VILNIUS TECH
Vilnius Gediminas Technical University

Business, Management and Economics Engineering
ISSN: 2669-2481 / eISSN: 2669-249X
2024 Volume 22 Issue 01

THE IMPACT OF MIDDLE SCHOOL TEACHERS' USE OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN INCREASING THEIR MOTIVATION TOWARDS DEVELOPMENT

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Abstract

The current study aimed to investigate the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District, and to identify the differences in teachers' responses according to the variables (gender, specialization, region, experience and qualification). The researcher used the descriptive field approach, and the study sample consisted of (1379) male and female teachers in middle schools in the Northern District within the Green Line during the academic year 2023-2024. They were selected randomly, distributed over (45) schools. To achieve the objectives of the study, a questionnaire consisting of (19) paragraphs was developed. The results of the study showed that the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Arab community in the northern region within the Green Line was moderate, and there were statistically significant differences at the significance level (α=0.05) in the study sample's estimates of the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District attributed to the effect of the gender variable in favor of females, and to the effect of the variable The academic qualification is in favor of the category "PhD", and the effect of the experience variable is in favor of the category "ten years or more", and there are no statistically significant differences attributed to the effect of the variables of specialization and region. The results also showed a positive and statistically significant correlation between the effect of the use of artificial intelligence applications by middle school teachers in increasing their motivation towards development in the Northern District. Based on the results of the study, it is recommended to prepare specialized training programs for middle school teachers in the Northern District to help them enhance artificial intelligence in teaching and learning, in addition to involving the local community in meetings aimed at informing them of the technological applications in artificial intelligence used in the school, as well as continuing to provide development programs for teachers related to artificial intelligence techniques and their use in teaching and learning.

Keywords: Artificial Intelligence, Teacher Performance, Middle Schools, Northern District.

Introduction

Worldwide, there has been a sharp increase in the application of AI systems in education to simplify administrative procedures, expedite communications, and enrich educational experiences. Even though AI is being used extensively in education, its application in the Arab world is still mostly untapped. Artificial Intelligence is bringing about significant changes in the realm of education, particularly in terms of its capacity to furnish educators with supplementary materials. AI solutions present several chances to boost instructional tactics, expedite administrative work, and raise overall educational efficacy (Abu Ajwa et al., 2023). Innovation encompasses both the development of novel ideas and cutting-edge approaches, rather than being restricted to the use of conventional techniques. Rather than making horses better, people can be transported more quickly and effectively by cars. Over the years, technology has advanced quickly thanks to these ideas, particularly in the area of education. As a tenured professor at a nearby university in 1950, Dr. Potter had a backlog of papers to review. These days, artificial intelligence is pervasive in many facets of academic circles, improving efficacy and efficiency, and it makes teaching easier and more efficient (Marwan, Zaghbi, and Rafeef, 2023).

Prior to the invention of computers, schooling was done by hand. Computing power increased and a significant shift happened with the arrival of computers in the 1970s. Artificial intelligence, which encompasses the creation of machines that can overcome obstacles and find solutions, emerged as a result of the advancements in computers and communications (Al-Baqmi, Al-Salamat, and Muhammad, 2023). Artificial intelligence aids in streamlining processes, enhancing individualised instruction, and managing educational information effectively. As artificial intelligence advances, new applications in the realm of education are emerging (Muhammad, 2023).

Shaker and Shenouda (2022) assert that the advancement of artificial intelligence in education involves its incorporation into teaching, learning, and educational administration. These fields, which offer a framework for assessing and comprehending artificial intelligence in education, are always evolving in tandem with the field's advancement and the application of cutting-edge technologies like data mining and deep learning.

The creation of computers with a certain degree of intelligence and the capacity to carry out human-like tasks including perception, learning, decision-making, and environmental adaptation is known as artificial intelligence (AI). This involves carrying out a variety of tasks and competencies requiring human-like skills (Al-Mithqal, 2023). The user interface explains learners' performance using a variety of input media, the AI system can aid through teaching theories integrated in the teaching model, and the output offers texts, shapes, and animations (Abu Ghneim, Saeed, 2022).

In addition to their primary duties, teachers who use ITS are able to complete administrative activities more efficiently, which raises student achievement (Hassanin, 2023). Artificial Intelligence (AI) in education increases productivity for administrative chores like assignment grading (Muhammad, 2023). Teachers can easily complete a variety of administrative activities with the use of programs like TurnItIn and Ecree (Al-Ghamdi, 2021).

The researcher thinks there is a lot of promise to enhance learning and give teachers in the Northern District of the nation access to cutting-edge resources given the increased interest

shown by school administration in integrating artificial intelligence in secondary education. This kind of technology is anticipated to become more important in raising student achievement, boosting the quality of education, and developing teachers' capacities throughout the Northern District of the nation as it develops and the relationship between education and artificial intelligence deepens.

Study problem and its questions:

The effects of the rapid development in the field of technology were reflected in the educational field, as many modern educational methods emerged, and education through the use of artificial intelligence applications is one of these methods that increases teachers' activity and works to increase their motivation towards development and supports the development of self-learning and learning with excitement. In middle schools in the country, the use of artificial intelligence applications improves teachers' performance and works to develop the skills aspect of learners as it stimulates interaction, reduces distraction and increases attention. Through the work of researchers in the field of education and upbringing in schools in the Northern District and their experience with the experience that middle schools in the district went through during times of conflict and during the Corona pandemic as well, which prevented students from reaching schools, they saw the importance of employing artificial intelligence applications and some technological methods that help reduce the difficulties and challenges that this educational sector suffers from. Accordingly, the study problem crystallizes in investigating the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development, and from here the study problem is limited to the following questions:

1- **What is the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view?**
2- **Are there statistically significant differences in the level of middle school teachers' use of artificial intelligence applications and their effect on increasing their motivation towards development in the Northern District attributed to the variable of educational region, specialization, gender of the respondent, academic qualification, and years of experience?**

Significance of the Study

Theoretical Importance

The theoretical importance of the current study stems from the lack of studies and research that addressed the topic of the impact of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development (within the limits of the researchers' knowledge). The importance of the study lies in the importance of the topic it addressed, which is the degree of impact of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development. Applied Importance:

1- This study may help educational leaders in the Ministry of Education in the country in preparing development plans and programs for teachers in the Northern District regarding their role in promoting the use of artificial intelligence applications in their schools.

2- This study may help colleges and universities to provide educational courses based on providing graduates with knowledge and skills about the importance of employing artificial intelligence applications in teaching and learning, and increasing their motivation towards development.

Study Objectives:

The current study aimed to reveal the impact of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development. And to identify there are statistically significant differences in the level of use of artificial intelligence applications by middle school teachers and their impact on increasing their motivation towards development in the Northern District attributed to the variable of educational region, specialization, gender of the respondent, academic qualification, and years of experience?

Study Limits:

The generalization of the results of the current study is limited to the following limits:

Human Limits: The study was limited to all male and female teachers of secondary schools in the Northern District in the country, numbering (3791).

Spatial Limits: The current study was limited to all male and female teachers of secondary schools in the Northern District, numbering (15) schools.

Temporal Limits: The study tool was applied in the academic year 2023-2024. Objective **Limits:** The subject of the study was limited to investigating the effect of secondary school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the point of view of male and female teachers and its relationship to some variables. Procedural Limits: This study is determined by the research tools that were built with the help of educational literature. The generalization of the results of this study is determined by the indications of the validity and reliability of the questionnaire that was developed for the purpose of achieving the objectives of the current study: The results are determined in light of the objectivity of the respondents when answering the paragraphs of this study tool.

Study Terminology: This study adopts the following definitions for its terms:

Artificial Intelligence Technologies: A set of tools, algorithms, and technological systems that enable devices and programs to simulate human intelligence and perform tasks that typically require human mental abilities such as learning, thinking, problem solving, and decision making. These technologies include machine learning, deep learning, natural language processing, and computer vision, and are used in a wide range of applications such as robotics, data analysis, smart assistants, and adaptive learning systems, with the aim of improving efficiency and performance in various fields (Abu Zaid, & Al-Shura 2022).

