The Effectiveness of AI-Powered Digital Educational Platforms: Students 'Attainment and Teachers' Teaching strategies in a private high school in Dubai

اثر المنصات العلمية الرقمية على عملية تحسين التحصيل الاكايمي للطلاب و اكتساب مهارات تعلم مبتكرة للاساتذة في الصفوف الثانوية في دبي

by

WASSIM EL ASMAR

Dissertation submitted in partial fulfilment

of the requirements for the degree of

MASTER OF EDUCATION

at

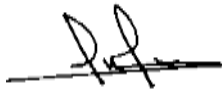**The British University in Dubai**

April 2022

DECLARATION

I warrant that the content of this research is the direct result of my own work and that any use made in it of published or unpublished copyright material falls within the limits permitted by international copyright conventions.

I understand that a copy of my research will be deposited in the University Library for permanent retention.

I hereby agree that the material mentioned above for which I am author and copyright holder may be copied and distributed by The British University in Dubai for the purposes of research, private study or education and that The British University in Dubai may recover from purchasers the costs incurred in such copying and distribution, where appropriate.

I understand that The British University in Dubai may make a digital copy available in the institutional repository.

I understand that I may apply to the University to retain the right to withhold or to restrict access to my thesis for a period which shall not normally exceed four calendar years from the congregation at which the degree is conferred, the length of the period to be specified in the application, together with the precise reasons for making that application.

_____

Signature of the student

COPYRIGHT AND INFORMATION TO USERS

ABSTRACT

The many uses of AI in education are making the academic environment simpler and more personalized. Educational resources are now accessible to everyone through smart devices and systems which has revolutionized the way people learn. Students no longer need to attend real classes to learn provided they have access to computers and the internet. AI is also helping schools to digitize administrative tasks so that teachers can better interact with students. Thus, this paper will discuss the changes that AI is bringing to education. Artificial Intelligence (AI) is a rapidly growing technical field that has the potential to change every aspect of human social relationships. In the field of education, AI has developed novel instructional approaches being tested in a variety of settings. Education policymakers forecast the impact of AI on the education sector so that knowledgeable and relevant potential solutions are made. Noticeably artificial intelligence is becoming a part of our daily life, Artificial Intelligence is making an impact in education, and old approaches are rapidly modernizing. Artificial Intelligence (AI) is gaining traction in the development of innovative forms of learning technologies, intending to revolutionize the educational system. To improve the learning experiences of students, schools are gradually changing from traditional teaching approaches to smart education. In recent years, digitalization has permitted substantial improvements in the evolution of educational pedagogy. Individualized education encounters are profoundly influenced by technology's delivery of an enhanced environment. Moreover, innovative educational alternatives are being created and validated all around the world due to intelligent educational systems, technology design, and Artificial Intelligence (AI) features. Such advances in education are required since education attempts to nurture individuals to future developments, guaranteeing that individuals and communities globally prosper. As young brains are nourished, skills like analytical thinking, management, communication, and cooperation become extremely relevant. These young learners are the workforce of the future. As a result, the school systems must encourage the development of these skills to keep up with the rapidly changing world. Categorization and decision-making are at the heart of AI applications. Although current learning systems are consumer-friendly, they do not have the dynamic self-learning power which is a characteristic of artificial intelligence. This study will focus on reviewing, artificial intelligence and explore: how Artificial Intelligence is applied

and effective in the education sector? What is the Impact of AI-Powered Digital Educational Platforms on Students' Learning and Teachers' Practice?

ملخص البحث

للذكاء الإصطناعى إستخدامات عدة في التعليم والتي جعلت البيئة الأكاديمية أسهل وأكثر فردية. ونظرا لتوافر المصادر التعليمية للجميع في الوقت الحالي عن طريق الأجهزة والأنظمة الذكية، فقد أحدث ذلك ثورة في الطريقة التي يتعلم بها الأفراد. حيث لم يعد هناك داعٍ لحضور الطلاب المحاضرات التي تنعقد وجهاً لوجه طالما توفر لديهم أجهزة الكمبيوتر والإنترنت. فقد ساعد الذكاء الإصطناعى المدارس على رقمنة المهام الإدارية، مما أدى الى تفاعل أفضل بين المعلمون وطلابهم. لذلك فإن هذه الورقة تناقش التغيرات التي أحدثها الذكاء الإصطناعى في التعليم. فالذكاء الإصطناعى هو مجال تقنى سريع النمو وله القدرة على تغيير كل جانب من العلاقات الاجتماعية الإنسانية. ففي مجال التعليم، عمل الذكاء الإصطناعى على تطوير مناهج تعليمية جديدة يتم اختبارها تحت ظروف بيئات متنوعة. ويتوقع خبراء التعليم تأثير الذكاء الإصطناعى على قطاع التعليم للتوصل الى حلول معرفية محتملة. ولقد أصبح الذكاء الاصطناعي يشكل جزءاً هاماً من حياتنا اليومية ، حيث أنه أثر في التعليم عن طريق ويتم التحديث السريع للأساليب القديمة كما عمل على تطوير أشكال مبتكرة من تقنيات التعلم ، بهدف إحداث ثورة في النظام التعليمي. ومن أجل تحسين الخدمة التعليمية للطلاب، تتحول المدارس تدريجياً من مناهج التدريس التقليدية إلى التعليم الذكي. ونتيجة لذلك، فقد أدت الرقمنة الى تحسينات جوهرية في تطور أصول التدريس التعليمية في السنوات الأخيرة. وتتأثر لقاءات التعليم الفردي بشكل عميق بالتكنولوجيا المقدمة لبيئة متطورة. وباستخدام التكنولوجيا، فيتمتع الطلاب بوصول غير محدود إلى المعرفة والخبرات داخل وخارج الفصل. إضافة إلى ذلك، يتم وضع بدائل تعليمية مبتكرة والتحقق من صحتها في جميع أنحاء العالم بسبب أنظمة التعليم الذكية وتصميم التكنولوجيا وميزات الذكاء الاصطناعي. وتعتبر مثل هذه التطورات في التعليم ضرورية وذلك لأن التعليم يحاول أن ينشئ الأفراد على التطورات المستقبلية، مما يضمن ازدهار الأفراد والمجتمعات على مستوى العالم. ومن ثم سيتمكن الأفراد الذين يتمتعون بالمرونة والقدرة على التكيف من التفوق في القوى العاملة وفي مثل هذه الأوقات المتقلبة. فعندما تتغذى العقول الشابة، تصبح مهارات التفكير التحليلي والإدارة والتواصل والتعاون وثيقة الصلة بالموضوع. ويجب دفع المتعلمين على المشاركة في التعلم مدى الحياة أو التعلم المستمر للتكيف مع بيئات العمل والمعيشة المختلفة. فيعتبر هؤلاء المتعلمين الصغار هم القوة العاملة في المستقبل. ونتيجة لذلك، يجب أن تشجع الأنظمة المدرسية تطوير هذه المهارات لمواكبة العالم سريع التغير.

تساعد أنظمة التعلم -التي تم تدعيمها بواسطة تقنية المعلومات- المعلمين في تحسين خدمة التعلم المقدمة لطلابهم، توليد خبرات تعليمية فردية، وتعزز أيضا من الاستراتيجيات التعليمية. ويعتقد داعمى الذكاء الاصطناعي أن لديهم إمكانات كبيرة لتحسين التعليم، ومع ذلك فإن الإستخدام الحالي لهذه التقنية يعتبر محدود. ويعتبر التصنيف واتخاذ القرار من ضمن تطبيقات الذكاء الاصطناعي. على الرغم من أن أنظمة التعلم الحالية صديقة للمتعلمين، إلا أنها لا تمتلك قوة التعلم الذاتي الديناميكية التي تعتبر من سمات الذكاء الاصطناعي. لذا فيجب أن تكون أنظمة الذكاء الاصطناعي ديناميكية وقادرة على التطور من خلال المواجهات المستمرة مع المتعلمين والمصادر المتغيرة في محيطها. ولذا تسلط هذه الدراسة الضوء على تجميع المعلومات عن الذكاء الاصطناعي واستكشاف كيفية تطبيق الذكاء الاصطناعي وفاعليته في قطاع التعليم، وتأثير المنصات التعليمية الرقمية التي تعمل بالذكاء الاصطناعي على تعلم الطلاب وممارسات المعلمين.

DEDICATION

To my dear wife, for all her support at every step

To my family who were supportive and believed in my ability

To my mentor and Supervisor Solomon David

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

AI	Artificial Intelligence
STEM	Science, Technology, Engineering and Math
VLE	Virtual Learning Environment
IBM	International Business Machines Corporation
CIEB	Center on International Education Benchmarking
UNESCO	United Nations Educational, Scientific and Cultural Organization
EMIS	Educational Management Information System
DDDM	Data-Driven Decision Making
ITS	Intelligent Tutor Systems
IAED	International Archive of Education Data
ML	Machine Learning
API	Application Programming Interface
SPSS	Statistical Package for Social Sciences
ICT	Information Communication Technology
EDM	Educational Data Mining
ANOVA	Analysis of Variance

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

According to the World Economic Forum, a high percentage of businesses would have incorporated technology like machine learning by 2025. To fulfil the imminent shortage, they strongly recommend policymakers and educational establishments to focus on rapidly developing relevant education and skills, with an emphasis on STEM and non-cognitive skills and experience (Foreman, Obiomon & Kirby, 2021). According to the Microsoft analysis, learners will need to grasp two aspects of this new environment before graduation. They must know how to adopt ever-changing technologies like artificial intelligence (AI), and how to successfully collaborate in a team to solve problems. Empowering learners to work with AI can begin as early as elementary school. Because many children are familiar with digital technology even before school enrolment, it's critical to train skills needed to succeed in a digital environment. The future workforce is built on today's foundations (Pajany, 2021). In the years 2018–2022, the AI demand is predicted to increase by 48%. With the rise of technologies in AI, its applications in education have grown, with exciting potentials for personalized learning, dynamic evaluations, and significant engagement in online, wireless, and hybrid learning environments (Li Da Xu & Zhao, 2018). More controversially, following the teacher shortage, experts have advocated for some teaching responsibilities to be replaced by AI-assisted robots. According to Global Industry Insights Inc., the AI education sector will be approximately $20 billion in market shares by 2027. The industry's rise is encouraging, as AI has the potential to relieve teachers' workloads across the world. While AI algorithms can teach learners math and reading, the more difficult tasks of instilling social and emotional development will remain in the hands of educators (Oke & Fernandes, 2020). With the advent of COVID-19, technology is used in classrooms has changed significantly in response. Lockdowns caused many instructors around the world to deliver educational instructions remotely, (Chamberlain et al., 2020).

