid than blackboards, enabling teachers to display images and videos to illustrate concepts and ideas more effectively. In secondary schools, there is a growing demand for teachers to use technology to help students visualize complex ideas and experiments, such as the movements of celestial bodies, the integration of math in real-life situations, and the application of scientific knowledge to future careers. This is particularly important because students need to develop critical thinking and problem-solving skills that will enable them to succeed in a rapidly changing world.

However, the use of technology in the classroom requires specialized training, as it is not a straightforward task. Teachers need to be equipped with the necessary skills to operate and troubleshoot different types of hardware and software used in the classroom. This training should not be limited to basic computer skills, but should also include the pedagogical aspects

of incorporating technology in the learning process. In conclusion, Gagne's theoretical framework provides a useful guide for teachers to present information effectively using technology in the classroom. Teachers should embrace the use of technology as a tool to enhance the learning experience of their students, but they should also receive adequate training to ensure that they can use technology effectively and appropriately. For this purport, the teachers need marginal training, as the utilization of technology is not a facile task. Teachers are required to first customize the material according to the course content, and the sequence and chunking of information are essential to evade cognitive overload (UNESCO, 2021). Gagne's this step is predicated on other theories; Skinner's sequenced learning, Bloom's Taxonomy, and learning strategies. Thus, teachers must be trained enough to utilize the efficacious material to enhance their instructional efficiency and to achieve students' gratification (Gagne, 1985).

2.8 Providing Learning Guidance

The fifth step in Gagne's model is the provision of guidance for learning. In this step, the teacher's role is to guide and support students as they acquire new knowledge and skills. This is particularly important because students often struggle with the traditional teaching methods, which can be frustrating and ineffective. To provide effective guidance for learning, the teacher must first develop the students' interest in the content. This can be achieved by using engaging and relevant examples and activities that connect the content to the students' lives and interests. When students are interested in the material, they are more likely to engage with it and retain the information.

The teacher must also inspire students to participate in knowledge-based discussions. This can be done by creating a supportive and respectful learning environment where students feel comfortable sharing their ideas and opinions. Discussions can help students to clarify their understanding of the material, learn from their peers, and develop critical thinking skills. Finally, the teacher must guide students to learn skills and abilities. This involves providing clear and specific instructions, modeling the desired behavior, and providing feedback and support as the students practice and develop their skills. The teacher should also provide

opportunities for students to apply their new knowledge and skills in real-world situations, which can help to reinforce their learning and build their confidence. A coach or the instructor must be capable of magnetizing the students towards learning. This will enhance his guidance adeptness to the learners and will enhance the future performance of the students (Ghavifekr & Kunjappan, 2021). The educators may also use digital dashboards of the schools to keep the students engaged in discussions and let them participate in interactive discussions via commenting on each other's posts regarding how their knowledge helped them to learn concepts in a better way.

2.9 Eliciting the Performance

Thompson & Leonard (2022) discussed that observational learning makes a learner more capable to understand the concept, instead of utilizing theories to describe the situation. Practical knowledge is an essential aspect of learning, especially in the secondary level of education. It involves learning by doing, acquiring skills, behavior, and knowledge through practical experience. Practical knowledge is important because it allows students to apply theoretical concepts to real-world situations. For example, a student may learn about scientific concepts in a classroom, but they may not fully understand the practical application until they perform an experiment in a laboratory. Practical knowledge is essential for students to perform well in the future, as it prepares them for real-world situations and helps them develop problem-solving skills.

One way to encourage practical learning is through participation in presentations and demonstrations. This allows students to demonstrate their understanding of the subject matter and to identify their weaknesses and areas of improvement. Presentations and demonstrations also provide opportunities for students to interact with their peers and receive feedback, which can enhance their learning experience.

Overall, practical knowledge is an integral part of learning, and it is crucial to provide students with opportunities to apply their knowledge in practical situations. By doing so, students can develop a better understanding of the subject matter and be better prepared for future

endeavors. This type of education system is called a modeling-based education system (Buckley, 2018). According to Gagny, this step brings acquisition, inhibition, facilitation, and creativity in teaching methods. And avail the teachers to make their students more capable and confident to learn incipient things virtually (Gagne, 1998).

2.10 Providing Feedback

Karipicke & Janell (2011) discussed the paramountcy of feedback from the teacher and its impact on learners' learning. Evaluation is a crucial step in Gagne's model, as it provides an opportunity for the teacher to assess the students' understanding and mastery of the material. Evaluation can take various forms, such as tests, quizzes, and examinations, and should be evidence-based to provide accurate and reliable feedback on the students' performance. Testing can help to identify the students' weak points and areas of misunderstanding. By analyzing the test results, the teacher can determine which concepts and skills need further review and can tailor future instruction to address these areas. Tests can also help to motivate students to study and review the material, as they provide a measure of their progress and performance. Quizzes are shorter assessments that can be used to check for understanding and retention of specific concepts. Quizzes can be administered more frequently than tests and can help to reinforce the material and identify areas where students may need additional support.

Examinations are typically more comprehensive assessments that cover a broader range of material. Examinations can be used to evaluate the students' overall mastery of the material and their ability to apply their knowledge and skills in different contexts. In addition to these assessments, teachers can also use other evidence-based methods to evaluate students' performance, such as observation, self-assessment, and peer assessment. Observation can be used to assess students' participation, behavior, and engagement in class, while self-assessment and peer assessment can help students to reflect on their own learning and provide feedback to their peers. The best edifier understands the paramountcy of feedback, and that is why he is more focused to give authentic comments on learners' performance rather than

saying, "You are doing a good job (Karipicke & Janell, 2011)." Gagne utilized this concept of providing feedback as the seventh step of the model.