Literature Review

Technology is advancing quickly around the world and has an impact on all facets of life, including education. Because of this, educators and teachers are searching for the most effective ways to set up a classroom that inspires kids and motivates them to use artificial intelligence, contribute their thoughts, and share their experiences. Information technology and artificial intelligence technologies that rely on computers and the Internet make it possible to work on collaborative projects. Students can broaden their knowledge on subjects that interest them in the field of artificial intelligence technologies and across various educational institutions by interacting with professionals and people who have similar interests (Bani Khalid, Warda, 2023). Critical thinking skills in students are enhanced by their capacity to recognise and arrange information (Al-Ghamdi, 2021). According to Shaker and Shenouda (2022), a number of new theories and practices have emerged with the goal of redefining the student's role as one of the fundamentals in accordance with a comprehensive educational vision for all methods and curricula in the field of using artificial intelligence. These new learning approaches rely heavily on the use of computers and the Internet in the educational system as one of the most up-to-date forms of communication and instruction, thanks to the new arti The use of artificial intelligence techniques and applications, PowerPoint presentations, videos, and other multimedia, along with homework assignments and the discovery of electronic documents and study texts, are just a few of the changes that technology and applications of artificial intelligence in education have brought about. Additionally successful in encouraging students to follow their own interests is artificial intelligence (Abu Ghneim, Saeed, 2022).

Education and Artificial Intelligence

AI technologies, such as machine learning and natural language processing, have the potential to improve education by personalising instruction, handling administrative duties, and offering data-driven insights, according to Marwan, Zaghbi, and Rafeef (2023). Artificial intelligence (AI) has been used more and more in the field of education, and this is a field full of opportunities and benefits. The introduction of AI into education has altered the way that high school principals, instructors, and students impart knowledge (Al-Baqmi, Al-Salamat, and Muhammad, 2023).

AI-based solutions offer school administrators a number of advantages, such as personalised learning for students, which evaluates each student's strengths and shortcomings and modifies content to fit their preferred method of learning. By giving immediate feedback and direction, intelligent tutoring systems identify and solve students' problems (Al-Ghamdi, 2021). In order to optimise learning results in high schools, adaptive learning platforms change the degree of difficulty in various disciplines. AI can be used to finish the classification process, which will increase assessment speed and uniformity as well as teacher and student performance in secondary schools. Mohammed (2023) reports that chatbots and virtual tutors offer educational support outside of regular school hours, predictive analytics assists teachers in identifying and helping at-risk students, and accessibility features, augmented and virtual reality experiences, content creation, and language learning applications have all improved the educational experience. According to Hassanein (2023), data analysis enables organisations to make well-informed decisions. However, as artificial intelligence (AI) is employed in education more frequently, it will be crucial to address concerns like data privacy, ethical AI use, and guaranteeing that all students have equal access to these potent tools.

Artificial Intelligence in Education

Artificial Intelligence (AI) has the potential to improve school management by streamlining administrative procedures like resource allocation, stakeholder communication, and attendance tracking (Al-Mithqal, 2023). Consequently, the use of AI in school administration has the power to fundamentally alter how educational establishments are managed (Bani Khalid, Warda, 2023). According to Al-Hammar, Al-Eidan, Hassan, and Al-Najjar (2022), AI-powered systems can more effectively manage resources, connect with stakeholders, track student attendance, and carry out other administrative activities. Al-Mithqal (2023) claimed that by utilising AI, schools may improve decision-making, lessen the workload associated with administration, and boost productivity. AI systems, for instance, can analyse attendance data to spot patterns and trends and assist administrators in addressing absenteeism and low student engagement by assisting them in taking proactive steps. According to Hassanein (2023), AI also aids in resource allocation, making sure that employees, facilities, and other assets are utilised to their maximum capacity. Furthermore, AI-powered communication technologies can improve smooth communication between parents, schools, and the community, fostering a more transparent and cooperative learning environment in the classroom (Abu Ghneim, Saeed, 2022). All things considered, using AI into school management is a workable way to manage learning settings in a way that is more effective and flexible (Al-Ghamdi, 2021). According to Al-Mithqal (2023), a number of factors, such as the learning environment, classroom management, and pedagogical growth, have an impact on effective teaching. Data-driven insights from artificial intelligence could help improve these features.

Artificial intelligence's function in giving educators assistance tools to increase their effectiveness in the classroom

First: By means of tailored instructional assistance:

According to Ammar and Eleya (2022), one way artificial intelligence benefits teachers is by fostering individual learning. By leveraging artificial intelligence systems to analyse vast databases of student performance, learning preferences, and styles, teachers can tailor their pedagogy to each individual student. Adaptive learning platforms modify the degree of course content based on each student's success through the use of artificial intelligence algorithms (Al-Ghamdi, 2021). Students are continuously pushed to the appropriate level as a result, and learning becomes more productive and individualised (Itmazi & Khlaif, 2022). Additionally, based on each student's distinct learning profile, artificial intelligence can suggest particular exercises, resources, or interventions, assisting teachers in more successfully bridging individual learning gaps (Hassanin, 2023).

Finishing up administrative tasks: Historically, teachers have been forced to perform laborious administrative tasks that AI excels in (Al-Ghamdi, 2021). Grading, attendance monitoring, and resource allocation can all be significantly expedited using AI-based solutions (Hassanin, 2023). Automated grading systems, for instance, can oversee routine exams, freeing up teachers' time for lesson planning, student interaction, and specialised education. In a similar spirit, AI can guarantee correct records, expedite attendance monitoring processes, and relieve teachers of tedious administrative duties, according to A'mar & Eleyan (2022). By doing these things, teachers can devote more of their time, as mentioned by Shraim & Crompton (2022), to fostering a friendly and stimulating learning environment.

Enhancing Resource Accessibility is the Second

AI has played a major role in opening up a plethora of instructional tools for teachers. Digital textbooks with AI enhancements include interactive elements, multimedia components, and chances for adaptive learning (Al-Ghamdi, 2021). According to Al-Hammar, Al-Eidan, Hassan, and Al-Najjar (2022), these technologies can better engage students and meet a variety of learning preferences. According to Lucci, Kopec, and Musa (2022), AI may also choose and recommend more instructional materials, providing teachers with a greater assortment of tools to utilise while creating dynamic and captivating classrooms. More access to resources not only enhances students' educational experiences but also provides educators with the means to continuously innovate their pedagogy (Hassanin, 2023). Perspectives on Educational Development: AI is significantly enhancing teachers' professional and educational development by offering insight into their instructional practices (Lucci, Kopec, & Musa, 2022). With data analytics, AI systems may investigate student performance, classroom dynamics, and educational tactics. Teachers can use the data-driven insights from this analysis to better identify their areas of strength and growth, as highlighted by Lucci, Kopec, & Musa (2022). According to Lucci, Kopec, and Musa (2022), artificial intelligence (AI) can offer tailored feedback and suggest strategies to enhance the efficacy of instruction. Teachers are better able to modify their lesson plans, adjust to evolving standards, and stay current with industry best practices thanks to this ongoing feedback loop. Al-Hammar, Al-Eidan, Hassan, & Al-Najjar (2022) state that AI-powered pedagogical growth is becoming a helpful ally in keeping teachers effective and engaged in the classroom. Promoting efficient classroom administration: Artificial intelligence (AI) systems enable efficient classroom administration by giving real-time data on student behaviour and engagement (Al-Ghamdi, 2021). Artificial intelligence (AI) systems can identify possible issues or indications of indifference by utilising patterns in student interactions (Lucci, Kopec, & Musa, 2022). This makes it possible for educators to enhance the learning environment and promptly handle behavioural difficulties. As described by Lucci, Kopec, & Musa (2022), AI can also offer suggestions for tactics or interventions to improve classroom dynamics. According to A'mar & Eleya (2022), AI gives teachers the tools they need to create a friendly and effective learning environment by giving them quick feedback and proactive management strategies.

Third: Ensuring effectiveness of workload

According to A'mar & Eleya (2022), the employment of artificial intelligence in education boosts instructors' workload efficiency. Grading assignments and keeping track of attendance are two repetitious duties that teachers might complete to recover a considerable amount of time. This efficiency not only helps instructors feel less stressed and exhausted but also frees them up to concentrate on other crucial facets of their jobs, such lesson planning, individualised instruction, and student involvement (Abu Ghneim, Saeed, 2022). As technology advances, the ability of artificial intelligence to lessen administrative responsibilities is probably going to play a significant role in raising teacher retention rates and overall job satisfaction (Al-Hammar, Al-Eidan, Hassan, and Al-Najjar, 2022).