1.2. Problem Statement

Does AI have effective applications in the education sector? AI has been used in education, notably in the form of skill development tools and assessment systems. As AI educational technologies

evolve, the hope is that AI will bridge gaps in teaching and learning processes, allowing schools and instructors to do more. AI may increase efficiency, personalization, and administrative responsibilities, offering instructors more flexibility and autonomy to focus on learning and responsiveness, which are unique characteristics that AI robots lack (Roll & Wylie, 2016). Because today's kids will need to work in a world where AI is a reality, education institutions must familiarize them with and teach them how to use the technology. From the knowledge of the cognitive structures that organize the information in the individual's memory; education is carried out. Thus, the way information is distributed in the Virtual Learning Environment (VLE) ensures the development of skills. The perspectives described concerning the assessment of VLE produce meaning when its use is established in the educational context. This is because this use essentially brings together technical resources but with pedagogical meanings that can reconfigure educational practices. To organize the different technologies that can be used in the Education environment, the following stand out: collaborative learning; conversation channels; video interaction; the interactive classes; the technological and pedagogical outlines for the development of educational methodologies; and support for virtual educational activities.

Although computing is a popular and daily practice, many difficulties can be encountered by both students and teachers. These obstacles will be reported throughout this research through the researchers conducted previously and used here. It is believed that there is a need to develop skills in the use of these new educational technologies in order to contribute to the development of methods, techniques, and strategies for the construction of VLE aimed at education. Big companies such as Google and IBM are committed to improving school education by making it innovative and progressive. It is expected that the impact of artificial intelligence to grow even more, with more benefits than those already implemented in classrooms. The application of new AI technologies can transform education, although the reality is that the media hype surrounding these changes will be much more tangible than their results, as has been the case with other transformative learning technologies implemented in the past. Researchers started the trend of developing an AI-based algorithm that will help students determine their future career path and potential for higher education. In practice, however transperancy of data collection and uncertain digital privacy remain important issues as data is collected from millions of students. Research

must continue to protect the private data of both students and teachers using AI devices. There are many benefits to using AI in schools sving money and time. In addition, various algorithms that use artificial intelligence can analyze users' knowledge and interests and provide personalized recommendations and training programs.

With AI techniques, it is also possible to identify ideal people and schools to delegate activities and coordinate processes. Optimizing resources, minimizing costs, and maximizing educational gains becomes a simpler and more common task. Thus, much of the manager's organizational work would be replaced by decision-making activities related to complex problems, which require analysis of several variables. According to the CIEB report (2022), human involvement is fundamental not only in decision making but also to understanding the behavior of intelligent machines because a) various types of algorithms operate in our society and play an important role in our daily activities; b) due to the complex properties of these algorithms and the environments in which they operate, analytical modeling is difficult or impossible; and c) due to the ubiquity and complexity of intelligent algorithms, being able to predict their effects on humanity becomes a pressing challenge. Luckin et al. (2016, p. 4). AI-based education systems can help improve the entire education system by applying targeted improvements to the process; that is, each city, state, or region may have different solutions to the same problem. Education plays an essential role in efforts to make future AI-ready workforces. Bridging the gap between AI skills goes beyond adopting increasingly powerful technologies to facilitate learning. It also means rethinking the content and methods used to deliver instruction at all levels of education. The increasing use of AI in education has also aroused interest in a larger universe in which only students and teachers are served. Complete educational systems based on AI are studied and developed, and with the help of big data, an immense set of data constantly collected by the system, they can generate information at levels much greater than those generated by students, or groups of students, a class or even a school. According to UNESCO (2019, p. 18), an Educational Management Information System (EMIS) refers to an organized group of information services that collect, store, process, analyze and disseminate information for educational planning and management. It is used by educational leaders, decision-makers, and managers at the regional, local, and school levels as well as to compile statistics. Data-driven Decision Making (DDDM) applied to student test data is central to many schools and district reforms in part due to federal and state test accountability policies

(UNESCO, 2019, p.18). With the data collected, AI make decisions to improve schooling A well-designed and functioning EMIS allows members at all levels of the education community to access useful information to more effectively manage and administer an education system more efficiently and develop viable and cost-effective plans, formulate responsive policies, and monitor and evaluate educational outcomes. In countries where data is complete, reliable, collected regularly, and can be aggregated and disaggregated, AI-enhanced EMIS would have a much stronger ability to automatically analyze data and generate data dashboards at school and national levels. (UNESCO, 2019, p. 18). The research will also analyze and explore the various applications of AI in the educational sector.

The use of technology, combined with teaching methodologies, is reaching levels that we would never have imagined possible. We often hear about chatbots (computer programs 18 developed to carry out conversations with humans), responsible for helping people to get information, widely used mainly by commercial and financial companies, but which are gradually being inserted in education. The systems will be individualized and adaptive so that the client or student is directed to perform certain tasks according to their choices and preferences because, in this way, they can improve their performance in carrying out the activities. We are also experiencing in education the rapid development of Intelligent Tutor Systems - ITS, widely used mainly in Virtual Learning Environments of the various online courses spread across Brazil. We need to analyze the main studies and trends in the evolution of AI in education that can enable schools, universities, educators, and researchers to understand current educational phenomena linked to Artificial Intelligence technology. The construction of systems using artificial intelligence methods requires based on the models of human successes in an everyday struggle with countless, sometimes simple, and sometimes very complex life problems. And the fact that we humans do not always manage to find a reasonable solution to problems immediately is only the exception to the rule: after all, we can somehow deal with the most diverse difficult situations. Regardless of various critical opinions, many enthusiasts of a new technique - computer technology - have undertaken research and experiments on building "thinking programs, modeled on human thought processes. Their work, already in the early period of computer science development, led to the creation of a number of

interesting solutions that did not fit within the framework of the developing algorithmics and algorithmic approach to the construction of computer programs

1.3 Aim and Objectives

Aim: to study Impact of AI-Powered Digital Educational Platforms on Education

Objectives:

- To explore the relevance and practice of Artificial Intelligence in the education sector for Teaching and learning
- To investigate the Impact of AI-Powered Digital Educational Platforms on Students' Learning and Teachers' Practice

1.4 Research Questions

- How is Artificial Intelligence applied and effective in the education sector
- What is the Impact of AI-Powered Digital Educational Platforms on? Students' Learning and Teachers' Practice

1.5 Rationale of the Study

With the outbreak of pandemic, significance of online education platforms and role of AI in educational platforms was signified. It is worth investigating the impact of these platforms on learning and teaching environment in the given context.

1.6 Structure of Thesis

The thesis begins with introduction after which a chapter would be dedicated to the review of past literature on similar subject. The third chapter presents adopted methodology and fourth one will present results and their analysis. Finally, a conclusion will be drawn for the entire thesis.

CHAPTER 2: LITERATURE REVIEW

2.1. Overview of the Chapter

This chapter will present an overview of the current state of knowledge on the phenomena under investigation. After a thorough review of the literature, the study will proceed with the answers to the developed questions and reveal desired insights for the readers.

2.2. Artificial Intelligence in Education: a theoretical view

This section presents a theoretical construct on AI in Education, reflecting on the studies of several national and international researchers. Initially, it addresses issues highlighted in official documents that involve the use of digital information and communication technologies in the educational context. We saw for the first time the complex field of programming and languages that is understood as the beginning for the use of programming for educational purposes, thus, putting AI on the way to this development. The purpose of including informatics as a curricular component is to allow access to all those who wish to make it an element of their culture, as well as those for whom the purely technical approach seems insufficient to understand its deep mechanisms(Fauzi et al., 2021). In education, changes do not occur as quickly as in computer technology, creating a gap to be overcome. The world of technology and information provides us with indications, enhances our senses, allows us to experience well-being that our ancestors did not dare to dream of. Having access or not to information can constitute an element of discrimination in the new society that is being organized. This problem can be overcome through changes in school curricula that must develop skills for obtaining and using information through the computer and adapting students to the presence of new technologies in everyday life(Iftakhar, 2016).

It is assumed, therefore, that current curricula should provide for the development of specific skills and abilities in the area of technology, mainly related to information and communication technologies, for obtaining, selecting, and using information through the computer. The student finds opportunities to use the various technological resources that can mediate the learning of multidisciplinary content, through project pedagogy, for example, in addition to developing the necessary skills to enter and remain in the job market (Panconesi & Guida, 2021). Computers are

products of intelligent technology: they are semantic machines, using very sophisticated forms of language, such as images, language codes, word processors and calculations, etc. Digital culture: involves learning aimed at more conscious and democratic participation through digital technologies, which involves understanding the impacts of the digital revolution and advances in the digital world in contemporary society, building a critical, ethical and responsible attitude in relation to the multiplicity of media and digital offers, the possible uses of different technologies and the contents they convey, and also the fluency in the use of digital technology to express solutions and cultural manifestations in a contextualized and critical way. Digital communication and information technology are present in our daily lives, and it can no longer be ignored that today's young people are increasingly inserted in this world (Wang et al., 2021).

2.3. Google in Education Technology

With the development of Classroom, Google is gaining extraordinary mover in the education technology industry. In its new job, Classroom can incorporate with existing school data frameworks, going about as a critical connection point between the school and understudy information (Barlow and Lane, 2007). Study hall extension focuses on particular instruction model in light of the consistent assortment and trade of understudy information between stages by means of Google Cloud. The qualification among business and instructive purposes turns out to be increasingly troublesome. It looks like Google will bring its new AI elements to schools also. Education will not be the only sector affected by Google's conversational AI interface (Iftakhar, 2016). A group of researchers, including the two co-chairs of the Ethical AI (Ethical Artificial Intelligence) team at Google itself, published a research paper claiming that these models contain harmful ideas, biases, and misleading information (Panconesi & Guida, 2021). Google subsequently dismissed authors from its Ethical AI group, resulting in widespread judgements and genuine inquiries about the protracted moral implications of its AI methodology. This raises the issue of with respect whether introducing Google AI innovation in instructive items can repeat inclination and falsehood in instructive organizations. Pichai maintains that further development will ensure honesty, accuracy, security and privacy at LaMDA prior to full market launch, although the dismissal of AI ethics specialists weakens the credibility of these assurances (Fauzi et al., 2021).

A techno-ethical audit seems to be necessary to solve the problem of the growing role of Google in education. However, larger questions remain about the impact of private tech companies on state and public education systems and the potential of new AI platforms to change school practices and priorities (Barlow & Lane, 2007). The involvement of private companies in education is nothing new, but the international scale of Big Tech's influence and the technological and ethical implications of emerging platforms, AI, and data systems in schools require great attention. Sofware, hardware and underlying data and cloud systems are produced by Google for dependency of education system across the globe. These are specialized, moral, and policy driven issues that ought not be managed exclusively by educators and school chiefs. They should be tended to at the administrative level as well as through fair, aggregate conversation about the eventual fate of schools after the pandemic (Gleason & Heath, 2021).