2.11 Assessing the Performance

Enhancement of retention is a crucial step in Gagne's model because it helps students retain what they have learned for a longer time. For this purpose, educators can use various techniques such as revision, practice tests, and assignments to reinforce students' learning. These techniques help to maintain the knowledge and skills that students have acquired during the learning process. Revision is a powerful technique that involves going over the learned concepts repeatedly to make them stick in the student's mind. This technique helps students to recall the concepts at a later stage with ease. Revision can be done through various methods such as reviewing notes, discussing the concepts with peers, and watching educational videos related to the topic.

Practice tests are another powerful technique to enhance retention. Students can test their knowledge and identify their weaknesses through these tests. These tests help students to practice and apply what they have learned in the classroom. They can also help students to gain confidence in their abilities. Assessment are also an effective way to enhance retention. Assessment provide an opportunity for students to apply their knowledge and skills to solve real-world problems. They also help to reinforce concepts learned in the classroom and provide an opportunity for students to practice and apply their learning.

The feedback can further be utilized for the assessment of the learner's performance. The feedback on the test, quiz, and examination is of no means if the teachers do not assess the learners' performance. The edifier must highlight the weak points of the learners and then must evaluate if the edification has been learned by the students and provide general progress information or not. Final and the ninth step of Gagne's model is the Enhancement of retention. This step is highly essential to polish the skills of the students. Albeit the students have learned the concepts, re-practicing, and additional practice polish their skills to make the diamond. Thus, teachers must enhearten the students to make additional practice and must put

the learners in a cognition transfer situation to review the learner's performance as a skilled student (Karipicke & Janell, 2011).

2.12 Enhancing retention and transfer

Lubega (2010) highlighted that an educator's purpose should be to increase students' retention levels. This means that students should not only learn the material but also retain it for a long time, and be able to reflect on it throughout their lives. To achieve this, educators need to make their lectures engaging, relevant, and memorable. One effective way to do this is by using real-life examples to illustrate complex concepts. This can be particularly challenging when teaching science-related topics, as some concepts are abstract and difficult to visualize. For example, it can be challenging to show where oxygen is located, and how it behaves in different environments.

To address this challenge, the use of technology can be particularly helpful. For instance, teachers can use online videos of experiments related to oxygen to demonstrate its properties and behavior. By using a projector, multimedia, and presentations based on videos, teachers can transfer knowledge to students in a more engaging and effective way. This approach can also help to cater to different learning styles, as some students may prefer visual or auditory learning methods over text-based ones.

Moreover, the use of technology in education can enhance the overall learning experience for students, making it more interactive, dynamic, and engaging. It can also provide students with access to a wider range of resources, such as online textbooks, simulations, and educational games. This can help students to explore different concepts and topics in a more hands-on and interactive way, which can enhance their understanding and retention levels. Overall, the use of technology can be a powerful tool for educators to increase students' retention levels and prepare them for lifelong learning.

2.13 Research Gap

The review of the literature highlights the significance of using technology for improving students' learning at the secondary or higher education level. While many studies have investigated the impact of educational technology on student performance, the current study is unique in its focus on the implementation of ICT-based techniques in classrooms of a public school in Ras Al-Khaimah, UAE. The study aims to evaluate how the use of technology in the classroom will affect student academic performance in the future.

The selection of the sample is crucial for the study's success, as it will determine the generalizability of the findings. By focusing on a public school in Ras Al-Khaimah, the study is well-positioned to provide insights into the impact of technology on student performance in a real-world setting. Additionally, the use of secondary literature to support the findings adds credibility to the study, as it draws on existing research to inform its conclusions. Overall, the study is highly significant in its potential to inform education policymakers and practitioners about the use of technology in the classroom and its impact on student academic performance.

3 CHAPTER 3: RESEARCH METHODOLOGY

The data for this research was collected through both primary and secondary resources.

Primary data was collected using a questionnaire developed using Google Forms, which is a free and user-friendly tool for collecting data online. The questionnaire was based on Likert Scale questions, which allowed participants to provide their responses on a scale ranging from strongly agree to strongly disagree. The use of this type of questionnaire made it easier for participants to respond and provided a structured approach to data collection. Additionally, it facilitated the data analysis process by providing quantifiable data that could be analyzed using statistical methods.

Secondary data, on the other hand, was collected from research articles that were already published and had relevant information or data sets. Several research articles were identified that shared insights about UAE, and specifically about Ras Al-Khaimah's education system and other aspects. This helped to provide a broader context for the research and allowed for a more comprehensive understanding of the factors that may impact student performance in the region.

Overall, the use of both primary and secondary data sources helped to ensure that the research findings were robust and provided a well-rounded understanding of the topic. The combination of both types of data allowed for a more in-depth exploration of the research questions and facilitated a more nuanced analysis of the data. Further details of how the data was collected and analyzed throughout the study are discussed in the section below:

3.1 Research Design

The purpose of the current study is to analyze how advanced technologies at school may be helpful to enhance the performance of students at the secondary level. To achieve this purpose, qualitative and quantitative approaches to research can be utilized as appropriate. In the majority of cases, the quantitative research approach is the most prominent type of research framework. This type of research examines the data through numerical patterns (Driscoll,

2010), and requires data collection while adaption of statistical matters, such as survey questionnaires, 5 or 7-scale responses, interviews, or polls. The findings are then analyzed graphically to reflect on the findings. On the other hand, the qualitative research methodology is based on testing the hypotheses based on published literature, reports, or material from websites. It works on the principle of existing theories.