Fourth: Challenges and moral dilemmas:

Despite all of artificial intelligence's potential benefits for education, there are also challenges and moral dilemmas that should be carefully thought out. Instructors can worry that AI would take away their freedom and control how they instruct, or that it will erode their one-

on-one connections with pupils (Al-Ghamdi, 2021). The resistance of instructors to adjusting to new technology, particularly those who are less experienced with AI, is another challenge that necessitates targeted initiatives for educational development, as highlighted by A'mar & Eleya (2022). As Lucci, Kopec, & Musa (2022) pointed out, strong data privacy safeguards, transparency in AI systems, and unbiased and equitable decision-making in educational contexts are all important ethical considerations.

AI and Enhancing Digital Learning Performance for Teachers and Students

One of the main drivers of this change is artificial intelligence (AI), which has the potential to significantly increase teacher effectiveness in digital learning environments. As education increasingly leverages digital tools and platforms, AI is assisting in the creation of more successful, personalised, and adaptive learning experiences for instructors and students (Lucci, Kopec, & Musa, 2022). One of the main ways AI is improving teacher effectiveness in online learning is through personalised learning routes (Al-Baqmi, Al-Salamat, & Mohammed, 2023). AI algorithms analyse large data sets, which include the learning styles, strengths, and shortcomings of students (Al-Ghamdi, 2021). By using this information, educators can develop customised lesson plans that better address the needs of each unique student. Teachers may design adaptable classrooms that suit a variety of learning styles and foster a more engaging and productive atmosphere by utilising AI-based insights. Additionally, AI excels at handling digital learning administration, freeing up teachers' time to concentrate on instructional design and student engagement (Al-Ghamdi, 2021).

Artificial intelligence (AI) expedites laborious processes like monitoring student progress and grading exams, freeing up teachers' time to enhance their lesson plans and give students timely feedback. By lessening the administrative load, artificial intelligence (AI) frees up teachers' time to concentrate on more crucial elements of teaching and learning. According to Al-Baqmi, Al-Salamat, and Mohammed (2023), artificial intelligence (AI) enhances digital learning by enabling real-time analytics and performance tracking. Teachers receive real-time feedback on student engagement, progress, and comprehension through dashboards driven by artificial intelligence. Using this timely information, educators can modify their lesson plans to provide students with the support they require at the appropriate time (Al-Ghamdi, 2021). These dynamic insights enable educators to make data-driven decisions that improve student learning and increase their effectiveness in the classroom. AI is also necessary to create a digital learning environment that is more inclusive. In order to guarantee that instructional materials are developed to satisfy a variety of learning demands, it can assist in identifying and resolving accessibility concerns that students encounter (Al-Baqmi, Al-Salamat, & Mohammed, 2023). Examples of AI-powered solutions that help expand digital content accessibility to a wider spectrum of students are text-to-speech and speech-to-text systems (Al-Baqmi, Al-Salamat, & Mohammed, 2023). Al-Hammar, Al-Eidan, Hassan, and Al-Najjar 2022) state that although artificial intelligence (AI) has numerous benefits, there are drawbacks as well. These include the need for thorough teacher preparation, protecting student data, and addressing potential biases in AI systems. But when applied properly, artificial intelligence (AI) can be a teacher's greatest ally in the digital learning environment, helping them to provide more specialised, high-quality training. In conclusion, artificial intelligence has changed how well teachers work in digital learning environments. As noted by Shraim and Crompton (2022), artificial intelligence (AI) helps educators better navigate the complex terrain of digital education by

offering personalised learning experiences, streamlining administrative tasks, facilitating real-time analytics, and promoting inclusivity. Collaboration between AI and educators will probably shape education in the future, providing students worldwide with more personalised, dynamic, and interesting learning experiences as technology develops.

Artificial Intelligence in the Performance of Teachers and Students:

More and more individuals are curious about how the integration of artificial intelligence (AI) into education is affecting secondary school teachers' performance (Al-Baqmi, Al-Salamat, and Mohammed, 2023). AI has the power to totally change education by offering a plethora of tools and resources that enhance teaching methods and expedite administrative duties. The complicated effects of AI on teachers' jobs are covered in this article, along with the advantages and disadvantages of its application. Given that teachers and students are intelligent systems, it will be intriguing to observe how AI affects their performance (Al-Baqmi, Al-Salamat, and Mohammed, 2023). As the number of students in educational institutions rises, AI systems will be helpful in lessening the effort for teachers. With the use of AI technology, educators can provide individualised content by evaluating the course materials and curriculum [11]. Furthermore, these systems are capable of designing and assessing tests following their analysis (Al-Hammar, Al-Eidan, Hassan, and Al-Najjar, 2022). In the end, this will allow educators to concentrate on more crucial issues, like student achievement. AI systems, as mentioned by Shraim & Crompton (2022), can analyse study data more efficiently for independent learning and individualised teaching, assisting teachers in developing lesson plans that are specifically tailored to each student. Human prejudice is another issue that arises when AI is used in education (Abu Ghneim, Saeed, 2022). An AI system may use pre-established criteria and templates to evaluate examinations and papers in order to remove prejudice (Al-Ghamdi, 2021). This can be accomplished via computer vision-based AI by interpreting and recognising handwritten document images. These methods stop students from plagiarising and cheating in addition to lessening bias (Al-Baqmi, Al-Salamat, & Muhammad, 2023). By analysing student data, artificial intelligence (AI) devices can detect learning gaps in pupils and intervene early in their education. Most students are treated similarly by the traditional education system (Al-Ghamdi, 2021). Consequently, no student can use the same teaching style and acquire the best level of knowledge (Al-Baqmi, Al-Salamat, & Muhammad, 2023). AI will assist in creating a personalised learning plan for every student based on their aptitudes, personality, and areas of strength. In this approach, all students can improve and gain from their study. As knowledge increases and contributes to the development of the cognitive system, students' learning capacities, routines, and creativity all improve (Al-Hammar, Al-Eidan, Hassan, and Al-Najjar 2022). Furthermore, by gathering academic data, AI algorithms forecast each student's future course of study, assisting students in making more targeted course selections for their university education. Students can raise their grades and acquire useful skills by considering their individual learning styles and intended course of study (Abu Ghneim, Saeed, 2022). AI has a lot of potential to finish and expedite administrative work for both institutions and teachers, as noted by Shraim & Crompton (2022). With AI, teachers can now grade essays and conduct assignment evaluations in-person with students, freeing up more face time. AI developers are also creating new techniques for marking homework assignments and written exams (Abou Ghneim, Saeed, 2022). Artificial Intelligence generates flexible digital learning interfaces for educational materials suitable for learners of all ages and

grade levels. Furthermore, during the teaching and learning process, AI assists teachers in understanding their students "based on the entire ecosystem of learning tools," according to Brightspace developer Nick Oddson. AI systems can learn more readily based on the difficulties they encounter when interacting with humans. According to Shraim and Crompton (2022), students had a brief window of time to communicate with their lecturers before office hours or by expecting a response to their emails. In order to work one-on-one with students and give them feedback, modern learning platforms like Carnegie Learning now days leverage student data (Abou Ghneim, Saeed, 2022). AI will soon be able to assist educators and learners by acting as a fully functional assistant that can adjust to different learning preferences. Teachers and students with such needs in any field will benefit most from it (Al-Baqmi, Al-Salamat, & Muhammad, 2023).

Issues Educators Encounter While Implementing AI In the Classroom.

While there is a lot of promise for using AI in education, there are several unique obstacles that educators must overcome (Abu Ghneim, Saeed, 2022). One of the primary obstacles is the need for extensive training (Al-Baqmi, Al-Salamat, & Mohammed, 2023). It's possible that many educators lack the skills and training necessary to use AI resources in the classroom. As artificial intelligence (AI) becomes more widely used, educational development programs must be created to make sure that teachers can use these tools to enhance teaching and learning, as highlighted by Shraim & Crompton (2022). Another difficulty is the ethical issues that AI in education raises. Teachers may have privacy concerns because AI systems frequently require access to sensitive student data for individualised learning (Abu Ghneim, Saeed, 2022). Finding the ideal balance between safeguarding student privacy and utilising student data to provide practical AI-based insights can be challenging for regulators and educational institutions (Al-Hammar, Al-Eidan, Hassan, & Al-Najjar, 2022). It is necessary to resolve any biases and guarantee transparency in the operation of these algorithms in order to foster trust in AI technology throughout the education sector (Al-Baqmi, Al-Salamat, & Mohammed, 2023). Additional integration challenges are posed by the heterogeneous IT infrastructures found in educational institutions. Low-funded schools may find it more difficult to adopt and maintain AI technology, which could exacerbate already-existing educational gaps (Al-Baqmi, Al-Salamat, & Mohammed, 2023). Closing the digital gap and granting fair access to AI tools and resources are necessary to stop technology from favouring some kids or schools over others. Teachers also confront a challenge because AI systems can adapt to a range of learning environments, as mentioned by Shraim & Crompton (2022). Because of their one-size-fits-all architecture, some AI systems might not appropriately account for the subtleties of culture, language, and contextual distinctions found in various educational contexts. The issue for educators is to combine AI tools with their pedagogical approaches and the individual needs of every student (Abu Ghneim, Saeed, 2022). Teachers' resistance to change is another common problem. Some educators could be hesitant to integrate AI into their class plans because they fear it will undermine their autonomy as teachers or result in their dismissal (Al-Baqmi, Al-Salamat, & Mohammed, 2023). In order to overcome resistance and foster a favourable attitude towards artificial intelligence in education, these concerns must be addressed by honest dialogue, showcasing AI's capacity for collaboration, and stressing the technology's role as an aid rather than a replacement.