2.4. Collaborative Teaching and AI

AI can help promote collaborative learning. One of the most progressive parts of PC upheld cooperative learning is found in circumstances where stuents are not actually in a similar area. It gives students variable decisions as they need when and where to study (pervasiveness) (Yang et al., 2021). Simulated intelligence can assist with customizing learning in numerous ways and can assist with establishing an expert climate for educators to work better and foster activities that can all the more successfully address the hardships of 42 students. Luckin et al. (2016 p. 26), in the article Intelligence, unleashed: A contention for AI in Education, distributed by Pearson, propose that the cooperation of students undertaking a venture together, or a local area of students partaking in an internet-based course, can advance preferable learning results over learning alone. Cooperative learning urges members to express and think about different clarifications, resolve contrasts through the exchange, and construct shared information (CIEB, 2022).

Cooperative learning can likewise build inspiration, as though students care about the gathering, they become more engaged with the assignment and accomplish better learning results. This may not be so easy to do, in light of the fact that with regards to online joint efforts, where members seldom meet the eye to eye, making bonds and association mentalities can be troublesome. Henceforth the significance of IAED in having the option to add to this interaction. Different

methodologies have been examined, for instance, versatile gathering arrangement, master assistance, virtual specialists, and shrewd control (Kabudi, Pappas & Olsen, 2021). Artificial intelligence can turn into a significant partner in building cooperative gatherings to help educate and learn processes. The product can be taken care of consistently with the data created by students and thusly produce the best mixes of students for the start of a movement. Gatherings might be framed by similitudes between people or even by reciprocal information and practices, making every part significant and crucial for the development of information. During the creation, the actual cycle of doing the movement and the end should be joined and interceded by a guide or instructor, answerable for checking the great advancement, and in the event of any issue, mediate to address the circumstance (Hamal, Faddouli & Harouni, 2021).

2.5. Teachers and AI

One of the most discussed and most explored subjects in the researches deals with the role of the teacher in this new reality in which AI could eventually replace their work with that of a machine equipped with intelligent software. Today, AI is being worked on and developed to assist educators in the teaching and learning process, whether by automating routine tasks or helping to choose the most appropriate content to present (Lee & Choi, 2021). In the article Teaching in the machine age: How innovation can make bad teachers good and good teachers better, published by Thomas Arnett in 2016 by the Christensen Institute, the subtitle contains an enigmatic sentence in relation to the content of the text: "How innovation can make bad teachers good, and good teachers even better. The study shows that as scientific understanding and AI advance, many professions will be dramatically affected, and this advance allows machines, in the very near future, to perform tasks previously dominated exclusively by humans (**Arnett**, 2016). According to the UNESCO article, teachers spend a lot of time on routine and administrative tasks in this sense. We can think of a dual teacher model that involves a teacher and a virtual teaching assistant, who can take over the routine task and free up time. Teachers, allowing them to focus on student guidance and individual communication (UNESCO, 2019, p. 13). Teachers have already started that AI brings. It is unlikely that machines will replace teachers in the near future (Hou et al., 2021).

Schools have faced many challenges over the years, whether with a shortage of teachers, a lack of clear teaching methods, the development of qualified teachers, among other problems. Arnett (2016) adds that even the best teachers who struggle to meet the diverse needs of their students still need to find time to develop deeper learning; in the midst of all the pressures to carry out the fundamental instructions, they can, through AI, have their lives made easier (Panconesi & Guida, 2021). Innovations can simplify and automate aspects of the teaching experience and can improve student performance in two different ways. Examining evaluating innovation can't supplant an instructor's capacity to give input and prepare on explicit words and expressions; the product only arranges student expositions into general regions - like association, thought advancement, and style - and afterward gives conventional ideas to progress in those areas. However, when instructors utilize the product as a first pass in evaluating and afterward capture your definite input to address the regions for development distinguished by the product, paper reviewing turns into a significantly less tedious and work concentrated cycle. The net outcome is that instructors can invest less energy on grades and additional time on educating, just as offering students more chances to get customized criticism on composition (Kabudi, Pappas & Olsen, 2021).

Cooperate with AI collaborators to get the best outcomes for your students. Innovation can assist with planning all students' singular learning plans and directions, their assets and shortcomings, subjects that cost more and are effectively acclimatized or learned, and learning inclinations and exercises. (UNESCO, 2019). Utilizing calculations to assist students with exploring different substance ways, AI can customize learning and further develop valuable open doors for students with the assistance of their instructors and schools (Hamal, Faddouli & Harouni, 2021).

2.6. The Importance of Using Virtual Learning Environments and their Tools
It is important to highlight that it is not the virtual environment that defines education, it can condition the teaching and learning processes, but it is due to the pedagogical intention of the subjects involved. With this trend, one can discuss the role of these technologies not only in the context of virtual education but in its resignification as electronic learning. Education is carried out virtually from the knowledge of the cognitive structures that organize the information in the

individual's memory; thus, the way information is distributed in the VLE ensures the development of skills (GANDRA, 2015).

The perspectives described concerning the assessment of VLE produce meaning when its use is established in the educational context. This is because this use essentially brings together technical resources but with pedagogical meanings that can reconfigure educational practices. To organize the different technologies that can be used in the Education environment, the following stand out: collaborative learning; conversation channels; video interaction; the interactive classes; the technological and pedagogical contours for the development of educational methodologies; and support for virtual educational activities (Gleason & Heath, 2021). The main synchronous and asynchronous tools available to users in the VLE are chats, blogs, video classes, forums, discussion list, electronic mail, bulletin board, poll, portfolio, virtual libraries, Google Scholar, profile and Frequently Asked Questions (FAQ) (Panconesi & Guida, 2021).

2.7. Artificial Intelligence Definition and Correlations

Artificial Intelligence is defined as a set of computer programs and technologies that mimic the human's brain functioning and intelligence (Huang & Rust, 2018). AI-systems are either technologically intelligent, capable of efficiently performing routine tasks, cognitive thinking, self-learn through data, or altering their output. Learning from a range of data inputs has enabled systems to become intelligent that is, text, audio, or video. The huge data repository allows AI software to learn automatically from data using a variety of analytical techniques, including machine learning and deep learning. Artificially intelligent networks are computers that adapt from big data and upgrade their forecasts and behaviors (Najafabadi et al., 2015). On the other hand, the study of techniques that develop computerized programs to enhance autonomously via experience is known as Machine Learning (ML). By discovering and accumulating knowledge on the ground and increasing performance using the new knowledge, ML uses software to replicate human learning. Researchers developing systems for applications like classifiers, automated control of vehicles, picture recognition, machine vision, and computational linguistics most commonly employ ML in the AI area (Lee & Hannafin, 2016). The term "artificial intelligence" (AI) is closely correlated with computers. However, several articles in the education sector reveal that, even as

computers serve as the foundation for the creation of artificial intelligence, there is a shift away from computers to include hardware, software, and equipment, as artificial intelligence (Dopico et al., 2016). The transference of artificial intelligence to technologies and other products like buildings and robots is aided by integrated computers, sensors, among other developing technologies. Indeed, Amit (2018), offered a dual definition and explanation of AI. They defined AI as both a discipline and a concept. AI is a branch of research in computer science whose objectives include resolving several cognitive issues often related to human intelligence, for example, comprehension, abstract reasoning, and algorithms, and afterward evolving. Chassignol et al (2018) described AI as a conceptual framework that guides the advancement and adoption of machines systems with human-like functionalities, — especially in intellect and performance of tasks to using human intelligence like visual perception, voice recognition, judgment, and translation software.

The definition of AI presented by various researchers brings to light near comparable features or properties of AI. According to Lake, et al (2017), AI refers to systems that can imitate human cognition. Similarly, Alam (2021) noted that AI is the culmination of decades of research & innovation joining system engineers, data analysts, software developers, statisticians, linguists, cognitive scientists, social scientists, educationalists, and others to create education systems aligned with a level of sophistication and capacity to execute various functions like assisting teachers and students. According to the author, AI employs advanced functionality of systems and software for instance algorithmic machine learning, to allow computers to perform various activities that need human cognition and the capacity to conform to their surroundings. In addition, Natale & Ballatore (2020) defined artificial intelligence as the potential of machines and computers to emulate human thought and behaviors.

In general, artificial intelligence covers the creation of computers with a certain degree of intelligence and its capacity to execute human-like tasks like cognition, comprehension, decision-making, and adaptability to the environment which was the collective similarity between all descriptions. As a result, specific features and concepts stand out as essential for AI. From the definitions and discussion of AI, intelligence, or a machine's potential to display a certain degree

of intelligence and execute several activities and capacities that need human-like abilities, emerges as a crucial aspect of AI (Rouhiainen, 2018). AI and machine learning have recently been intensively researched for their use in mobile platforms, to improve computing quality and open up new applications such as face unlocking, voice recognition, translation software, and virtual environments. Machine learning, on the other hand, needs a massive computational force to accomplish complicated education and training. Some systems for operating computational efficiently have been proposed to overcome this issue. Qualcomm announced the Snapdragon Neural Processing Engine in 2016 to help GPU processors speed up the implementation of neural network models (Wang et al., 2020). It's important to note that the Android Neural Networks API was created to implement machine learning algorithms efficiently on mobile devices. By lowering the latency and intricacy of the network, API offers a lot of value to mobile subscribers. SqueezeNet, MobileNet, and Shufflenet are well AI-related learning networks for mobile phones. The progress of AI technology in mobile devices has elevated wireless education to a new level, allowing for easy learning by assisting students in very little time and delivering interactive and individualized learning (Sonti & Sundari, 2022). Because AI connects students to a virtual classroom, virtual reality can contribute to the process of learning beyond the classroom environment to establish a global classroom. Furthermore, AI-based chatbots offer individualized web-based learning and convert teacher interactions into chat dialogues. This technology may be used to determine a student's degree of comprehension. Intelligent education, creative virtual classrooms, and statistical predictive analysis are all examples of AI-aided education. As learning demands increase, AI-enabled education is becoming increasingly vital. For both teachers and students, intelligent classrooms offer timely and tailored training and guidance. Multiple computing technologies, specifically machine learning-related systems strongly tied to data models and cognitive developmental theory, are used to increase learning value and efficiency (Nez, & Lantada, 2020)

2.8. Difficulties in Accessing and Handling Virtual Learning Environments

Although computing is a popular and daily practice, many difficulties can be encountered by both students and teachers. These obstacles will be reported throughout this research through the researches read and used It is believed that there is a need to develop skills in the use of these new

educational technologies in order to contribute to the development of methods, techniques, and strategies for the construction of VLE aimed at education (Maghsudi et al., 2021). With the implementation of remote Teaching in times of the Coronavirus pandemic, new rules were demanded by society with the use of digital technologies generating changes in the routine of life of its users. From digital platforms, as a way of accessing the virtual learning environment, new ways of studying, learning, and living in this cyberspace are experimented with (Gleason & Heath, 2021).