Now, as the current study aims to evaluate how ICT is going to affect students' learning at Ras Al-Khaimah, without evaluation of the student's perspective regarding this approach, findings can be of no mean. Therefore, the current study has used quantitative research methodology approach for collection of response data from the students of secondary level of Ras-Al-Khaimah. For this purpose, survey questionnaire was developed as per the variables of the study, whereas the questionnaire was distributed to the students through google online, and were encouraged to share their response within two weeks. Further, the study did not only rely on the responses; rather secondary resources were also utilized to evaluate what other scholars have published regarding impact of ICT on students and how does it resemble to our current research results. In this way, the research relied on the mixed methodology, in which both quantitative and qualitative research techniques are being utilized.

3.2 The Method of Data Collection

The data collection of the study depended on two parts; in the first part the data was collected through questionnaire, whereas the second part depended on online research.

For the questionnaire-related data collection, firstly permission was taken from the institutional authorities regarding whether the study can be conducted with their students or not. After getting approval, informed consent was sent to the students and their families, indicating the purpose of conducting the study and explaining how the confidentiality measures will be adapted throughout the study. After the approval from the students, regarding participating in the studies, was received then the participants were given information regarding how they are going to receive the questionnaire in the study and how that data is going to be analyzed. Once, everything was done, then the link to the questionnaire was shared

with the students, through which they could fill out the questionnaire and share their thoughts regarding the impact of ICT-based teaching techniques on their ease of learning.

In the second part of the data collection, the study relied on secondary resources, including books, scholarly journals, published papers, and annual publications produced by the schools, or the government of UAE. To begin, to collect the secondary source data, a scholarly search engine such as Google Scholarly was used as a search tool, and effective keywords were chosen to target the material that was both the most relevant and had been published the most recently. This was done to ensure that the information was as up-to-date as possible. By searching with several different terms, such as "impact of ICT teaching techniques on students' learning," the exact related scholarly material or publications were accessed online.

The first thing that was done in the study procedure was to collect roughly thirty papers that were connected to the impact of ICT-based teaching techniques on students' academic performance. After collecting the articles, the inclusion and exclusion process was applied to sort through the data to remove any irrelevant or unnecessary information and select only that which was highly pertinent, most recently published, and had a high degree of dependability.

3.3 Sample Size

The researchers chose to collect quantitative data for the research, which involves to use of statistical analysis to draw conclusions from numerical data. To collect this type of data, the researchers selected a sample of at least 100 students from different grades at the Ras Al-Khaimah Public School. The sample size of 100 students was chosen to ensure that the findings of the study are representative of the population of students at the school. The students were selected randomly from different grades to ensure that the sample is diverse and includes a range of ages and academic levels. This approach helped to reduce the possibility of bias in the data and to ensure that the findings of the study are generalizable to the larger population of students at the school. By selecting a diverse sample of students, the researchers were able to obtain a broader range of perspectives on the use of ICT-based techniques in the classroom, which increases the validity and reliability of the study.

In addition to the student sample, a sample of at least 10 teachers from the secondary level at Ras Al-Khaimah Public School was selected. The teachers were selected based on their experience and expertise in the use of ICT-based techniques in the classroom. The student sample was selected using a random sampling technique, which helped to reduce bias and ensure that all students had an equal chance of being selected. Additionally, the sample was diverse in terms of gender, age, and academic performance. This ensured that the findings of the study could be generalized to the wider population of students at the school. Similarly, a purposive sampling technique was used to select a sample of teachers who had experience and expertise in using ICT-based techniques in the classroom. This ensured that the teachers selected could provide valuable insights into the impact of these techniques on student learning.

The use of both student and teacher samples allowed the study to provide a more comprehensive understanding of the impact of ICT-based techniques on student learning. The student sample provided insights into the experiences of students, while the teacher sample provided insights into the implementation and effectiveness of these techniques in the classroom.

To support the findings of the study, at least 30 articles were used. This ensured that the study was based on a robust body of literature and that the findings could be compared and contrasted with previous research in the field.

The selection of both student and teacher samples was crucial to ensure that the study was representative of the population of students and teachers at the school. Additionally, the use of a diverse sample of students and teachers allowed the study to provide valuable insights into the impact of ICT-based techniques on student learning in a real-world setting.

3.4 Variables

The objective of this study was to evaluate the impact of the ICT-based teaching methodology on students' academic performance at the Ras Al-Khaimah Public School in the UAE. The

study utilized a mixed methodology approach, incorporating both quantitative and qualitative research methods to gather and analyze data. The independent variables in the study were the different ICT techniques, including learning through the projector, presentation, online video streaming, dashboard discussion, and online engagement in students' learning.

The dependent variables in the study were students' academic performance in terms of understanding, retention, confidence, and satisfaction. Understanding refers to how well the students understood the subject matter, while retention refers to how well they retained the information over time. Confidence refers to how confident the students were in their ability to apply the knowledge they had acquired, while satisfaction refers to how satisfied the students were with the learning experience overall.

To achieve the objectives of the study, a survey questionnaire was designed and distributed among a sample of students to collect data on their experiences and perceptions of using advanced technologies in the classroom. The survey questions were designed to evaluate students' perceptions of ICT-based techniques for their learning. The questions included whether students were aware of the use of technology during classrooms or not, if yes, then which technologies they had experienced and which technology they found to be extremely helpful for their learning.

The findings of the study indicated that 100% of the participants responded to the survey questionnaire, and the average response of the participants was 'Satisfied.' This suggests that the students were satisfied with the use of digital technologies by the educators at Ras Al-Khaimah UAE. Furthermore, the students reported positive experiences with different ICT techniques such as video streaming, presentation, online quiz, discussion board, online experiments, vision exercises, or other material.

The study also found that Ras Al-Khaimah Public School has been adapting the latest measures to teach their students and improve their academic performance. For example, during COVID-19, the school distributed Chromebooks to the students. This is an example of

how the school management is highly concerned about using advanced technologies to improve student learning outcomes.