It is one of the subjects that has been the subject of numerous studies, second only to school administration and its role in encouraging the use of artificial intelligence in the school community, because of its significant influence in equipping educators and students with the technological know-how required to keep up with the field's rapid changes.

The study (Tedia, 2012) set out to determine the drawbacks of incorporating technology into the classroom at numerous East African universities. The study employed a number of techniques to gather data, such as group talks and observation with thirty-one experts and specialists in those nations, as well as an analysis of the findings of earlier research studies. Numerous elements that have a negative impact on the protocols for utilising information and communication technology in the learning process were found to be present in the study on technology and education. The most notable of these, given its low efficiency and potential to negatively affect the adoption of technology in schools, is the lack of school leadership that keeps up with the technology. The survey suggests that in order for officials to effectively employ technology in their classrooms, they should be given more training in leadership.

In an effort to ascertain how school administration helps to the spread of information technology throughout the school community, Al-Sarayrah and Abu Hamid (2016) added their work to this context. In order to do this, a 42-paragraph questionnaire divided into five sections was constructed. The study sample comprised seventy-four assistant principals from the Al-Mazar Al-Janoubi schools in the Karak Governorate. The findings indicated that the overall and specific role of school administration in encouraging the use of ICT in education was deemed moderate by the school community. Additionally, it was discovered that the factors of gender and specialisation did not significantly differ, with the exception of the field of school principal. Supporting humanities specialisations differed from information technology support at the school. Esplin (2017) suggested a study to evaluate the quality of leadership preparation for primary school principals in Utah, one of the US states, using the International Society for Technology in Education (ISTE) requirements for supervisors. The study's findings showed that school principals are not adequately prepared for technological administration leadership and that there is a relationship between training hours and technological leadership readiness. Al-Qurainawi (2018) reported the findings of a study to ascertain the role performed by technology school principals in promoting education within the Green Line. The study sample comprised 327 male and female teachers who were chosen using the basic random approach, whereas the study population comprised 800 male and female teachers spread among 20 technological schools. To accomplish the study goals, the researcher employed a questionnaire with forty paragraphs spread across five chapters. The study discovered that while there were no statistically significant differences in instructors' answers to the questionnaire sections pertaining to the experience factor, there were statistically significant variances based on the factors of gender and academic qualification.

Al Jarida Research (2019) developed a 34-paragraph questionnaire that was distributed to 82 school principals in the Al Dhahirah Governorate of the Sultanate of Oman in order to ascertain the degree of technical competence held by these administrators. The study's most notable finding is that schools only possess mediocre levels of technological proficiency. The lack of variations in competency according to years of experience, gender, or educational background was another finding. Prioritising technical expertise over other areas while developing training curriculum for school principals was one of the key recommendations.

In the study Popenici and Kerr (2017) addressed the phenomenon of integrating artificial intelligence into teaching and learning in higher education. He investigates the educational impacts of emerging technologies on student learning and institutional pedagogies and their evolution. By exploring recent technological developments and the rapid adoption of new technologies in higher education, the paper aims to predict the future landscape of higher education in a world where AI is an integral part of universities. It identifies the challenges faced by higher education institutions and student learning in adopting these technologies for teaching, learning, student support and administration, and suggests directions for further research.

Uğur (2019) carried out a qualitative investigation to find out how high school administrators affect the configuration and utilisation of AI apps. Ten high school principals who had been teaching for at least eighteen years and were all deputy principals made up the study sample. The study, conducted over 39 years in Istanbul, İzmit, and Sakarya schools, came to several conclusions, the most significant of which is that school principals should be required to have academic credentials in addition to becoming more aware about the usage of technology in their buildings. School principals should find it easier and more flexible to acquire the technical skills they need to become leaders in a digital learning environment that raises students' knowledge of technology.

In addition to the descriptive survey, a thirty-one-paragraph questionnaire divided into six sections was prepared and given to a sample of eighty assistant managers. The findings demonstrated how little assistant managers used artificial intelligence and digital management tools, and how many limitations they faced. The study's findings demonstrated that changes in favor of women were statistically significant when the gender variable was taken into account. Additionally, research demonstrated a difference in the degree of practice based on academic specialization in favor of humanities specializations and a variance in the level of practice based on years of experience, favoring those with fewer experience. According to the report, assistant managers should be urged to fortify the organizational framework and implement additional digital management tools. Infrastructure, artificial intelligence, and media. academic staff, Regarding Al-Subhi's study (2020), it was able to determine the extent to which faculty members at Najran University really employ artificial intelligence apps, as well as the challenges associated with this and how it relates to particular attributes like gender and academic standing. The study employed an analytical technique, a descriptive survey, and a questionnaire given to 301 faculty members at Najran University in order to accomplish this purpose. The findings showed that the college makes very little use of artificial intelligence tools. Furthermore, it demonstrated that the real-world use of artificial intelligence applications was insensitive to factors such as gender or educational attainment.

The investigation came to the conclusion that faculty members ought to take training programs. and inform them about the most recent advancements in the application sector The goal of Al-Rashidi's 2021 study was to ascertain how much digital management is used by assistant principals in middle schools in the State of Kuwait. In addition, it looked for statistically significant variations in the study sample members' responses based on factors including gender, years of experience, academic specialisation, and scientific background. The research goals were met by using a methodical investigation. Astuti (2021) conducted research

on how proficient educators and learners are at using digital artificial intelligence applications for education. In addition to 181 randomly chosen students and 52 teachers, the study sample comprised 233 students and teachers from Indonesian secondary schools. There was a questionnaire used to collect the data.

According to the findings, there are low levels of maturity and no appreciable disparities in students' and teachers' digital technology proficiency across all skill levels. According to the study's findings, education is necessary to address the issue of instructors' and students' lack of maturity in their use of digital technology, as well as to emphasize the value of improving training and utilizing a variety of cutting-edge teaching strategies. Artificial intelligence has a significant impact on teaching and learning in the field of education, as Lameras & Arnab (2021) noted in their study. In order to improve their talents and skills, teachers are essential in developing and implementing artificial intelligence-based teaching and learning strategies. Using the PRISMA paradigm, this research offers recommendations for using artificial intelligence-based teaching and learning in the classroom as well as insights into the ethical ramifications.

Cox (2021) stated that artificial intelligence (AI) and robotics are likely to have a significant long-term impact on higher education (HE). The scope of this influence is difficult to understand, partly due to the isolation of the literature, as well as the changing meaning of the concepts themselves. But developments are surrounded by disagreements about what is technically possible, what is practical to implement, and what is educationally desirable or for the benefit of society. Design imagination that clearly imagines future scenarios of artificial intelligence or robotics in use provides a way to explain and inquire about technological possibilities. The paper describes the use of a large-scale narrative literature review to develop eight such design narratives that capture the range of potential use of artificial intelligence and robotics in learning, management, and research. It prompts broader discussion by raising issues such as how to enable the teaching of higher-level skills or change staff roles, as well as exploring the impact on human agency and the nature of data transformation.