In this learning environment, there is a collaborative system between teacher and student playing new roles. Students are protagonists of their own learning, and the teacher becomes a mediator of knowledge and promoter of pedagogical proposals so that there is a progression of this learning. For both roles, the social relationships developed are essential, and it may be necessary to deal with the difficulties arising from this collaborative system, as intellectual discussions are highly desirable, driving learning to a more organized level of reasoning, through greater creativity than that proposed. by the Virtual Learning Environment (AVA) (Maghsudi et al., 2021).

Darnton (2010, p. 15) argues that the "future, whatever it may be, will be digital" and that the "present is a moment of transition," in which, among other aspects, "print and digital modes of communication coexist and new technologies become obsolete quickly. Furthermore, despite the anti-technology speeches, which are nothing more than an individual's reaction to the new, the numbers and impacts of innovations brought about by the digital revolution increasingly signal how irrepressible digital technologies can be. Therefore, with regard to Basic Education, the debate on policies for the use of digital technologies in the school environment needs a culture of prudent, productive, and full use, extracting from this environment what is best to offer society. Thus, the Basic Education school is a privileged space to start this construction (Murrell, 2012).

In this context, this research addresses a statistical analysis investigation based on 30 articles presented from the analysis of periodicals with Qualis A strata in the Education area that presents the use of VLEs in Basic Education. Given this situation, the objective is to investigate whether there are limitations and potentialities in Science Teaching when applied remotely or in a hybrid way. Digital technology that allowed the advancement of distance education was established by

the development of a current body of Action plan for validation and non-formal adult education (AVA), which is a software environment developed on the internet with technological resources in order to create an educational context that allows different types of interaction between student and teacher that are geographically separated. The first VLE construction projects aimed at education began in the mid-1990s (Rinne, 2012).

2.9. Pedagogical Practices from the use of VLE

Contemporary pedagogical practices can be implemented and innovated from technologies with prior preparation in the sense of continuing teacher training, as well as systematic and reflective planning of practice. Miranda et al. (2010) conducted a study to determine trends in technology-enabled teaching and learning processes. These authors came to the conclusion that there are other factors that influence the interactive processes in educational environments with technology, such as familiarity with online game environments didactic models that are put into play. Faced with advances in technologies, the traditional educational process makes room for pedagogical strategies of thinking and acting as in a game.

With this, Martins et al. (2018) propose to integrate perspectives of pedagogical engineering from the Moodle tool, which stands out among the current media through collaborative learning, interactivity, and different forms of learning with asynchronous tasks. It is important to note that Tavares and Melo (2019) reveal in their research the relationship that the school establishes with the new generation of digital-native students on the influence of digital technologies on their knowledge acquisition processes, observing the use of VLE through Facebook, Twitter, Instagram, YouTube, Google: Students' adherence to the increasingly intensified use of digital information and communication technologies can contribute to changing this analog school, provided that educators are able to integrate the use of technologies into their pedagogical methods, extracting the potential of virtual networks for the process of learning (TAVARES; MELO, 2019).

According to professors Carneiro and Passos (2014), ICTs allow students, especially those from less favored economic classes, to have contact with VLE through software. Both point out that they are still in a comfort zone by not fully introducing the use of ICT in their Mathematics classes because they demonstrate insecurity due to the lack of training in these virtual environments. Certainly, even being a means of facilitating new learning, the change in the educational paradigm still proves to be difficult for the teacher who tries to train himself in small spaces of time (Sun, Anbarasan & Praveen Kumar, 2021). Considering the reflection of Mello and Gobara (2013), who reveal the need to institute pedagogical practices in High School in Physics classes using VLE through an Interactive Virtual Educational Laboratory, it was a consensus that the students interacted with each other and with the teacher through of a chat in order to solve a given Physics problem. By analyzing the records, evidence was found of students' learning and development as they tried to solve problems. In these studies, the subjects involved in the implementation of these technological systems are trying to adapt to the new times so that they can present something more effective in the education system.

In the same perspective, Rios et al. (2018) carried out a survey with Pedagogical Political Projects of some municipal schools in Santa Catarina and São Paulo to analyze teaching and learning practices directed to the use of ICT. It was evidenced that there is a need for school managers to broaden the discussions in order to promote curricular reorientation and the demand for pedagogical, political projects. In this way, they were developing a technological culture in order to define paths and processes for the insertion of ICT in schools. Individual Machine Behavior is related to understanding what implications the behavior of a specific intelligent machine can have. In an educational context, we can mention the classic adaptive educational environments, which try to adapt according to the needs of students and the availability of educational resources (Yang et al., 2021). The concern and implications concern how intelligent machines collectively interact and behave. As an example, we can mention independent systems that make use of computer vision and voice recognition to understand the affective characteristics of students and teachers (Sun, Anbarasan & Praveen Kumar, 2021). And yet when interacting with adaptive platforms (which infer student learning) to decide not only about adapting content, but also determine where and when someone should study, whether to provide information and alerts about students and teachers

to parents and administrators and even which teacher should teach a particular class (Wang et al., 2021). Human-Machine Hybrid Behavior is considered the most complex and, at the same time, the most important type of interaction to be considered, mainly in the reflection on the ethical implications. This hybrid model does not exclude the previous ones and, in an educational context, it is more expected that there will be a hybrid behavior between human and machine, where: a) machines shape human behavior; b) humans shape machine behavior; or c) humans and machines co-exist (Sun, Anbarasan & Praveen Kumar, 2021).

2.10. Intelligent Tutor System (ITS)

Known as Intelligent Tutor Systems (ITS), this area is the most successful case of AI in education today, with the purpose of studying and developing computer systems that interact with both students and students with teachers (Jagannathan, 2021). The ITS collaborates in the students' learning process, whether to help with doubts, correct activities and monitor the development of studies in an individualized way. The CIEB technical note (2019, p. 15) says that for students, these systems adapt and personalize learning. This means that, depending on the student's knowledge, skills, and personal characteristics, the system presents differentiated content, uses pedagogical strategies that bring more benefits, considers the individual's particularities, and offers the appropriate motivational triggers for him to be able to build his own knowledge. Thus, it is possible to model, monitor, and estimate the student's development throughout the learning process, which enables effective action at the root of the problems encountered by students. (CIEB, 2019, p. 15).

The quality of individual human tutoring has been considered the most relevant approach to teaching and learning, but unfortunately, it is unsustainable for all students. Considering the scalability of online Teaching, there will hardly be enough human tutors, and it would not be accessible either (Maghsudi et al., 2021). According to Luckin et al. (2016, p. 24), this is where Intelligent Tutor Systems (ITS) come in, which use AI techniques to simulate individual human tutoring, offering learning activities that best match a student's mental requirements and giving designated and ideal input, all without the requirement for a singular educator to be available (Kabudi, Pappas & Olsen, 2021). Many ITS utilization AI strategies and self-preparing calculations

in light of enormous datasets and neural organizations to empower them to settle on proper choices about the learning content to convey to the understudy. Take the case of an AI framework intended to give suitable individualized criticism to an understudy (Jagannathan, 2021).

While this content is being conveyed to the understudy - as text, sound, action, video, or movement - constant investigation of understudy cooperation can give criticism (for example, tips and direction) to assist them with advancing on the substance they are learning (Tlili et al., 2021). A few frameworks incorporate supposed open learning models, which present the consequences of the examination to understudies and instructors. These outcomes can incorporate significant data about the understudy's achievements, their emotional state, or any confusion they have. This can assist educators with understanding their understudies' way of dealing with learning and permit them to shape future growth opportunities in like manner (LUCKIN et al., 2016). One of the upsides of versatile IAED frameworks is that they frequently gather a lot of information, which is an upright circle can be registered to progressively further develop teaching methods and area models. This interaction illuminate's better approaches to give more proficient, customized, and contextualized support, just as testing and refining how we might interpret instructing and learning processes. Notwithstanding student, educational, and dominance models, IAED scientists have likewise evolved models that address the social, enthusiastic, and metacognitive parts of learning. This implies that frameworks can oblige the full scope of elements that impact understudy learning (Saadati et al., 2021).

Currently, in 2020 and 2021, there are many apps that are used in schools and universities, which incorporate IAED and Educational Data Mining (EDM) techniques to "track" student behaviors – collecting data on class attendance and assignment submissions in order to for identifying and supporting the students at risk of dropping out (Panconesi & Guida, 2021).
ITS are increasingly present nowadays, playing a role of aid in the teaching and learning process of many students who have access to a modern and updated education policy (usually private schools). This software can, in the absence of human teachers or human teachers prepared for online Teaching, complement teaching effectively, enabling a greater scope in the context of a

country as large as Brazil. Another great advantage is that an ITS doesn't sleep, doesn't take a vacation, and can be accessed from any device that has internet available (Chounta et al., 2021).

Not only do students take advantage of this technology, but also teachers can use this resource to generate information about their students and thus intervene if necessary. In addition, they can automate routine administrative tasks and benefit from continuing education programs based on AI technology. That is, you can have your class or material evaluated among thousands of contents available in a database (Hamal, Faddouli & Harouni, 2021). Closing the AI skills gap should not be limited to reforms informal education. According to Mononen et al. (2021), schooling should be distinguished from learning: although schooling takes place in structured learning environments with a fixed time and place, learning takes place on an ongoing basis, irrespective of time and place. With the existence of mobile technologies, it has become even more apparent that learning can take place outside the confines of traditional educational institutions. There is no doubt that AI for education is a path of no return. Faced with the numerous possibilities of aid in the student's teaching and learning process and the ability to improve and increase teachers' classes, the use of this technology only has to add to the educational system as a whole (Hamal, Faddouli & Harouni, 2021). Not only students will be able to benefit, but also teacher's educational agents. In short, the entire educational policy will be able to enjoy the benefits that AI can bring (Maghsudi et al., 2021).