The use of different ICT techniques such as learning through the projector, presentation, online video streaming, dashboard discussion, and online engagement in students' learning was expected to have a positive impact on students' academic performance in terms of understanding, retention, confidence, and satisfaction. By measuring these dependent variables, the study aimed to evaluate the effectiveness of the ICT-based teaching methodology in improving student learning outcomes.

Overall, the study aimed to provide insights into the effectiveness of the ICT-based teaching methodology in improving student learning outcomes at the Ras Al-Khaimah Public School in the UAE. The findings of the study suggest that the use of advanced technologies in the classroom has a positive impact on students' academic performance. Students reported positive experiences and were satisfied with the use of digital technologies. The school management is also taking measures to incorporate the latest technology into the teaching process to improve student learning outcomes.

The findings of this study have important implications for education policymakers and school management. The results suggest that incorporating advanced technologies into the classroom can have a positive impact on student's academic performance. Therefore, policymakers and school management should consider investing in the latest technology and incorporating it into the teaching process to improve student learning outcomes. Additionally, further research is needed to explore the effectiveness of different ICT techniques on student learning outcomes in other educational settings.

3.5 Data Analysis

The table provides a summary of the data collection process, the sample size, and the methods used for data analysis. The study adopted a mixed-methods approach, utilizing both quantitative and qualitative methods to collect and analyze data. A survey questionnaire was used to gather quantitative data, while interviews were conducted to gather qualitative data.

Research Question	Method of data collection	Site	Sample	Method of data analysis
<i>To what extent does the usage of Educational Technology affect student performance at a public secondary school in Ras Al-Khaimah?</i>	Questionnaire – closed-ended questionnaire & Data through reviewing documents and literature	Articles for secondary data collection will be selected from Google Scholar (2018-2022)	Minimum of 100 school students Sampling Strategy: Non-probability, convenience sampling	Data interpretation through SPSS and discussion through thematic analysis
<i>To examine the impact ICT have on the performance of students in schools</i>	Questionnaire – closed-ended questionnaire & Data through reviewing documents and literature	Articles for secondary data collection will be selected from Google Scholar (2018-2022)	Minimum of 100 school students Sampling Strategy: Non-probability, convenience sampling	Data interpretation through SPSS and discussion through thematic analysis
<i>To analyze if the advanced technologies used</i>	Questionnaire – closed-ended questionnaire	Articles for secondary data collection will	Minimum of 100 school students	Data interpretation through SPSS

in schools at Ras Al-Khaimah keep the students aligned with the international education systems	& Data through reviewing documents and literature	be selected from Google Scholar (2018-2022)	Sampling Strategy: Non-probability, convenience sampling	and discussion through thematic analysis
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Also, after the completion of the data collection phase of the study project, an analysis employing an inclusion-exclusion paradigm. In this particular study project, an inclusion-exclusion paradigm was employed to determine which articles should be included in the analysis phase. The purpose of the inclusion-exclusion paradigm is to ensure that the selected articles are relevant to the research question and objectives. This involves carefully scrutinizing the articles to determine whether they meet the criteria for inclusion in the analysis.

In this study project, the inclusion-exclusion paradigm was used to exclude articles published before 2010, as they may not reflect the current state of the field. This is because the use of ICT-based techniques in education is a rapidly evolving field, and older articles may not reflect the latest research findings and practices.

Additionally, the analysis phase focused on recently published articles that were most related to the research objectives. This ensured that the study was based on the most up-to-date and relevant information available in the field.

Overall, the use of the inclusion-exclusion paradigm in the analysis phase of the study project was crucial in ensuring that the selected articles were relevant, recent, and of high quality.

This helped to increase the validity and reliability of the study findings and provided a robust basis for drawing conclusions and making recommendations.

According to the findings of the research conducted by Patino and Patino (2018), the inclusion-exclusion framework is utilized during the process of conducting research by research protocols that are of a high degree of quality. Therefore, in order to attain a certain level of research quality in this study, certain constraints have been imposed in order to reject data that does not comply with the standards of the study. For instance, the purpose of this study is to analyze impact of ICT-based teaching techniques on the performance of students of secondary schooling level of education. Therefore, any research publications that was published before 2010 were excluded because at that time the use of technology was not common in educational institutions.

After the necessary data for the analysis has been gathered, each of the included articles will be subjected to a thorough examination so that it can be determined how ICT helped the students in their academic learning. The vital information was saved in a password-protected word document on the personal computer.

3.6 Ethical Measures

The research has followed the ethics guide and kept participant's information confidential, the following is a list of ethical matters that will be kept in mind while completing the research:

- Before sending out the questionnaire to the research population, an email was sent to them requesting their consent to participate in the research. This means that participants were informed about the purpose of the research, the data that will be collected, and how it will be used. The consent process ensured that the participants were aware of what they were agreeing to and that they agreed to participate voluntarily.
- Participants have the right to withdraw from the research at any point in time. This means that they can choose not to participate in the study or withdraw their consent for their data to be used in the research. If a participant chooses to withdraw, it will not

affect them in any way. Additionally, they can also request to remove their answers from the research. This means that their data will not be used in the research and will be deleted if it has already been collected.

- The personal information of the research participants was kept confidential. This means that their identities and personal details were not shared with anyone. The participants appeared anonymous in the fact sheet, which means that neither their identities nor the institute they belong to would be published. This ensured that their privacy was protected and that they felt comfortable sharing their responses with the researchers.
- The data collected for this research was not used for any further research. This means that the data will not be used in any other research studies, nor will it be shared with any other researchers. Additionally, the data will be discarded after 10 years. This ensures that the data is not kept indefinitely and that the privacy of the participants is protected.