According to Mousa (2022), research should be done to determine the real challenges middle school principals in Egypt's New Valley Governorate confront as they attempt to incorporate the characteristics of contemporary artificial intelligence apps. The researcher employed a questionnaire with a sample of twenty-one school leaders in order to meet the study's objectives. Three key findings emerged from the investigation: school administrators were not adequately trained in technology-related legislation; there was a dearth of legal culture in schools; and the training programs were inadequate. The study came to the conclusion that disseminating the culture of contemporary administrative technology is essential. Teaching instructors about the rapidly advancing field of artificial intelligence (AI) is essential for K–12 student education, as noted by Yam, Chai, Shu, Meng, King, Yau, Chai, and Chiu (2023). Studies on instructors' opinions on AI education, however, are scarce. Six types of teachers' perspectives were discovered in this study, which involved 28 in-service teachers from 17 secondary schools in Hong Kong: bridging technology, communicating knowledge, generating interest, nurturing morality, growing abilities, and developing thinking. These notions' hierarchical relationships shed light on how teachers view AI education. In order to improve teacher competency and advance general AI education for K–12 students, two learning routes are suggested for the preparation of technical and non-technical instructors to teach AI.

In his publication, Holmes (2023) asserts that artificial intelligence (AI) is progressively exerting a greater influence on several facets of our everyday existence. This statement holds equally true in the realm of education, specifically in the context of Artificial Intelligence and Educational Technology (AI&ED). Nevertheless, the exact effects of AI on education, including its impact on teaching and learning as well as the potential changes in the roles of instructors and learners, remain unresolved. Consequently, they conducted research with the objective of analysing the present condition of artificial intelligence and education. This analysis included examining the potential advantages and risks of using artificial intelligence in teaching, as well as the role of teachers and teachers' unions in ensuring that the use of artificial intelligence aligns with principles of social development. Legal fairness and the fundamental entitlements of individuals.

The objective of the study done by Hamdan, Khair, and Mohammed (2023) was to investigate the potential of the Classera platform in enhancing the professional development of secondary school science instructors in Taif and Makkah. As part of the descriptive survey technique, a questionnaire was provided to 50 female science instructors from private schools. According to the instructors' perspective, the results indicated a rise in the platform's significance in teaching science and facilitating education administration. Regarding the platform's role, scientific instructors' remarks did not show any discernible variations based on their years of experience, specialisation, or number of training courses. When it comes to qualifications and years of experience, there were no significant variations in the replies. The survey revealed that secondary school science instructors had encountered more obstacles in utilising the Classera scientific teaching platform. Several ideas and recommendations were put up in response to the findings, with the goal of improving the platform's capacity to educate in the field of science. The study findings offer valuable understanding into the challenges that secondary school science instructors have while utilising the Classera platform.

The research conducted by Ismail, Abdel Raouf, and Al-Dahasi (2024) investigated the impact of utilising the "Reading Progress" application, which employs artificial intelligence analysis through the Microsoft Teams platform, on the enhancement of reading abilities in elementary school pupils. The study had a total of 32 students, who were randomly allocated into two groups: the experimental group, which utilised the tool, and the control group, which followed the standard study method. The researchers utilised the experimental treatment material and the reading skills observation card as their primary instruments. The investigation revealed statistically significant disparities in the post-measurement between the experimental group. The researchers suggest offering training and assistance to instructors about the utilisation of artificial intelligence-driven reading development tools. Additionally, they propose inspiring teachers to employ technology and pedagogical strategies to augment reading proficiency. The research also proposes research topics and factors to enhance the practical effectiveness of artificial intelligence applications and tools in the educational process and advance the field of teaching and learning technology.

The study conducted by Mansour Saad et al. (2024) sought to determine the impact of King Khalid University in promoting revolutionary advancements in e-learning with the goal of attaining long-term viability. The research sample comprised 348 university faculty members in the Kingdom of Saudi Arabia. The study employed a questionnaire of 39 items categorised into three axes: the actuality of e-learning at King Khalid University, the benefits

of radical innovation in e-learning, and the contribution of radical innovation in attaining sustainability. The findings indicated unanimous consensus among all participants about the existence of e-learning at King Khalid University to a significant extent, a moderate level of agreement on the benefits of radical innovation in e-learning, and recognition of the role played by radical innovation in e-learning. Significant statistical differences exist in the average responses of the sample when considering the role of King Khalid University in promoting radical innovation in e-learning for sustainability, based on the variables of academic qualification (scientific) and experience, to benefit the members. The study suggests that King Khalid University should offer specialised training programs to faculty members in order to foster creativity and invention in the field of innovation. Furthermore, it fostered collaboration and communication among scientific departments to facilitate the interchange of ideas and experiences, ultimately leading to the attainment of sustainability goals inside the institution.

In 2024, Hussein, Nisreen, and their colleagues did a research to assess the extent to which female general education school administrators engage in organisational intelligence practices. The study employed the descriptive survey methodology and administered a questionnaire to gather data from a sample of 385 educators, comprising both male and female instructors throughout elementary, middle, and secondary education levels. The findings indicated a high level of organisational intelligence in the practice. Nevertheless, there were statistically significant disparities in the replies based on the educational stage variable, with elementary school instructors having more favourable outcomes. Similarly, teachers with a bachelor's degree had more favourable outcomes in comparison to those with other academic qualifications. There were no significant variations seen as a result of the variable of years of service. The study emphasises the significance of comprehending the elements that impact the implementation of organisational intelligence among female managers.

Concluding Remarks

The presentation of previous studies indicates that while each study examined a distinct topic warranting additional investigation, the present study specifically investigated how the utilisation of artificial intelligence applications by middle school teachers in the Northern District enhances their motivation for professional growth. Tedla's study (2014) employed a qualitative methodology, incorporating focus groups, observations, and interviews. Additional research, such as the study conducted by Musa in 2022, included the use of a questionnaire. This study distinguishes itself from prior research by utilising existing studies to establish the research question, develop the study instrument, and analyse the findings. Notable studies in this field include Esplin's (2017), Abu Hayya's (2021), Al-Qarnawi's (2018), Al-Jarida's (2011), and Ariban's (2018) investigations. These investigations demonstrated that, to the best of the researcher's knowledge, no study has examined the effect of middle school teachers' utilisation of artificial intelligence apps on their motivation for professional growth.

Study Methodology: The researchers followed the descriptive analytical approach with the aim of identifying the impact of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view, in order to collect data from the study sample members, using the study tool (questionnaire) to achieve the purpose of this study. Their number is (3791).

Study community and sample: The study community consists of all middle school teachers in the Northern District, numbering (3791) male and female teachers. The study sample included (1379) questionnaires, i.e. (34%) of the study community.

Table (1), distribution of sample individuals

Rate	No	Independent variable levels	Variable
%43	599	North of the brigade	Educational area
%57	780	South of the brigade	
%100	1379	Total	
%43	599	Humanities	Specialization
%57	780	Scientific	
%100	1379	Total	
%50	690	Male	Respondent gender
%50	689	Female	
%100	1379	Total	
%73	1000	Bachelor's	Specialization
%19	256	Master's	
%9	123	PhD	
%100	1379	Total	
%32	436	Less than 5 years	Experience
%30	420	From 5 to 10 years	
%38	523	More than 10 years	
%100	1379	Total	

Table 1 shows the distribution of the study sample members according to the educational region variable, with a percentage of (43%) north of the brigade, and a percentage of (57%) south of the brigade. The specialization variable shows that the percentage of (43%) is humanities, and the percentage of (57%) is scientific specializations. The respondent gender variable shows that the percentage of (50%) is male, and the percentage of (50%) is female. The educational qualification variable shows that the percentage of (73%) is bachelor's, (19%) is master's, and (9%) is doctorate. The experience variable shows that the percentage of (15.3%) is diploma, (71.8%) is bachelor's, and (13%) is master's or more. The years of experience variable shows that the percentage of (32%) is less than (5) years, (30%) is from (5-10) years, and (38%) is more than (10) years.