2.11. Algorithms and Advantages of AI educational devices

Applying artificial intelligence to educational purposes can bring a number of benefits, such as personalized AI-based learning approaches that enable teachers to individually tailor their students' learning paths. Institutions use artificial intelligence to make the experience more attractive and enable self-service. Usually, the large-scale transcription or translation of online educational material (e.g., lectures, discussion groups) was too costly. AI-powered translation, transcription, and text-to-speech services are opportunities to provide comprehensible content to students around the world for little or no cost. Artificial intelligence is no longer limited to the activities of the computer science department, but it provides benefits for each scientific discipline. Artificial intelligence makes it easier to search and find content in repositories of scientific and research documents. In addition, students have the opportunity to learn at any time because applications

based on artificial intelligence allow you to learn also in your spare time, even for 10 or 15 minutes. Additionally, students can receive real-time feedback from teachers. These applications offer different options depending on the needs of the students. AI-based solutions can be customized depending on students' level of knowledge, interests, etc. This system can help students overcome their weaknesses. Moreover, AI-devices offer educational materials tailored to students' needs. For example, a student takes a test before using the application. The app analyzes the test and then provides you with the appropriate assignments and courses. In addition, when using AI-based platforms, you can use a virtual mentor who will track students' progress. It is clear that real teachers have a better understanding of students' needs, but it is beneficial to get immediate feedback from a virtual teacher. The various training courses reveal gaps in students' knowledge. Thanks to this, the teacher has the opportunity to see what topics should be covered. AI educational platforms employ many teachers, so the student has the opportunity to communicate with specialists from different countries. Learning platforms using artificial intelligence offer tailored support for teachers, depending on teaching experience and soft skills. There are many options for integrating and using artificial intelligence in education. Several very good solutions for adults, children, teachers, and even schools have already appeared on the market. Artificial intelligence-based applications can analyze huge amounts of information, offering users more personalized educational material. The various applications allow automating the distribution of didactic load to teachers and the tracking of schedules, goals, and critical points in the educational ecosystem. According to data collected in the AI Readiness Index 2019 report, made by Oxford Insights, the implementation of Artificial Intelligence technology will move 15 trillion dollars worldwide by 2030. AI is inserted in the most diverse areas, making machines intelligent, with characteristics of reasoning, perception, adaptation, and ability to evolve according to the information it receives, which facilitates operations and process management efficiently and contributes to the evolution of a more connected society with unlimited possibilities. This generates cultural and social changes, fascinates humanity, and makes people, when appropriating this technology, reconfigure their habits not only in terms of usability but also of technology appropriation, acceptance, and interaction. Today we live surrounded by AI on our smartphones, tablets, PCs, and also in several other electronic components equipped with IoT (Internet of Things) that are loaded with AI and have changed our professional and personal routines. Teaching and learning methods are

undergoing a transformation in which technology has been an important part of the teaching and learning process.

2.12. Summary

The chapter offers an extensive review of the current literature in highlighting the significance as well as challenges associated with the role of AI in educational platforms. The chapter started with a theoretical construct on AI in Education, reflecting on the studies of several national and international researchers. Initially, it addresses issues highlighted in official documents that involve the use of digital information and communication technologies in the educational context. It is assumed that current curricula should provide for the development of specific skills and abilities in technology, mainly related to information and communication technologies, for obtaining, selecting, and using information through the computer. The involvement of private companies in education is nothing new, but the international scale of Big Tech's influence and the technological and ethical implications of emerging platforms, AI, and data systems in schools require great attention. An association between collaborative Teaching and AI is found that helps advocate its adoption. AI can help promote collaborative learning. One of the most progressive parts of PC upheld cooperative learning is found in circumstances where students are not actually in a similar area. It gives students variable decisions as they need when and where to study. Simulated intelligence can assist with customizing learning in numerous ways and can assist with establishing an expert climate for educators to work better and foster activities that can more successfully address the hardships of students.

Intelligent Tutor Systems is also discussed in the chapter for highlighting potential applications of technology for education. Known as Intelligent Tutor Systems (ITS), this area is the most successful case of AI in education today, with the purpose of studying and developing computer systems that interact with both students and students with teachers. The quality of individual human tutoring has been considered the most relevant approach to teaching and learning, but unfortunately, it is unsustainable for all students. Considering the scalability of online teaching, there will hardly be enough human tutors, and it would not be accessible either.

It is found from a review of current literature that AI has the potential to close the gaps in an online learning environment; however certain challenges arising in the process need to be addressed. With the existence of mobile technologies, it has become even more apparent that learning can take place outside the boundaries of traditional educational institutions. There is no doubt that AI for education is a path of no return. The chapter suggests that not only students will be able to benefit, but also teachers' educational agents. In short, the entire educational policy will be able to enjoy the benefits that AI can bring if the barriers and challenges are addressed.

CHAPTER 3: METHODOLOGY

3.1 Overview of the Chapter

This methodology chapter provides an outline of the research procedures that were followed in this work. It also gives information on the study sample (participants), that is the requirements for insertion in the study, who the participants were and how they were sampled. The research design that was selected for the objective of this work and the causes for this selection were described. Furthermore, the study tool that was applied for data collection and its validity and reliability are described as well and the methods that were followed to perform this study are involved. Moreover, the techniques used to analyze the data were also discussed. Finally, the ethical aspects that were followed in the research conducting process are also argued.

3.2 Research Approach

To answer the study questions, mixed method research that combines quantitative and qualitative data was used in this study. Kemper, Springfield and Teddlie (2003) define mixed methods design as a method that includes both qualitative and quantitative data collection and analysis in parallel form (concurrent mixed method design in which two types of data are collected and analyzed in sequential form). Both closed-ended and open-ended questionnaires (Appendix I) were distributed then the data was collected and analyzed. Besides, the descriptive method was adequately used for describing the demographic data and the responses of the respondents.

3.3. Data Collection Plan

This work follows a mixed method with closed-ended and open-ended questionnaires (Appendix1) that aimed at to exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning. These study tools could help in obtaining sufficient information that can answer the study questions. Firstly, the tool was created and designed to be distributed to the participants. Next, the researcher randomly selected a sample, who are the teachers in the private school, and got a permission from the school general director to distribute the online survey to the participants. Finally, data were collected and analyzed using statistical tool to answer the study questions.

3.4. Instrument

For the purpose of this study, closed and open-ended questionnaires were developed. To develop the questionnaire, the researcher was inspired by previously done studies related to the study topic. To ensure the preciseness of the tool, the questionnaire was exposed to an extensive review by an expert in the field. The comments were received then the questionnaire was modified accordingly. The questionnaire consisted of three sections as follows:

Section one: the demographical data that contained three questions, section one: gender, the educational stage and the times number, the number of times the platform is used.

Section two: this section was closed-ended questions that reports the students' learning; it consists of 16 items.

Section three: It was closed-ended questions which consists of 8 items that reflect teachers' practice.

Section four: 3 open-ended questions.

All the items in both sections 2 and 3 were measured with five Likert scales, which are considered the most common variation summated rating scale as it can be seen in Table 3.1.

In this study, the Likert scale was chosen over other scaling techniques. The scale is regard as the preferred scaling procedure for getting attitudinal knowledge, with participants indicating their degree of agreement or disagreement with each statement in the survey. The Likert scale is most appropriate for this research context since it is a "subject-centered" scale particularly constructed to scale participants, rather than objects. The benefits of applying Likert scales involve ease of building the questionnaire, ease of realizing the questions and also ease of management. Additionally, Likert scales generate the most information by decreasing the quantity of leniency (Meric, 1994)

Table 3.1 Five-point Likert Scale

Degree	Response	Weighted Average
5	Strongly agree	4.20–5
4	Agree	3.40–4.19
3	Neutral	2.60–3.39
2	Disagree	1.8–2.59
1	Strongly disagree	1–1.79

3.5. Participants

Twenty-three teachers, who are working in a private school in Dubai, participated in this study as they used the platform in teaching and learning process. Their characteristics are summarized in Table (3.2).

Table 3.2 The demographic characteristics of the respondents

Variable		Frequency	Percent
Gender	Male	9	39.1
	Female	14	60.9
	Total	23	100.0
Educational Stage	Middle	4	17.4
	Secondary	19	82.6
	Total	23	100.0
The number of times the platform is used	Daily	13	56.5
	Once a week	1	4.3
	Twice a week	5	21.7
	Once a month	1	4.3
	Twice a month	3	13.0
	Total	23	100.0

Sample characteristics include three major items in this study; (1) gender, (2) educational stage, (3) the number of times the platform is used. The frequency and percentage for each variable is

listed according to the survey categories in Table (3.2). Table (3.2) reveals that most of the respondents are females with 60.9% while the males represent 39.1%. The respondents who are teaching in secondary school represent around 82.6%, while 17.4% of the respondents are teaching in middle school. Obviously, the respondents who use the platform daily represent 56.5%, while the respondents who use the platform twice a week represent around 21.7%. Whereas 13 % of them use the platform twice a month.

3.6. Study Tool Validity:

Questionnaire validity: This focuses on verifying that the tool will measure what it is intended to measure. The researcher verified the study tool validity through:

3.6.1. Validity and Internal Consistency of the Tool:

The validity of internal consistency refers to the extent of consistency of each item of the questionnaire in the area in which the item belongs. The researcher calculated the internal consistency of the questionnaire by calculating the correlation coefficients between each item of the domains of the questionnaire and the total degree of the domain itself, as illustrated in the following tables. The below table shows that all terms of the questionnaire contribute to the questionnaire's overall reliability, as can be seen in Table 3.3, when examining all correlation coefficients between terms of the questionnaire and the total area, as well as the total degrees eliminated against the degree of term at the level of 0.05.

Table 3.3 Validity and internal consistency of the tool (n=23)

Item	Correlation coefficient	Item	Correlation coefficient	Item	Correlation coefficient
Students' Learning				Teachers' Practice	
1	0.834*	9	0.892*	1	0.236*
2	0.932*	10	0.737*	2	0.831*
3	0.926*	11	0.073*	3	0.884*
4	0.903*	12	0.145*	4	0.861*
5	0.863*	13	0.819*	5	0.885*
6	0.878*	14	0.829*	6	0.856*
7	0.881*	15	0.791*	7	0.947*
8	0.878*	16	0.795*	8	0.922*

* Statistically significant at the level of 0. 05

3.6.2. Constructive Validity:

Constructive validity is one of the validity scales measuring the extent of achievement of the goals that the tool seeks to achieve and which further highlights the extent of correlation of each theme of study with the total degree of the tool items. It is clear from the results shown in Table 3.4 that the value of validity for all items of the tool was (0.983) for the sample (n=23), which means that the tool has a high degree of validity and reliability. Furthermore, validity is the square root of reliability coefficient. Thus, the researcher verified the validity and reliability of the study tool, establishing it is fully reliable, ensuring veracity and relevance in analyzing the results and answering the questions of the study.