For the secondary data, the secondary data refers to information that has already been collected by other researchers or sources, rather than the data that is collected by the researchers themselves. In this study project, secondary data was used to support the findings and conclusions. When using secondary data, it is important to cite the sources properly to give credit to the authors for their effort and assistance in the research.

4 CHAPTER 4: RESULTS AND DISCUSSION

The key aim of this research is to analyze how advanced technologies at school may be helpful to enhance the performance of students at the secondary level. To achieve this aim, a mixed methodology was adopted. The mixed methodology approach involves using both quantitative and qualitative research methods to gather and analyze data. The first phase of the study involved conducting a survey with the students to evaluate their perceptions of ICT-based techniques for their learning. A survey questionnaire was designed and distributed among a sample of students to collect data on their experiences and perceptions of using advanced technologies in the classroom.

The key aim of this research is to analyze how advanced technologies at school may be helpful in enhancing the performance of secondary level students. To achieve this aim, a mixed methodology approach was adopted. The mixed methodology approach involves using both quantitative and qualitative research methods to gather and analyze data. The first phase of the study involved conducting a survey with the students. The purpose of this survey was to evaluate their perceptions of ICT-based techniques for their learning. A survey questionnaire was designed and distributed among a sample of students to collect data on their experiences and perceptions of using advanced technologies in the classroom.

The survey questionnaire was designed to collect quantitative data on various aspects of ICT-based techniques, such as the frequency of usage, the effectiveness of these techniques in improving academic performance, and the level of student engagement. The questionnaire also included open-ended questions to collect qualitative data on the students' opinions and suggestions for improving the use of advanced technologies in the classroom. The survey was distributed to a representative sample of students from different secondary level schools. The sample was selected using a random sampling technique to ensure that the results were representative of the population.

After the data was collected, the quantitative data were analyzed using statistical techniques to identify patterns and trends. The qualitative data were analyzed using content analysis to identify themes and patterns in the students' responses. The results of the survey will help the researchers to understand the students' perceptions of using advanced technologies in the classroom and to identify the most effective techniques for improving academic performance. This information can be used to develop strategies for incorporating advanced technologies into the classroom in a more effective way and to provide teachers with the necessary tools and training to support the use of these techniques.

Out of 100 students, 56 were female and 44 were male students from the Public school of UAE, Ras Al-Khaimah.

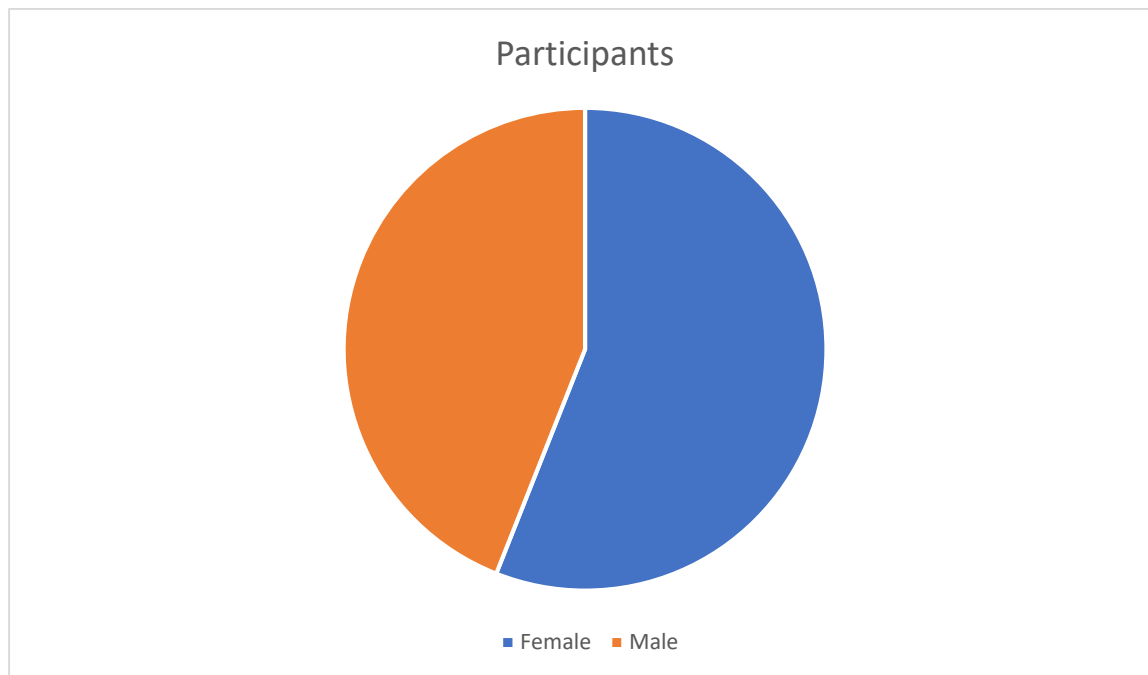


Figure 3 Participants

The students were asked multiple questions, and these questions are categorized in terms of research objectives.