Instrument

A questionnaire was developed to achieve the objectives of this study by using standard tools with proven credibility and reliability. These scales were adapted according to the requirements of the study, as it benefited from: educational literature such as the 2017 Esplin study, the Al-Quraini study (2018), and the Al-Rashidi study (2021), as well as the International Society for Technology in Teaching standards for supervisors. The study tool consisted of (27) paragraphs in their initial form, and was modified to become (19) paragraphs in two sections of questions. The first section: included the initial data (educational district, school gender,

respondent gender, field of specialization, academic qualification, and years of experience). The second section: included the questionnaire and its paragraphs. The researchers used the five-point Likert scale, where each paragraph of the questionnaire was matched by a list containing (very much, moderately, slightly, very slightly). The researchers also developed a scale for each paragraph of the study tool so that the scale contained five levels, as follows:

Means	Level
1.80	very low
1.81 – 2.60	Low
2.61 – 3.40	Medium
3.41 – 4.20	High
upper - 4.21	very high

Instrument Validity: The researchers designed the questionnaire in its initial form, and then verified the validity of the study tool by presenting it to a group of specialists with experience in the field of study, and their number reached (8) arbitrators from Al-Quds Open University, Palestine Technical University, Al-Quds University Abu Dis and Yarmouk University), and they were asked to express their opinion on the paragraphs of the questionnaire in terms of the clarity and soundness of the language of the paragraphs, the extent to which the paragraphs cover the studied aspect, and to add any information, modifications or paragraphs they deem appropriate), and according to these observations, the questionnaire was produced in its final form. On the other hand, the researchers verified the validity of the tool by calculating the correlation coefficient (Pearson) for the questionnaire paragraphs with the total score of the tool, and it became clear that there was statistical significance in all paragraphs of the questionnaire, indicating the presence of internal consistency between the paragraphs, and the following table shows this:

Table (2): Results of the Pearson Correlation Coefficient for the correlation matrix of the paragraphs of the effect of middle school teachers using artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view

The corrected correlation coefficient between the item score and the total score for its field	Pearson correlation coefficient between the item score and the total score for its field	Item	Domain
.60	.68**	1	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.
.72	.77**	2	
.69	.76**	3	
.75	.82**	4	
.71	.77**	5	
.61	.72**	6	
.73	.80**	7	
.77	.83**	8	

The corrected correlation coefficient between the item score and the total score for its field	Pearson correlation coefficient between the item score and the total score for its field	Item	Domain
.78	.83**	9	Second Domain: The use of artificial intelligence leads to digital learning.
.77	.84**	10	
.81	.87**	11	
.82	.89**	12	
.85	.92**	13	
.74	.80**	14	Third Domain: The challenges faced by teachers when using artificial intelligence in education.
.71	.78**	15	
.72	.77**	16	
.71	.75**	17	
.74	.78**	18	
.78	.83**	19	

- **Statistical significance at 0.01**
- **Statistical significance at 0.05**

Reliability of the study instrument : The researchers verified the stability of the tool by calculating the stability of the total score of the stability coefficient for the study areas according to the Cronbach alpha stability equation, and the total score for the use of artificial intelligence by school administration and its relationship to improving the performance of teachers and teaching in secondary schools in the Northern District was (0.973), and this result indicates that this tool has stability that meets the purposes of the study.

Statistical processing: After collecting the questionnaires and ensuring their validity for analysis, they were coded in preparation for entering their data into the computer to conduct appropriate statistical processing and analyze the data according to the study questions and data. Statistical processing of the data was carried out by extracting the arithmetic means and standard deviations for each paragraph of the questionnaire, the t-test, the one-way ANOVA test, the Pearson correlation coefficient, and the Cronbach Alpha reliability equation using the Statistical Package For Social Sciences (SPSS).

Results related to the first question: **What is the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view?**

To answer this question, the researchers calculated the arithmetic means and standard deviations of the responses of the study sample members on the three areas of the questionnaire that express the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view, and the results of the following table illustrate this:

Table 3: Arithmetic means and standard deviations of the effect of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view in the three areas:

Level	Rank	Standard deviation	Means	Domain
High	1	.61	4.55	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.
High	2	.48	3.93	Second Domain: The use of artificial intelligence leads to digital learning.
High	3	.57	3.27	Third Domain: The challenges faced by teachers when using artificial intelligence in education.
	High			Total

As can be seen from Table (3), the arithmetic means of the study sample estimates for the three areas ranged between (3.28-4.56), with a degree from medium to high, as the field of the role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process came in first place with an arithmetic mean (4.56), a standard deviation (.620), and a high degree of practice, and the field of using artificial intelligence leads to digital learning came in second place, with an arithmetic mean (3.94), a standard deviation (.49), and a high degree of practice, and the field of challenges facing teachers when using artificial intelligence in education came in third place, with an arithmetic mean (3.28), a standard deviation (.58), and a medium degree of practice.

The arithmetic means and standard deviations were also calculated for the effect of middle school teachers using artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view, for each area separately, and Tables (4-9) show this.

The first domain: The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.

Table (4): Arithmetic means and standard deviations of the study sample estimates in the field of the role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.

Level	Rank	Standard deviation	Means	Item	No
High	1	.61	4.155	The director considers artificial intelligence an effective tool in improving the efficiency of teachers in the educational process	1
High	2	0.60	4.12	The director uses artificial intelligence to identify the strengths and weaknesses of teachers.	2

High	3	0.68	4.10	The director directs teachers to use artificial intelligence to improve their performance.	3
High	4	0.70	4.10	It is considered that artificial intelligence systems are capable of providing individual and customized support to the needs of teachers in the areas of developing teaching skills	7
High	5	0.77	4.01	The school teacher has the skill to access digital content across all devices through artificial intelligence applications.	4
High	6	0.93	3.96	The school teacher has the necessary knowledge to deal with artificial intelligence applications for cloud computing services in the school.	5
Moderate	7	1.14	3.30	Through artificial intelligence applications, the school teacher has the skill to apply copyright and licensing rules to protect intellectual property products for teachers' achievements.	6
High		**0.62**	**4.17**	Total	

It is noted from Table (4) that the arithmetic means of the study sample's estimates in the field of the role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process ranged between (3.31-4.16), with a degree from medium to high, and the practice of paragraphs (1, 2, 3, 4, 5, 7) came in a high degree, while the practice of paragraph (6) came in a medium degree. Paragraph (1) came in first place, while paragraph (6) came in last place.

The second domain : The use of artificial intelligence leads to digital learning

Table (5): Arithmetic means and standard deviations of the study sample's estimates in the field of the use of artificial intelligence leads to digital learning.

Level	Rank	Standard deviation	Means	Item	No
High	1	0.58	4.21	The school teacher uses intelligence applications to create different software to create digital content.	13
High	2	1.10	3.47	The school teacher has the knowledge to evaluate digital information and data using artificial intelligence.	12
High	3	.58	4.20	The school teacher has the ability to use search engines using artificial intelligence.	8
Moderate	4	1.24	3.41	The school teacher has the knowledge to use artificial intelligence that serves the administrative process.	10

Moderate	5	1.04	3.40	The school teacher has the ability to manage digital identity through artificial intelligence applications.	9
Moderate	6	1.12	3.26	The school teacher tries to create a digital code of conduct through artificial intelligence applications.	11
High		1.25	**3.67**	**Total**	

It is noted from Table (5) that the arithmetic means of the study sample's estimates in the field of using artificial intelligence leads to digital learning ranged between (3.27-4.22), with a high degree, and the practice of paragraphs (8,9, 12, 13) came in a high degree. Paragraph (13) came in first place, while paragraphs (10, 11) came in last place with a medium degree.

The third domain : Challenges faced by teachers when using artificial intelligence in education.

Table (6): Arithmetic means and standard deviations of the study sample's estimates in the field: Challenges faced by teachers when using artificial intelligence in education.

Level	Rank	Standard deviation	Means	Item	No
High	1	0.83	4.10	The school teacher does not have experience in managing work teams through artificial intelligence applications in the educational environment.	17
Moderate	2	0.93	3.12	There are many challenges facing teachers in the effective integration of artificial intelligence technologies in the teaching process, which stem from school management.	15
Moderate	3	0.90	3.15	Teachers still need intensive training and qualification to deal with artificial intelligence technologies in the educational process.	19
Moderate	4	0.86	3.13	There are challenges regarding privacy risks related to the use of smart technology in the educational environment.	16
Moderate	6	0.93	3.20	The school teacher has experience in managing work teams through artificial intelligence applications.	18
Moderate	8	0.96	3.25	The school teacher is unable to employ cybersecurity skills while using artificial intelligence technologies.	14

Moderate	**0.89**	**3.32**	**Total**

The table (6) shows that the average values of the study sample estimates regarding the challenges faced by teachers when using artificial intelligence in education ranged from 4.11 to 3.21. These values indicate a medium to high level of difficulty. The practice described in paragraph (17) was rated as highly challenging, while the practices described in paragraphs (14, 15, 16, 18, 19) were rated as moderately challenging. Paragraph 17 achieved the highest ranking, whereas paragraphs 15 and 16 obtained the lowest ranking.