Table 3.4 Constructive Validity of the Questionnaire

Area	No. of terms	Validity
Students' Learning	16	0.978
Teachers' Practice	8	0.972
Total	**24**	**0.983**

3.6.3. Study Tool Reliability:

Scale reliability infers that this tool gives the same result if reapplied several times under the same conditions; in other words, scale reliability means that the stability in the results of the tool is not altered significantly if redistributed across the sample several times during certain periods of time. The researcher verified tool reliability using the Cronbach's Alpha Coefficient method as follows:

Table 3.5 Reliability of the Questionnaire by using the Method of Cronbach's Alpha Coefficient

Area	No. of terms	Cronbach's Alpha Coefficient
Students' Learning	16	0.956
Teachers' Practice	8	0.945
Total	**24**	**0.967**

The results shown above demonstrate that the reliability tool is good, reaching (0.967) for the sample (n=23), which indicates the reliability and relevance of the tool of field application. According to Downing (2004), 'values of reliability tool between 0.5 and 0.7 are mediocre, values of reliability tool between 0.7 and 0.8 are good, values of reliability tool between 0.8 and 0.9 are great and values of reliability tool above 0.9 are superb'. The researcher has thus verified the reliability and validity of the scale in its final form, establishing that it is applicable on the main sample, which makes it fully reliable with veracity and relevance of the scale in collecting the data necessary for answering the study questions.

3.7. Data Analysis Plan

After the participants submitted their responses, data were organized in an editable excel spreadsheet and then were imported to the Statistical Package for Social Sciences (SPSS) V. 23 for analysis process using descriptive and inferential statistics following different statistical techniques:

1) Frequency and percentage distribution were used to analyze various characteristics of the sample population.

2) Frequency, mean score, and standard deviation were computed for quantitative variables against each item score to identify the effectiveness of AI-powered digital educational platforms: students 'attainment and teachers' teaching strategies in a private high school in Dubai-UAE.

3) To verify the overall validity of the questionnaire, Cronbach's Alpha reliability coefficient was used.

4) In order to investigate the impact of AI-powered digital educational platforms on students' learning and teachers' practice, a regression analysis has been performed. The model was judged based on $R^2 > 0.7$ and Significant level < 0.05.

3.8. Delimitation

Delimitations are considered as the features that bound the scope and explain the study limitations. It is the researcher's authority to decide the related factors for the study, starting from the study aims, problems, questions, variables, population, and accomplishments. In this work, the researcher restricted the study to a private school in Dubai. This selection was intentional as the researcher wanted to regulate the research topic. The participants of the study are the school participants (teachers).

The scope of the study concentrated on:

1- Teachers' demographics data.

2- Time limitations (Semester 2) 2021-2022

3- Teachers number who participate in the survey

3.9. Trustworthiness

In research, the trustworthiness of information is necessary to avoid any prejudices. To guarantee the credibility of this study, academic experts in the educational field were asked to check the questionnaire for more consistency. Their comments on the content and wordings, modifying of the scale items were vital. Beneficial feedback was provided by the experts and modifications were done to the questionnaire prior to it was finalized and employed in the study instrument

The investigator asked the school situated in Dubai to assist in responding the survey. Moreover, the researcher quoted every information, and considering all the ethical documents.

3.10. Ethical considerations

Appreciating the experience of participants, their ability, and knowledge they convey to the study are considered as the key research parameters. Participants need to generously express their experience to reach the study aim.

Accordingly, all the required ethical consents were considered. The process commenced with requesting for a permission letter form from the university to the school administration in which study will be performed. Once the researcher has obtained the administration's approval, the study instrument, as a google form link, was distributed. During the process, the study objectives were verbally justified to the participants. Besides, the subject information sheet which also clarified the purpose of the study were then provided to the study participants including researcher's contact details. Privacy and anonymity were confirmed, and they were notified that they were not compelled to take part by beginning the questionnaire with the following question, *do you agree to participate in this research study?* and that they could leave the process at any time without any adverse concerns. Lastly, participants were notified that the outcomes of the study would be maintained in the library and that in case of publication, no names will be mentioned.

3.11. Conclusion

This methodology chapter concentrated on the approach that was employed in this study. A description of quantitative and qualitative research as a method for data collection and analysis was provided. The information about the sample and validity and reliability of the study tool was provided. Finally, data analysis techniques were discussed in this chapter.

CHAPTER 4: RESULTS, ANALYSIS AND DISCUSSION

4.1. Overview of the Chapter

To finalize this study appropriately, it is essential to analyze the collected data to test answer the research questions. As already revealed in the previous chapter, data is explained in a descriptive form. This chapter includes the analysis, presentation and interpretation of the outcomes generating from this study. The analysis and interpretation of data is performed is based on the results of the survey, deals with a quantitative analysis of data.

The purpose of this study is to explore the relevance and practice of artificial intelligence in the education sector for teaching and learning and to investigate the impact of AI-powered digital educational platforms on students' learning and teachers' practice. In this chapter the researcher presented the results collected from both qualitative and quantitative data to answer the study questions. To achieve the objectives of this study, data analysis process was performed to statistically reduce raw data to make presentations, interpretations, and conclusions on the study's findings.

All data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL) version 23.0. In this work, descriptive statistical analysis and regression analysis were employed. Moreover, the frequency distribution, central tendencies, percentages, mean and standard deviation were calculated.

4.2. Summary of the Quantitative Results

4.2.1. The first question: "How is Artificial Intelligence applied and effective in the education sector"?

To answer this question, the frequencies, percentages, means, and standard deviations were calculated to explore the relevance and practice of artificial intelligence in the education sector for teaching and learning. Additionally, the degree was determined based on the fifth Likert scale. The outcomes are listed in the following tables.

4.2.1.1. The relevance and practice of artificial intelligence in the education sector for teaching

Table 4.1 Frequencies, percentages, means and standard deviations of the relevance and practice of artificial intelligence in the education sector for teaching

No	Item		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	Opinion	Rank
1	The system is always accessible	**Freq**	2	-	3	13	5	3.83	1.07	Agree	3
		%	8.7	-	13.0	56.5	21.7				
2	The system is user-friendly	**Freq**	1	-	4	15	3	3.83	0.83	Agree	3
		%	4.3	-	17.4	65.2	13.0				
3	The system is interactive	**Freq**	1	-	5	11	6	3.91	0.95	Agree	1
		%	4.3	-	21.7	47.8	26.1				
4	The system has attractive features	**Freq**	1	-	5	12	5	3.87	0.92	Agree	2
		%	4.3	-	21.7	52.2	21.7				
5	The system provides high-speed information access	**Freq**	1	-	4	13	5	3.91	0.90	Agree	1
		%	4.3	-	17.4	56.5	21.7				
6	The system provides information exactly as needed	**Freq**	1	-	5	15	2	3.74	0.81	Agree	5
		%	4.3	-	21.7	65.2	8.7				
7	The system provides information that is relevant to learning	**Freq**	1	-	4	14	4	3.87	0.87	Agree	2
		%	4.3		17.4	60.9	17.4				
8	The system provides information that is easy to understand	**Freq**	1	-	4	13	5	3.91	0.90	Agree	1
		%	4.3	-	17.4	56.5	21.7				
9	The system provides up-to-date information	**Freq**	1	-	4	14	4	3.87	0.87	Agree	2
		%	4.3	-	17.4	60.9	17.4				
10	I depend upon the system	**Freq**	1	1	9	8	4	3.57	0.99	Agree	6
		%	4.3	4.3	39.1	34.8	17.4				
11	I only use the system when it is absolutely necessary for learning	**Freq**	1	6	8	7	1	3.04	0.98	Neutral	7
		%	4.3	26.1	34.8	30.4	4.3				
12	I do not have a positive attitude or evaluation about the way the system functions	**Freq**	2	8	9	2	2	2.74	1.05	Neutral	8
		%	8.7	34.8	39.1	8.7	8.7				
13	Overall, I am satisfied with the system	**Freq**	1	1	4	12	5	3.83	0.98	Agree	3
		%	4.3	4.3	17.4	52.2	21.7				
14	The system has a positive impact on my learning	**Freq**	1	-	4	15	3	3.83	0.83	Agree	3
		%	4.3	-	17.4	65.2	13.0				
15	Overall, the technical performance of the system is good	**Freq**	1	-	4	15	3	3.83	0.83	Agree	3
		%	4.3	-	17.4	65.2	13.0				

16	The system is an important and valuable aid to me in the performance of my class work	Freq	1	-	5	14	3	3.78	0.85	Agree	4
		%	4.3	-	21.7	60.9	13.0				
	Overall mean							**3.71**	**0.71**	**Agree**	

Table (4.1) illustrates the descriptive analysis of the participants' responses on the relevance and practice of artificial intelligence in the education sector for teaching (16 items). Table (4.1) revealed that the artificial intelligence is highly applied in the education sector for teaching with an average of 3.71 and a standard deviation of 0.71. Consequently, the items can be ordered based on the mean as follows:

1. Items no. (3, 5 and 8) "The system is interactive, the system provides high-speed information access and the system provides information that is easy to understand" have the first order among the items with an average of 3.91 and a standard deviation of 0.95, 090 and 0.9, respectively.

2. Items no. (4 and 9) "The system has attractive features and the system provides up-to-date information" have the second order among the items with an average of 3.87 and a standard deviation of 0.92 and 0.87, respectively.

3. Items no. (1, 2, 13, 14 and 15) "The system is always accessible, the system is user-friendly, Overall, I am satisfied with the system, the system has a positive impact on my learning and Overall, the technical performance of the system is good." have the third order among the items with an average of 3.83 and a standard deviation of 1.07, 0.83, 0.83, 0.83 and 0.85, respectively.

4. Item no. (16) "The system is an important and valuable aid to me in the performance of my class" has the fourth order among the items with an average of 3.78 and standard deviation of 0.85.

5. Item no. (6) "The system provides information exactly as needed" has the fifth order among the items with an average of 3.74 and a standard deviation of 0.81.

6. Item no. (10) "I depend upon the system" has the sixth order among the items with an average of 3.57 and a standard deviation of 0.99.

7. Item no. (11) "I only use the system when it is absolutely necessary for learning" has the seventh order among the items with an average of 3.04 and a standard deviation of 0.98.

8. Item no. (12) "I do not have a positive attitude or evaluation about the way the system functions" has the seventh order among the items with an average of 2.74 and a standard deviation of 1.05.