4.1 Advanced technologies used in schools at Ras Al-Khaimah

To evaluate whether any advanced technology is being used at Ras Al-Khaimah Public School or not, the students were initially asked a few questions regarding whether they are aware of the use of technology during classrooms or not, if yes then which technologies they have experienced and which technology they found to be extremely helpful for their learning. The responses of the students are as follows:

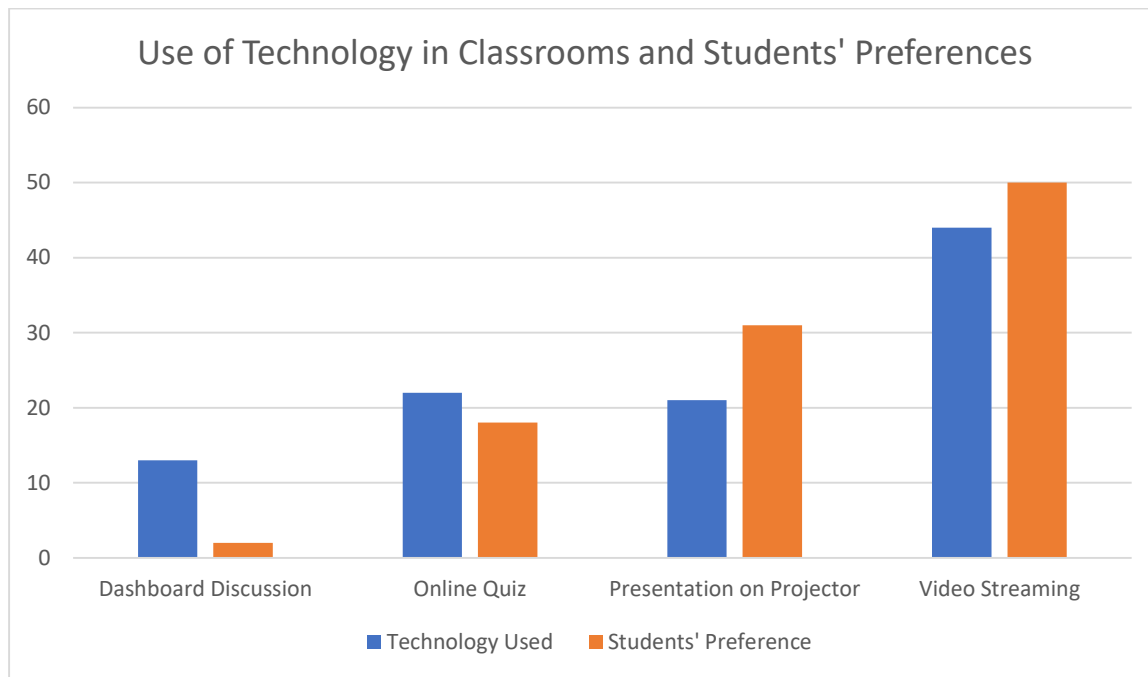


Figure 4 Use of Technology in Classrooms and Students' Preferences

The above figure highlights that the teachers at Ras Al-Khaimah institution use different technologies to guide the students in their academic concepts. The four common techniques used are dashboard discussions, online quizzes, presentations on projectors, and video streaming. Apart from this e-books, online discussions, teacher-student interaction through Chromebook, and other techniques are also being used by educators. However, out of these four, the students find video streaming as the best approach, which helps them to improve their understanding level, keeps them satisfied, helps them in remembering the concepts which increase their retention level, as well as enable them to perform excellent due to clear concepts regarding the content.

4.2 Impact ICT has on the performance of students in schools

The performance of the students was measured through four variables; understanding of content, retention, confidence, and academic performance. The following are the results of the study:

Descriptive Statistics

Descriptive Statistics

	Satisfaction	Retention	Understanding to Content	Academic Performance
Valid	100	100	100	100
Missing	0	0	0	0
Mean	3.930	4.190	4.060	3.980
Std. Deviation	0.640	0.581	0.489	0.376
Minimum	2.000	2.000	2.000	2.000
Maximum	5.000	5.000	5.000	5.000

Table 1 Descriptive statistics of the Survey Response

The above figure indicates that 100% of the participants responded to the questions of the questionnaire, out of which the average response of the participants indicates '4' which means 'Satisfied.' This means that the students are satisfied with the use of digital technologies of the educators at Ras Al-Khaimah UAE; either it is in terms of video streaming, presentation, online quiz, discussion board, online experiments, vision exercises, or other material. Recently, during COVID-19, Ras Al-Khaima has also distributed Chromebooks to the students (RAK, 2020), which is evidence that the management of the Ras Al-Khaimah Public School is highly concerned to adapt the latest measures to teach their students and improve their academic performance.

The survey results demonstrate that the students are content with the various digital technologies being used in the classroom, such as video streaming, presentations, online quizzes, discussion boards, online experiments, vision exercises, and other materials. The high

level of satisfaction suggests that the use of advanced technologies in the classroom is contributing positively to the students' learning experience and academic performance. Additionally, the fact that Ras Al-Khaimah Public School distributed Chromebooks to the students during the COVID-19 pandemic indicates the management's commitment to adapting the latest measures to teach their students and improve their academic performance. This action highlights the school's efforts to provide students with the necessary tools and resources to succeed in their education, even in challenging circumstances.

Overall, the results that Ras Al-Khaimah Public School is taking a proactive approach to integrating advanced technologies into the classroom, and is working to ensure that students have access to the latest tools and resources to enhance their learning experience. This commitment to innovation and excellence bodes well for the future success of the students at the school.

Binomial Test

Variable	Level	Counts	Total	Proportion	p
Which technology you find helpful for your learning?	Dashboard Discussion	1	100	0.010	< .001
	Online Quiz	18	100	0.180	< .001
	Presentation	31	100	0.310	< .001
	Video Streaming via Projector	50	100	0.500	1.000
Satisfaction	2	5	100	0.050	< .001
	3	9	100	0.090	< .001
	4	74	100	0.740	< .001
	5	12	100	0.120	< .001
Retention	2	2	100	0.020	< .001
	3	3	100	0.030	< .001
	4	69	100	0.690	< .001
	5	26	100	0.260	< .001
Understanding to Content	2	2	100	0.020	< .001
	3	3	100	0.030	< .001
	4	82	100	0.820	< .001
	5	13	100	0.130	< .001
Academic Performance	2	2	100	0.020	< .001
	3	2	100	0.020	< .001
	4	92	100	0.920	< .001
	5	4	100	0.040	< .001

Note. Proportions tested against value: 0.5.