The researchers posit that the attainment of this outcome with a notable level of proficiency is deemed satisfactory. This can be attributed to the fact that educators in the Northern District possess the International Computer Driving Licence (ICDL) certification, a universally acknowledged credential in the field of information and communications technology and digital literacy. This certification equips them with fundamental proficiencies and essential principles in artificial intelligence te
The study demonstrates that the use of AI technologies in middle schools has a substantial impact on teacher motivation and the improvement of interaction and engagement within the educational setting. The teachers' replies about their motivation and involvement with AI technology exhibited favourable and elevated outcomes. Nevertheless, there are still obstacles that they encounter while implementing these technologies. The researchers ascribe this outcome to the fact that AI technologies offer prompt feedback and ongoing monitoring of instructors' performance, hence augmenting their drive to acquire knowledge and progress. This feedback assists educators in consistently enhancing their work. The researchers further ascribe this outcome to the ability of AI to tailor and guide instructional content based on the specific requirements of individual teachers, hence enhancing the efficacy and personal relevance of the educational process for each instructor. This fosters the improvement of motivation and engagement. The researchers additionally ascribe this outcome to the accessibility of AI technologies equipped with sophisticated educational tools and resources that assist instructors in enhancing their abilities and attaining their educational objectives more efficiently. These resources enhance self-assurance and drive for improved performance. The researchers further ascribe this outcome to the use of AI technologies in the educational setting, which amplifies the engagement between educators and technology. This ongoing connection fosters an engaging and intellectually interesting instructional setting. The researchers further ascribe this outcome to the capability of artificial intelligence to encourage cooperative learning among educators, so enhancing the sharing of experiences and ideas, and promoting more interaction and effective engagement in the educational setting. Artificial intelligence technologies offer efficient communication platforms that enhance the communication between instructors and school leadership. Effective communication enhances interaction and involvement. Although artificial intelligence offers advantages, educational institutions may encounter technical obstacles with the necessary infrastructure and tools required for the successful implementation of these technologies. These problems can have an impact on the actual application of technology in the educational setting. This outcome can be attributed to the middle school teachers in the Northern District being aware of the availability of digital

skills and the utilisation of artificial intelligence applications. They are motivated to acquire these skills in order to keep up with the rapid advancements in digital technology, excel in their profession, fulfil their job responsibilities efficiently and effectively, advance their positions within the school, and strive to establish an educational environment that fosters growth and progress. However, despite the available facts, there are many problems and difficulties that occasionally hinder their progress in digital professional growth. As a consequence, the quality of their work in certain paragraphs was only average and did not meet the expected level of proficiency. The researchers also attribute this outcome to the Northern District's middle school teachers' desire for self-improvement. However, their focus on school responsibilities hinders them from attaining their objectives and acquiring advanced digital skills, such as the ability to easily utilise artificial intelligence applications. This particular skill necessitates training courses provided by technicians and specialists in the field or through specialised professional academies. Additionally, th

The researchers also ascribe the cause to resistance to change and reluctance to adapt to new technology. Certain educators may exhibit hesitancy in embracing and modifying new technology, hence impacting the actual implementation of AI technologies in the educational realm. The study also ascribes this outcome to the necessity for school leadership to offer continuous training and professional assistance to teachers in order to encourage their embrace of AI technology and their proficient use in teaching. Inadequate training might result in restricted or inefficient utilization of these technologies. Implementing AI technology necessitates substantial financial expenditures in infrastructure and technical tools, which might present a difficulty for schools with low resources. The researchers further ascribe this outcome to the necessity of continuous training for teachers and school leadership on the utilization of AI technology, which presents an added difficulty that demands time and exertion. Implementing AI technologies necessitates a shift in the organizational culture and a movement towards embracing innovation and technology. There may be opposition from certain persons inside the educational institution over this move. This finding aligns with the findings of Al-Hur's (2022), Al-Khatib's (2021), Karagöz and Bolat's (2020), and Al-Sarayrah and Abu Hamid's (2016) studies, all of which demonstrated a high level of utilization of artificial intelligence applications and administrative technology by school teachers. In contrast to Al-Shadifat's (2020) findings of average utilisation of artificial intelligence applications and administrative technology among government school teachers, and Al-Anzi's (2018) findings of average availability of technological competencies in schools in Al-Kharj Governorate, our results indicate a different outcome.

Findings pertaining to the second inquiry:

Do the levels of teachers' response to the impact of middle school teachers' use of artificial intelligence applications and their motivation towards development in the Northern District differ significantly based on the variables of educational region, specialization, respondent's gender, academic qualification, and years of experience? In order to address this question, we calculated the average values and deviations for the impact of middle school teachers' utilisation of artificial intelligence applications and its correlation with their motivation for growth in the Northern District. This analysis took into account various factors such as educational region, specialisation, respondent's gender, academic qualification, and

years of experience. We examined these variables separately for teachers in three different areas (scale areas). The results are presented in Table 7.
Table 7 presents the arithmetic means and deviations of the impact of middle school teachers' use of artificial intelligence applications on their motivation for development in the Northern District. The table examines this relationship based on various variables, including educational region, specialization, gender of the respondent, academic qualification, and years of experience. The data is analyzed separately for each of the three fields (scale fields) and is categorised according to the aforementioned variables.

Standard deviation	Means	Variable Levels/Categories	Variable	Domain
0.50	3.93	North Brigade	Educational Region	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process. .
0.51	3.97	South Brigade		
0.57	3.97	Humanities	Specialization	
0.73	3.96	Scientific Specialties		
0.70	3.93	Male	Gender of Respondent	
0.71	3.97	Female		
0.72	3.94	Bachelor's	Academic Qualification	
0.71	3.58	Master's		
0.66	4.01	PhD		
0.46	4.10	Less than 5 years	Years of Experience	
0.64	4.16	From 5 to 10 years		
0.62	4.13	More than 10 years		
0.60	4.12	North Brigade	Educational Region	Second Domain: The use of artificial intelligence leads to digital learning.
0.61	4.17	South Brigade		
0.45	4.10	Humanities	Specialization	
0.65	4.17	Scientific Specialties		
0.70	3.58	Male	Gender of Respondent	
0.67	3.73	Female		
0.62	4.14	Bachelor's	Academic Qualification	
0.71	3.58	Master's		
0.61	4.20	PhD		
0.71	3.58	Less than 5 years	Years of Experience	
0.62	4.14	From 5 to 10 years		
0.46	4.10	More than 10 years		
0.60	4.13	North Brigade	Educational Region	Third Domain: The challenges faced by teachers when using artificial intelligence in education.
0.62	4.18	South Brigade		
0.46	4.10	Humanities	Specialization	
0.64	4.18	Scientific Specialties		
0.71	3.59	Male	Gender of Respondent	
0.67	3.73	Female		
0.62	4.14	Bachelor's	Academic Qualification	
0.71	3.58	Master's		

Standard deviation	Means	Variable Levels/Categories	Variable	Domain
0.61	4.20	PhD		
0.46	4.10	Less than 5 years		
0.71	3.58	From 5 to 10 years	Years of Experience	
0.67	3.73	More than 10 years		

Table (7) shows that there are apparent differences between the arithmetic means of the effect of middle school teachers' use of artificial intelligence applications and its relationship to increasing their motivation towards development in the Northern District attributed to the variable of educational region, specialization, gender of the respondent, academic qualification, and years of experience from the point of view of teachers in the three areas individually (scale areas). To determine the statistical significance of the apparent differences, a three-way multivariate analysis of variance (without interaction) (Three-Way MANOVA) was used, using the (Hotelling's Trace) test. Table (8) shows this.

Table (8): Results of the (Hotelling's Trace) test according to the variables (educational region, specialization, gender of the respondent, academic qualification, and years of experience), in the estimates of the study sample members The level of teachers' response to the effect of middle school teachers' use of artificial intelligence applications and its relationship to increasing their motivation towards development in the Northern District attributed to the variable of educational region, specialization, gender of the respondent, academic qualification, and years of experience in the three areas

ETA box	Statistical significance	Degrees of freedom of error	Degrees of freedom	F	Value	Source
.006	.387	236.000	3.000	.491	.005	Educational Region
.008	.578	236.000	3.000	.657	.007	Specialization
.006	.480	236.000	3.000	.490	.004	Gender of Respondent
.008	.378	236.000	3.000	.657	.007	Academic Qualification
.002	.925	236.000	3.000	.155	.001	Years of Experience

The results of the Hotelling's Trace test showed a statistically significant effect of the variables of respondent gender, academic qualification, and years of experience on the study sample members' estimates of the level of teachers' response to the impact of middle school teachers' use of artificial intelligence applications and its relationship to increasing their motivation towards development in the Northern District in the three areas combined. While there is no statistically significant effect of the educational region and specialization variables on the study sample's estimates of the level of teachers' response to the impact of middle school teachers' use of artificial intelligence applications and its relationship to increasing their motivation towards development.