4.2.1.2. The relevance and practice of artificial intelligence in the education sector for learning

Table 4.2 Frequencies, percentages, means and standard deviations of the relevance and practice of artificial intelligence in the education sector for learning

No	Item		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	Opinion	Rank
1	AI-powered educational platform has errors in the program that you must workaround	**Freq**	-	7	9	7	-	3.00	0.80	Neutral	6
		%	-	30.4	39.1	30.4	-				
2	You are satisfied with the accuracy of AI-powered educational platforms	**Freq**	1	1	8	12	1	3.48	0.85	Agree	5
		%	4.3	4.3	34.8	52.2	4.3				
3	The output options (print types, page sizes allowed for, etc.) are sufficient for your use	**Freq**	1	1	7	13	1	3.52	0.85	Agree	4
		%	4.3	4.3	30.4	56.5	4.3				
4	The information provided is helpful regarding your questions or problems	**Freq**	1	1	9	10	2	3.48	0.90	Agree	5
		%	4.3	4.3	39.1	43.5	8.7				
5	The AI-powered educational platform is user-friendly	**Freq**	1	1	6	11	4	3.70	0.97	Agree	2
		%	4.3	4.3	26.1	47.8	17.4				
6	An AI-powered educational platform is easy to use	**Freq**	1	-	5	13	4	3.83	0.89	Agree	1
		%	4.3	-	21.7	56.5	17.4				
7	Using an AI-powered educational platform enables me to accomplish student-related tasks more quickly	**Freq**	1	-	5	13	4	3.83	0.89	Agree	1
		%	4.3		21.7	56.5	17.4				
8	Using an AI-powered educational platform improves my job performance	**Freq**	1	1	6	12	3	3.65	0.93	Agree	3
		%	4.3	4.3	26.1	52.2	13.0				
	Overall mean							**3.56**	**0.75**	**Agree**	

Table (4.2) illustrates the descriptive analysis of the participants' responses on the relevance and practice of artificial intelligence in the education sector for learning (8 items). Table (4.2) revealed that the artificial intelligence is highly applied in the education sector for learning with an average of 3.56 and a standard deviation of 0.75. Consequently, the items can be ordered based on the mean as follows:

1. Items no. (6 and 7) "An AI-powered educational platform is easy to use and Using an AI-powered educational platform enables me to accomplish student-related tasks more quickly" have the first order among the items with an average of 3.83 and a standard deviation of 0.89.

2. Item no. (5) "The AI-powered educational platform is user-friendly" has the second order among the items with an average of 3.70 and a standard deviation of 0.97.

3. Item no. (8) "Using an AI-powered educational platform improves my job performance" has the third order among the items with an average of 3.65 and a standard deviation of 0.93.

4. Item no. (3) "The output options (print types, page sizes allowed for, etc.) are sufficient for your use" has the fourth order among the items with an average of 3.52 and standard deviation of 0.85.

5. Items no. (2 and 4) "You are satisfied with the accuracy of AI-powered educational platforms and The information provided is helpful regarding your questions or problems" has the fifth order among the items with an average of 3.48 and a standard deviation of 0.85 and 0.90, respectively.

6. Item no. (1) "AI-powered educational platform has errors in the program that you must workaround" has the sixth order among the items with an average of 3.00 and a standard deviation of 0.80.

4.3.1. The second question: "what is the Impact of AI-Powered Digital Educational Platforms on Students' Learning and Teachers' Practice"?

To identify the Impact of AI-Powered Digital Educational Platforms on Students' Learning, regression analysis was applied. The results of analysis are presented in the following tables:

Table 4.3 ANOVA results of the regression analysis (the Impact of AI-Powered Digital Educational Platforms on Students' Learning)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.33	1	5.332	19.004	0.000**
	Residual	5.89	21	.281		
	Total	11.22	22			

**significant at level of 0.01

Table 4.4 ANOVA results of the regression analysis (the Impact of AI-Powered Digital Educational Platforms on Students' Learning)

	Model	R^2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	Constant		1.28	0.57	-	2.25	0.03*
	Students' Learning	0.689	0.73	0.17	0.69	4.36	0.00**

* and **significant at level of 0.05 and 0.01, respectively

Table 4.3 shows that the p-value of the Impact of AI-Powered Digital Educational Platforms on Students' Learning was less than the significance level of 0.01. Moreover, the correlation coefficient R2 is 0.0.689, and the p-values of both constants of the linear model were significant at the level of 0.01 (Table 4.4). Therefore, there is a significant impact of AI-Powered Digital Educational Platforms on Students' Learning. Consequently, this means that the AI-Powered Digital Educational Platforms significantly contributed to Students' Learning.

Table 4.5 ANOVA results of the regression analysis (the Impact of AI-Powered Digital Educational Platforms on Teachers' Practice)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.85	1	11.847	403.022	0.000**
	Residual	0.62	21	.029		
	Total	12.46	22			

**significant at level of 0.01

Table 4.6 ANOVA results of the regression analysis (the Impact of AI-Powered Digital Educational Platforms on Teachers' Practice)

	Model	R^2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	Constant		0.37	0.16	-	2.25	0.04*
	Students' Learning	0.975	0.85	0.04	0.97	20.08	0.00**

* and **significant at level of 0.05 and 0.01, respectively

Table 4.5 shows that the p-value of the Impact of AI-Powered Digital Educational Platforms on Teachers' Practice was less than the significance level of 0.01. Moreover, the correlation coefficient R^2 is.0.975, and the p-values of both constants of the linear model were significant at the level of 0.01 (Table 4.6). Therefore, there is a significant impact of AI-Powered Digital Educational Platforms on Teachers' Practice. Consequently, this means that the AI-Powered Digital Educational Platforms significantly contributed to Teachers' Practice.

4.4. Summary of the Qualitative Results

4.4.1. the first question "Which Artificial intelligent –Powered Digital Educational platform do you use?"

Table 4.7 Frequencies of the common platforms used by the teachers

Platform	Frequency
Schoology	10
IXL	3
Achieve3000	3
Kahoot	2
SMS	2
Google AI	2
Alef	1
Calculater and computer app	1
Big-blue Button	1
Atlas	1
Follett Destiny	1
Study.com	1
Teachers pay teachers	1

From Table 4.7, it can be concluded that the most (n=10) of teachers, participants, use Schoology platform. Whereas 3 out of them use IXL and Achieve3000. Also, 2 out of them use Kahoot, SMS and Google AI. Other platforms such as Study.com, Follett Destiny, Atlas and Teachers pay teachers are used by not more than one participant.

4.4.2. the second question "What are the challenges you are facing while using this platform?"

The participants listed the following challenges which are facing them while using this platform as follows:

1) Slow Internet connection
2) Exam preparation, grading system
3) Controlling who enters and leaves using different nick names
4) The assessment security
5) Sometimes these platforms are boring for students
6) Too many options, which can be misleading when I need a specific option
7) In some cases, features are not working with Microsoft office.

8) Student Username and Passwords

4.4.3. the third question "What are some of the changes you think should be made on this platform?"

The participants think that the following changes should be made on this platform.

1. More options
2. To add more interactive features
3. Add a lockdown browser
4. More exciting feature
5. I would like to have the nudge button to call the attention of a certain student (DL) Improve the mobile app to become as effective as it is on the computer. Add a feature that allows teachers know whether a student received and read notifications from him/her or not. PowerPoint slide stay interactive and not automatically converted to Pdf files. Grade book directly connected to the SMS, so that teachers do not duplicate their work.
6. Customization to teacher's different needs as per level or subject
7. speed of completion
8. They should be more targeted on focused objectives
9. More choice in some topics
10. Exam screen lock browser
11. If it can have other languages
12. Being a compatible with other platforms.
13. A different username and password entry method
14. The recorded sessions must stay more than one week

4.4.4. the fourth question "What rates (out of 10) can you give this platform??"

Table 4.8 Frequencies and percentages of the rate given by the participants to this platform

Rate	Frequency	Percent
6	1	4.3
7	4	17.4
8	9	39.1
9	9	39.1
Total	23	100.0

Table 4.8 shows that 39.1% of the participants gave 9 out of 10 to this platform. Also, 39.1% of the teachers gave 8 out of 10 to this platform. While 17.4% of the participants gave 4 out of 10 to this platform and 4.3% of the participants gave 6 out of 10 to this platform.

4.5 Key Findings

- The demographic characteristics of the respondents:

The study findings revealed that most of the respondents are females with 60.9%. Meanwhile, the respondents who are teaching in secondary school represent around 82.6%. Interestingly, 56.5% of the respondents use the platform daily.

- The relevance and practice of artificial intelligence in the education sector for teaching and learning:

Since this study is exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning, it was concluded that the artificial intelligence is highly applied in the education sector for teaching and learning. The teachers agreed that the system is interactive, the system provides high-speed information access, the system provides information that is easy to understand, the system has attractive features and the system provides up-to-date information. Moreover, they agree that AI-powered educational platform is easy to use and using an AI-powered educational platform enables me to accomplish student-related tasks more quickly.

These results could be supported by the findings reported in Chin et al., 2020. They reported that AI in education initially took the form of computers and computer-related systems, and later, the form of web-based and online education platform. Embedded systems have made it possible to use robots, in the form of cobots or humanoid robots as teacher colleagues or independent instructors, as well as chatbots to perform teacher or instructor-like functions. The use of these platforms and tools have enabled or improved teacher effectiveness and efficiency, resulting in richer or improved

instructional quality. Similarly, AI has provided students with improved learning experiences because AI has enabled the customization and personalization of learning materials to the needs and capabilities of students.

-The Impact of AI-Powered Digital Educational Platforms on Students' Learning and Teachers' Practice

The results indicated that the AI-powered digital educational platforms significantly contributed to students' learning and teachers' practice.

Recently, it was found that AI application in education, in its various forms and serving different functions, has had a major impact on the performance of administrative and management functions in education. It has enabled instructors or teachers to perform their administrative functions, such s as grading and providing feedback to students more effectively (Chen et al., 2020).

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Overview of the Chapter

In this chapter the conclusions derived from the outcomes of this work on exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning. The conclusions were according to the purpose, research questions and results of the study. The implications of these outcomes and the subsequent recommendations are also explained. Recommendations were according to the conclusions and objectives of the study. Next, suggestions for future research are displayed in this chapter.

5.2. Summary of the Study

The study aimed at exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning and studying the impact of AI-powered digital educational platforms on students' learning and teachers' practice. The study was conducted in a private high school in Dubai. The study findings presented a significant impact of AI-powered digital educational platforms on students' learning and teachers' practice. Practically, the outcomes of this study could be beneficial to other investigators who are interested in exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning.

5.3. Limitations

1. Objective limits: the study is limited in dealing with exploring the relevance and practice of artificial intelligence in the education sector for teaching and learning.
2. Human limits: the study comprises the teachers in a private school.
3. Setting limits: the study was performed (online) in one of Dubai private high schools.
4. Time limits: The study is conducted in the second semester of the academic year 2021/2022.

5.4. Recommendations

According to the study outputs, it was evident that the AI manufacturing industries and education administrators should collaborate to tailor the exact needs of the education sector so that AI

engineers can work on facilitating those needs, only then the effect of applying the AI technologies in schools can have a maximum effect. The following can be recommended

1- A strong cooperation between the AI engineers and the teachers is needed.
2- Organizing training workshops to strength the teachers` knowledge on how to use the AI powered digital platforms.
3- Government must support and provide the AI powered digital platforms to the teachers and students.

5.5. Scope for Future studies

Based on the data analysis, outcomes might be prejudiced as they are performed in only one of Dubai private schools. Consequently, conducting the study on a wide sample in more than one school results in better and give more satisfactory findings. Furthermore, students should participate in such studies.