Table 2 Binomial Test

To further evaluate how the students have responded to the questionnaire, the binomial test was performed based on variables; satisfaction, retention, confidence, and academic performance. The findings showed that most of the students believe that video streaming via projector regarding different course contents have helped them at highest level to contribute

towards satisfaction, retention, understanding of content, and academic progress later. This is because the students find videos helpful to understand what teaching wants to explain, as understand how oxygen and hydrogen form water is not easy; rather visionary examples through videos can be highly helpful in this perspective. Thus, teachers can use highly interactive methods in which engaging students through lesson delivery + use of online digital resources can help them to gain better results.

One Sample T-Test

One Sample T-Test

	t	df	p
Satisfaction	61.437	99	< .001
Retention	72.148	99	< .001
Understanding to Content	83.084	99	< .001
Academic Performance	105.988	99	< .001

Note. For the Student t-test, the alternative hypothesis specifies that the mean is different from 0.

Note. Student's t-test.

Table 3 One sample T-Test

Further, t-test results also revealed that the use of digital technologies has been highly helpful to improve students' satisfaction level, retention, and understanding of content, and academic performance. Thus, the above findings make it clear that the use of ICT techniques leaves a positive impact on the students, as the p-value for all results is less than 0.001, which means that there is a strong correlation between the use of ICT technologies and understanding of the students to the content, retention level of the student, confidence of the student, and their academic progress.

In addition, the secondary sources show that electronic data collection devices assist teachers in moving the classroom to the field, where students enjoy opportunities to utilize inquiry to

formulate questions that are based on their observations. Students can collect, record, and evaluate data with the help of tools such as electronic probeware that can measure things like pH, temperature, or oxygen levels. These tools can interface directly with handheld calculators or laptop computers (Gagne, et al., 1998; Irving, 2006).

The use of imaging technology in the classroom, such as digital cameras and digital microscopes, opens up new possibilities for students to better visualize scientific concepts. Students can use time-lapse photography and digital microscopes to study the process of seeds soaking up water and germinating into new plants. The metamorphosis of a caterpillar into a chrysalis and the subsequent emergence of a butterfly, both of which were photographed in time-lapse sequences and will be described further below, provide students with windows into the subtle changes in nature that were formerly accessible only through the study of books (Buckley, 2018).

When compared to traditional classrooms, connected classrooms uniquely make use of instructional technology. A networked system of personal computers or portable devices that have been intended to be utilized in a classroom specifically for interactive teaching and learning is what is meant by the term "connected classroom technology." These networked technologies include response systems, classroom communication systems, and more recent systems included under the CATALYST, which stands for classroom aggregation technology for activating and assessing learning (Bravo, 2017). Connected classroom systems provide the potential for greater formative assessment through the use of questioning and fast feedback, and they also enable educators to modify education to better match the need of individual students (Bozalek, et al., 2013). Students transmit their replies anonymously to a receiving station, which then displays histograms of the various answers that students chose. Archiving data logs allows for further examination at a later time. Students are better able to comprehend their roles as thinkers in the classroom when they participate in discourse that takes place in a secure setting through the public assessment of problem-solving strategies and alternative concepts (Irving, 2006).

4.3 Role of teachers and the effective adoption of ICT

Educators, instructors, and teachers all play an important part in the concept development of their respective student populations. They necessitate the development of various instructional strategies to accommodate the requirements and prerequisites of the pupils. The modern educational system is rigorous, and as a result, teachers need enough support as well as instructional strategies that are based on technological advancements.

In his research, Misra (2010) focused on highlighting the same necessary components. He believed that productive learning could not take place in the absence of the application of technology. Students are increasingly hooked on participating in online communities in virtually every aspect of their lives because of technological advancements. This period is a technology-dependent era, in which the students begin their day with alarms that are determined by technology, and start their days with the blinking screens of their mobile devices (Misra, 2010). In addition, he believes that for educators to be successful in achieving their goals and acquiring edifying competencies, they need to become proficient and E-excellent in their application of various technologies (Misra, 2010).

Some authors (Bozalek et al., 2013; Cohen, Manion, & Morrison, 2011; Economists, 2017) believe that the creation of a curriculum is a vital stage in the process of establishing a better learning environment. Whether it be at schools or colleges, the importance of the curriculum cannot be overstated. The curriculum delineates the learning goals for the students, to accomplish which the instructors make use of their expertise and a variety of instructional approaches. The course material is broken down into several categories, some of which are as follows: objectives, edifying techniques, expected outcomes, testing tactics, evaluation process, examination syllabi, and classroom discussions. The educators adhere to the curriculum as well as the procedures that were outlined. If the curriculum is out of date or was simply developed, educators cannot be held accountable for the application of straightforward teaching strategies. On the other hand, the best curricula describe the use of teaching methods, the application of useful technologies, the aims of the syllabi, and the evaluation process. In addition, the management uses evaluation techniques to determine whether or not teachers are

adhering to the curriculum. This helps to preserve a more conducive atmosphere for learning within the school.

According to Kelly (2004), the official curriculum is outlined in syllabi and prospectuses, but the received curriculum is the authenticity of what is transmitted to the learners. The author explains that the gap between the two might be either unintentional or deliberate. He then moves on to talk about the 'hidden curriculum,' which is a term that is used by many people to explain the things that children learn as a direct result of how the school orchestrates and organizes its activities. Kelly then goes on to explore further parts of the hidden curriculum, such as the roles that are played by gender, social conditions, and postures towards a variety of facets of life (Kelly, 2004).

5 CHAPTER 5: CONCLUSION

The key aim of the study was to analyze how advanced technologies at school may be helpful to enhance the performance of students at the secondary level. For this purpose, data needed for this research was collected through both primary and secondary resources. The first-hand information was collected with help of a questionnaire. The questionnaire will be developed using Google Forms as it is easier and free of cost, also it was shared with the research participants online. The questionnaire was based on Likert Scale questions which are comparatively easier for the participant to respond also it will help in the data analysis process as well. On the other hand, secondary data was collected from the research and articles that are already published and have relevant information or data sets. Several research articles share insights about UAE and specifically about Ras Al-Khaimah's education system and other aspects.

The findings of the study indicated that 100% of the participants responded to the questions of the questionnaire, out of which the average response of the participants indicate '4' which means 'Satisfied.' This means that the students are satisfied with the use of digital technologies of the educators at Ras Al-Khaimah UAE; either it is in terms of video streaming, presentation, online quiz, discussion board, online experiments, vision exercises, or other material. Thus, it proves that the use of technology proves to be highly helpful in improving students' academic performance. Not only this but also the educator's role is of great significance in using the right resources for the right purpose. Technological advances have made students increasingly addicted to online networks. This is a technology-dependent era in which pupils wake up to technology-controlled alarms and mobile device screens. To be successful in reaching their aims and obtaining edifying abilities, educators must adapt and be Excellent in their use of numerous technologies (Misra, 2010).

Specifically, the curriculum is important in secondary schools, as it outlines the students' learning goals, and teachers use their skills and a variety of teaching tactics to achieve them. The course material is divided into several categories. Objectives, teaching methods, expected

outcomes, testing, evaluation, syllabi, and classroom debates. Teachers follow curriculum and practices. Educators can't be held responsible for simple teaching tactics if the curriculum is outdated or newly established. The formal curriculum is specified in syllabi and prospectuses, but the received curriculum is what is taught.

Thus, it is recommended to the educators at the Ras Al-Khaimah keep their curriculum updated and include exercises that must include the use of technology for the completion, in this way the teachers will be better aware of which technique is going to bring maximum benefits for them in achieving the students' engagement, satisfaction, and retention. White (2007) also emphasized that to keep up with the development of lesson plans, the curriculum needs to be altered as well. Now, the curriculum needs to incorporate the use of modern technologies, online learning, distant learning, and interactions via social media. This indicates that teachers need to make use of technology to make the resources and content available for effective instruction. They need to encourage the use of online discussion forums or blogs as a means of providing assistance whenever it's needed and maintaining a continuous learning environment even after the class has ended. In addition, they call for encouraging students to take part in learning debates on social media to improve the quality of their relationships as well as their academic performance. This process of implementing a change in the curriculum design is not a simple one; rather, it requires significant efforts from every person employed by the educational establishment (White, 2007).

In addition, he (White, 2007) proposes that institutions include minuscule "pockets" of greatness that may be controlled thanks to the contributions of each administrator and educator. To achieve this level of quality, educators need to make use of effective methods of educating the students and foster an educational atmosphere that is driven by technology for the benefit of the students. This will improve the edifiers' attitude toward the pupils, the efficiency with which they instruct, and the success of the students (White, 2007).

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6 APPENDIX

Questionnaire

The key aim of this research is to analyze how advanced technologies at school may be helpful to enhance the performance of students at the secondary level. The following are some objectives that must be followed to accomplish the research goals;

- To analyze the advanced technologies used in schools at ***Ras Al-Khaimah*** to keep the students allied with the international education systems
- To examine the impact ICT, have on the performance of students in schools
- To analyze the role of teachers and the effective adoption of ICT

Now, you are requested to help us in getting the objective of the study by filling the questionnaire properly and share responses honestly. Your response is of great significance for the attainment of the research objectives.

Demographics

- 1- What is your gender?
Male
Female
- 2- To which age group do you belong?
10-15
15-18
18-20
20-22
22+
- 3- Do you Belong to UAE?
Yes
No
- 4- Are you studying in Ras Al-Khaimah Public School?
Yes
No

5- In which grade are you?

Basic Information

1- Do you agree that your teachers are well aware of using techniques in classrooms?

Yes

No

2- Which technology has been used frequently in class?

Presentation via projector

Video streaming

Online quiz

Dashboard discussions

None

3- Which technology you find helpful for your learning?

Presentation via projector

Video streaming

Online quiz

Dashboard discussions

None

Variables

Satisfaction	
1.	Are you satisfied with what your teacher teaches you? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied

2.	Do you agree that your teacher is aware of when and how to use technology in classroom? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
3.	Technology helps you to better understand the content of your syllabus and get satisfied for whatever you have learned? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
Retention	
1.	Through use of technology, teachers help you to keep the concepts remember for long time? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied

2.	Whatever you learn in classroom, always remains in your mind and you do not find it hard to recall it. Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
3.	Technology helps you to recall your previous lecture easily and then you understand new concepts quickly. Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
Understanding	
1.	Video streaming and other technology helps you to better understand difficult concepts? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
2.	Technology gives you insight to practical knowledge?

	Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
3.	Things are hard to understand in words but better to experience with technology. Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
Academic Performance	
1.	Do you believe that use of technology helps you to perform well in your academics, as you find it easier to learn new concepts? Highly disappointed Disappointed Neutral Satisfied Strongly satisfied
2.	Technology has helped you to perform excellent in classroom? Highly disappointed Disappointed

	Neutral Satisfied Strongly satisfied
3.	Effective teaching strategies with advanced use of technology helps you to get engaged with content positively, which also help you to get good grades. Highly disappointed Disappointed Neutral Satisfied Strongly satisfied

Word Count: 15814