1- Studying the Internet of things, swarm intelligence, deep learning, and neuroscience,
2- Assessment of the effect of AI in different educational stages.
3- Investigating the challenges of AI in education.
4- Evolution of the teaching-learning relationship as affected by using artificial intelligence in education.

5.6 Concluding Remarks

In conclusion, the teachers are satisfied with the AI-powered digital educational platforms, and they are using different platforms. However, they listed some challenges which are facing them while using this platform such as Slow Internet connection, exam preparation, grading system and in some cases, features are not working with Microsoft office. So, the participants recommend some changes that should be made on this platform such as adding more options and exciting features. Overall, AI has had a major impact on education, particularly, on administration, instruction, and learning areas of the education sector or within the context of individual learning institutions. These outcomes could be beneficial references for educational investigators, students, and AI developers who plan to participate in the related studies. Additionally, it is clear that

teachers need to cooperate with AI engineers to deal with the gaps between technology and education.

REFERENCES

Arnett, T. (2016). Teaching in the machine age: How innovation can make bad teachers good and good …

Retrieved from Christensen Institute: http://www.christenseninstitute.org/wp-content/uploads/2016/12/Teaching-in-themachine-age.pdf

Center on International Education Benchmarking - NCEE. (2022). Retrieved 25 January 2022, from https://ncee.org/cieb-2/

Chounta, I. A., Bardone, E., Raudsep, A., & Pedaste, M. (2021). Exploring teachers' perceptions of Artificial Intelligence as a tool to support their practice in Estonian K-12 education. International Journal of Artificial Intelligence in Education, 1-31.

Fauzi, A., Wandira, R., Sepri, D., & Hafid, A. (2021). I am exploring students' acceptance of google classroom during the covid-19 pandemic by using the technology acceptance model in west Sumatera universities. *Electronic Journal of e-Learning*, *19*(4), pp233-240.

Gleason, B., & Heath, M. K. (2021). Injustice embedded in Google Classroom and Google Meet: A techno-ethical audit of remote educational technologies. *Italian Journal of Educational Technology*, *29*(2), 26-41.

Hamal, O., El Faddouli, N. E., & Harouni, M. H. A. (2021). Design and implementation of the multi-agent system in education. World Journal on Educational Technology: Current Issues, 13(4), 775-793.

Hou, C., Hua, L., Lin, Y., Zhang, J., Liu, G., & Xiao, Y. (2021). Application and Exploration of Artificial Intelligence and Edge Computing in Long-Distance Education on Mobile Network. Mobile Networks and Applications, 1-12.

Iftakhar, S. (2016). Google Classroom: what works and how. *Journal of Education and Social Sciences*, *3*(1), 12-18.

Jagannathan, S. (2021). How to Accelerate Digital Learning to Achieve SDGs–Influencer Viewpoints. Reimagining Digital Learning for Sustainable Development: How Upskilling, Data Analytics, and Educational Technologies Close the Skills Gap.

Kabudi, T., Pappas, I., & Olsen, D. H. (2021). AI-enabled adaptive learning systems: A systematic mapping of the literature. Computers and Education: Artificial Intelligence, 2, 100017.

Lee, C. J., & Choi, S. W. (2021). A New Normal of Lifelong Education According to the Artificial Intelligence and EduTech Industry Trends and the Spread of the Untact Trend. In Software Engineering in IoT, Big Data, Cloud and Mobile Computing (pp. 191-205). Springer, Cham.

Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences-driven approach. British Journal of Educational Technology, 50(6), 2824-2838.

Maghsudi, S., Lan, A., Xu, J., & van Der Schaar, M. (2021). Personalized Education in the Artificial Intelligence Era: What to Expect Next. IEEE Signal Processing Magazine, 38(3), 37-50.

Mononen, A., Alamäki, A., Kauttonen, J., Klemetti, A., & Räsänen, E. (2021). Adopting AI-enhanced chat for personalising student services in higher education.

Panconesi, G., & Guida, M. (Eds.). (2021). Handbook of Research on Teaching with Virtual Environments and AI. IGI Global.

Saadati, Z., Zeki, C. P., & Vatankhah Barenji, R. (2021). On the development of blockchain-based learning management system as a metacognitive tool to support self-regulation learning in online higher education. Interactive Learning Environments, 1-24.

Sun, Z., Anbarasan, M., & Praveen Kumar, D. (2021). Design of online intelligent English teaching platform based on artificial intelligence techniques. Computational Intelligence, 37(3), 1166-1180.

Tlili, A., Zhang, J., Papamitsiou, Z., Manske, S., Huang, R., & Hoppe, H. U. (2021). Towards utilising emerging technologies to address the challenges of using Open Educational Resources: a vision of the future. Educational Technology Research and Development, 69(2), 515-532.

Yang, K. B., Lawrence, L., Echeverria, V., Guo, B., Rummel, N., & Aleven, V. (2021, September). Surveying Teachers' Preferences and Boundaries Regarding Human-AI Control in Dynamic Pairing of Students for Collaborative Learning. In European Conference on Technology Enhanced Learning (pp. 260-274). Springer, Cham.

Rinne, N. (2012). Teaching with Google Books: research, copyright, and data mining.

Murrell, M. (2012). The open book: digital form in the making (Doctoral dissertation, UC Berkeley).

Rios, F. (2018). The legacy and trajectories of multicultural education: Recognition, refusal, and movement building in troubling times. Multicultural Education Review, 10(3), 165-183.

de Mello, D. A. A., & Gobara, S. T. (2013). Analysis of interactions in a virtual learning environment based in Vygotsky's theory. Creative Education, 4(10), 54.

Darnton, R. (2010). Can we create a national digital library? New York Review of Books, 4.

Martins, G., Veiga, W., Campos, F., Ströele, V., David, J. M. N., & Braga, R. (2018, June). Building Educational Games from a Feature Model. In Proceedings of the XIV Brazilian Symposium on Information Systems (pp. 1-7).

Tavares, V. D. S., & Melo, R. B. D. (2019). Possibilities for formal and informal learning in the digital era: what does the digital native youth think? Psicologia Escolar e Educacional, 23.

Carneiro, RF, & Passos, CLB (2014). The use of information and communication technologies in mathematics classes: limits and possibilities. Electronic Journal of Education, 8 (2), 101-119.

Barlow, K., & Lane, J. (2007, October). Like technology from an advanced alien culture: Google apps for education at ASU. In *Proceedings of the 35th annual ACM SIGUCCS fall conference* (pp. 8-10).

Pei, Y., & Li, G. (2021, May). Massive AI-based cloud environment for smart online education with data mining. In 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS) (pp. 1115-1118). IEEE.

Wang, Y., Han, P., & Shi, L. (2021, May). The Practical Study of the Collaborative Teaching Mode of "AI-teacher" in the 5G Era. In 7th International Conference on Humanities and Social Science Research (ICHSSR 2021) (pp. 772-775). Atlantis Press.

Downing, S. M. (2004). Reliability: On the Reproducibility of Assessment Data. Med Education, 38, 1006-1012.

Lijia Chen, Pingping Chen, and Zhijian Lin. (2020). Artificial Intelligence in Education: A Review. IEEE Access, 8, 75264-75278.

Alam, A. (2021, December). Should Robots Replace Teachers? Mobilisation of AI and Learning Analytics in Education. In *2021 International Conference on Advances in Computing,*

    Communication, and Control (ICAC3) (pp. 1-12). IEEE.

Amit, K. (2018). *Artificial intelligence and soft computing: behavioral and cognitive modeling of the human brain*. CRC press.

Chamberlain, L., Lacina, J., Bintz, W. P., Jimerson, J. B., Payne, K., & Zingale, R. (2020). Literacy in lockdown: Learning and teaching during COVID-19 school closures. *The Reading Teacher*, *74*(3), 243-253.

Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: a narrative overview. *Procedia Computer Science*, *136*, 16-24.

Chen, X., Xie, H., Zou, D., & Hwang, G. J. (2020). Application and theory gaps during the rise of Artificial Intelligence in Education. *Computers and Education: Artificial Intelligence*, *1*, 100002.

Dopico, M., Gómez, A., De la Fuente, D., García, N., Rosillo, R., & Puche, J. (2016). A vision of industry 4.0 from an artificial intelligence point of view. In *Proceedings on the international conference on artificial intelligence (ICAI)* (p. 407). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Lake, B. M., Ullman, T. D., Tenenbaum, J. B., & Gershman, S. J. (2017). Building machines that learn and think like people. *Behavioral and brain sciences*, *40*.

Foreman, J., Obiomon, P., & Kirby, K. (2021, November). Enhancing Student Learning of Disruptive Technologies. In *Proceedings of the Future Technologies Conference* (pp. 651-660). Springer, Cham.

Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service*

Research, *21*(2), 155-172.

Lee, E., & Hannafin, M. J. (2016). A design framework for enhancing engagement in student-centered learning: Own it, learn it, and share it. *Educational technology research and development*, *64*(4), 707-734.

Li, S., Da Xu, L., & Zhao, S. (2018). 5G Internet of Things: A survey. *Journal of Industrial Information Integration*, *10*, 1-9.

Najafabadi, M. M., Villanustre, F., Khoshgoftaar, T. M., Seliya, N., Wald, R., & Muharemagic, E. (2015). Deep learning applications and challenges in big Data analytics. *Journal of big data*, *2*(1), 1-21.

Natale, S., & Ballatore, A. (2020). Imagining the thinking machine: Technological myths and the rise of artificial intelligence. *Convergence*, *26*(1), 3-18.

Nez, J. L. M. N., & Lantada, A. S. D. Artificial Intelligence Aided Engineering Education: State of the Art, Potentials and Challenges.

Oke, A., & Fernandes, F. A. P. (2020). Innovations in teaching and learning: Exploring the perceptions of the education sector on the 4th industrial revolution (4IR). *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(2), 31.

Pajany, P. (2021). *Ai Transformative Influence: Extending the Tram to Management Student's AI's Machine Learning Adoption* (Doctoral dissertation, Franklin University).

Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, *26*(2), 582-599.

Rouhiainen, L. (2018). *Artificial Intelligence: 101 things you must know today about our future*.

Lasse Rouhiainen.

Schiff, D. (2021). Out of the laboratory and into the classroom: the future of artificial intelligence in education. *AI & society*, *36*(1), 331-348.

Sonti, V. K., & Sundari, G. (2022). Ambient Intelligence: An Emerging Innovation of Sensing and Service Systems. *Applied Edge AI: Concepts, Platforms, and Industry Use Cases*, *297*, 293.

Wang, C., Shen, J., Fang, C., Guan, X., Wu, K., & Wang, J. (2020, August). Accuracy measurement of deep neural network accelerator via metamorphic testing. In *2020 IEEE International Conference On Artificial Intelligence Testing (AITest)* (pp. 55-61). IEEE.