To determine the statistical significance of the apparent differences in the three areas individually, a three-way analysis of variance was used, and Table (9) shows this.

Table (9): Results of the three-way analysis of variance to compare the arithmetic means of the impact of middle school teachers' use of artificial intelligence applications in increasing their motivation towards development in the Northern District from the teachers' point of view in the three areas individually according to the variables (educational region, specialization, respondent gender, academic qualification, and years of experience).

Statistical Significance	F	Mean of Squares	Degrees of Freedom	Sum of Squares	Variable	Source
.870	.025	.013	1	.013	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Educational Region
.697	.150	.058	1	.058	Second Domain: The use of artificial intelligence leads to digital learning.	
.251	1.311	.630	1	.630	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
.522	.410	.208	1	.208	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Specialization
.668	.187	.072	1	.072	Second Domain: The use of artificial intelligence leads to digital learning.	

.833	.043	.020	1	.020	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
.980	.001	.000	1	.120	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Gender of Respondent
.437	.601	.237	1	.237	Second Domain: The use of artificial intelligence leads to digital learning.	
.443	.588	.280	1	.280	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
.520	.410	.200	1	.208	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Academic Qualification
.667	.187	.072	1	.120	Second Domain: The use of artificial intelligence leads to digital learning.	
.833	.043	.020	1	.020	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
.980	.001	.000	1	.000	First Domain : The role of artificial intelligence in providing support tools for teachers to	Years of Experience

					improve their efficiency in the educational process.	
.437	.601	.237	1	.237	Second Domain: The use of artificial intelligence leads to digital learning.	
.443	.588	.280	1	.280	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
		.510	232	121.602	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Errors
		.391	237	93.406	Second Domain: The use of artificial intelligence leads to digital learning.	
		.476	237	113.485	Third Domain: The challenges faced by teachers when using artificial intelligence in education.	
			240	121.881	First Domain : The role of artificial intelligence in providing support tools for teachers to improve their efficiency in the educational process.	Total
			240	93.832	Second Domain: The use of artificial intelligence leads to digital learning.	

240	114.571	Third Domain: The challenges faced by teachers when using artificial intelligence in education.

Table (9) demonstrates that the study's findings revealed statistically significant disparities (α=0.05) in all domains due to gender, with females exhibiting more favourable outcomes. The researchers ascribe this outcome to the fact that female instructors, as a result of their numerous obligations, have cultivated favourable attitudes and ambitions to attain equilibrium in order to prevent shortcomings in their duties. As a result, individuals often want to attain development, advancement in their careers, and professional maturity by gaining a significant range of abilities, particularly in using artificial intelligence applications inside the educational setting, aligned with the demands of digital transformation. The researchers ascribe this outcome to the presence of cultural or societal patterns that amplify female endorsement of the proficient use of technology and artificial intelligence in schooling. The researchers further ascribe this outcome to the fact that women encounter distinct obstacles in specific civilisations, which might therefore foster their inclination towards technology as a method of enhancing the efficacy of education. The researchers further ascribe this outcome to the possibility that women may possess elevated degrees of training and certification in the use of educational technologies. The researchers also ascribe this outcome to the fact that female professors effectively engage with pupils and possess the ability to comprehend their unique requirements. The researchers further ascribe this outcome to the fact that female students at the institution exhibit greater self-assurance in utilising technology. The researchers further ascribe this outcome to the administration's endorsement and promotion of female instructors' utilisation of technology. Variances in teaching approaches on technology may result in divergent responses to artificial intelligence projects. The findings also indicated that there were no statistically significant variations (α=0.05) associated with the impact of the educational region variable across all domains. The researchers ascribe this outcome to the absence of disparities in school readiness and accessible technology across various geographies. Variations in the level of technology use can impact the options available for instructors to take advantage of. Educational and professional preparation: There is an absence of disparity in the amount of training and certification that instructors get in the use of technology and artificial intelligence. If there is a disparity in this regard, the influence of school management and the use of technology may vary. Support and follow-up are influenced by the geographic variable. The level of technical assistance and follow-up is consistent across all locations, perhaps resulting in varying benefits for instructors in terms of technology and artificial intelligence. Hence, the influence of employing artificial intelligence to enhance instructors' effectiveness and instruction in educational institutions is associated with several interconnected elements, rather than being dependent on geographical considerations. The results indicated that there were no statistically significant differences (α=0.05) related to the impact of the specialisation variable in all fields. The researchers attribute this to the extensive integration between humanities and scientific specialisations in the curriculum or educational methods employed. Consequently, instructors in all specialisations had a comparable reaction.

The researchers further credit this outcome to the integration and equitable direction of artificial intelligence activities across all specialisations, which minimises variations in impact depending on specialisation. The researchers further ascribe this outcome to the uniform amount of assistance and training provided by the school administration to teachers across all specialisations in utilising artificial intelligence technologies.

The researchers further ascribe this outcome to the explicit mandate from the school administration to include technology and artificial intelligence across all academic fields, which may elicit an equivalent response from instructors. The researchers further ascribe this outcome to the fact that all fields have shared constraints that may be linked to infrastructure, training programs, or other impediments. This has the potential to result in cohesive and synchronized reactions. The researchers further ascribe this outcome to the school culture's promotion of technology and its emphasis on its role in overall educational enhancement, which may be shown in the instructors' uniform reaction. The results demonstrated statistically significant disparities (< 0.05) associated with the impact of years of experience in all domains, with the exception of the information and data knowledge area. The disparities favored those with ten years or more of experience. This outcome may be ascribed to the notion that knowledge and its quantification are a progressive process that expands via experience and experimentation, since the impact of years of experience across individuals in the sample is clearly obvious in the development of knowledge. The researchers further ascribe this outcome to the fact that educators with a decade or more of experience are more equipped to embrace technology and artificial intelligence, since they possess a greater understanding of their significance in enhancing the instructional process. They could possess a more comprehensive comprehension of how to use these technologies into their instructional methodologies.

The researchers further ascribe this outcome to the notion that educators with a decade or more of experience may be more susceptible to the impact of school culture and conventional methods, hence reducing their inclination to promptly embrace technology. The disparity in influence may be less pronounced between seasoned and novice teachers in this instance.

The researchers further ascribe this outcome to the notion that educators with a decade or more of experience may possess heightened awareness of the complexities associated with technology and may have issues while adjusting to novel technological advancements. This may mitigate the disparity in reaction between seasoned and novice teachers. The researchers further ascribe this outcome to the presence of administrative support, whereby good assistance from the administration in training teachers and providing resources for technology adoption may mitigate any disparities in experience levels. The researchers further ascribe this outcome to the notion that teachers with a decade or more of experience may have honed their technical expertise over time, rendering them more proficient at using technology.

The findings indicated that there were statistically significant disparities in the average impact of middle school teachers' utilization of artificial intelligence applications and its correlation with enhancing their motivation for professional growth in the Northern District. These disparities were observed among teachers in the three areas, when considering their educational qualifications, with a preference for those holding a PhD degree. The researchers also ascribe this outcome to the fact that teachers with a doctorate degree possess greater

expertise in specific domains, rendering them more impactful in those areas and potentially possessing a more profound comprehension of how to employ technology and artificial intelligence to enhance teaching and learning abilities within those domains. The researchers further ascribe this outcome to the fact that individuals with PhDs may possess more extensive education in the realm of research and development, which might enhance their capacity to effectively incorporate and use contemporary technologies to enhance their teaching proficiency. The researchers further ascribe this outcome to the notion that professors with a doctoral degree may exhibit more interactivity with students and possess the ability to utilise technology in a manner that efficiently caters to students' requirements. The researchers additionally ascribe this outcome to the notion that individuals with PhDs may possess a greater familiarity with cutting-edge technical advancements and scholarly investigations in the realm of education, hence enhancing their ability to employ artificial intelligence proficiently. The researchers further ascribe this outcome to the notion that instructors with a PhD may possess enhanced capabilities to scrutinise novel technologies, hence augmenting their profound comprehension of the advantages and obstacles associated with employing artificial intelligence in education. The researchers further attribute this outcome to the possibility that instructors with a PhD may have gotten additional instruction in the areas of technology and artificial intelligence during their academic journey. The findings of this study align with the findings of Al-Hur's study (2022), Al-Khatib's study (2021), Karakoz and Bolat's study (2020), and Al-Sarayrah and Abu Hamid's study (2016). These studies all demonstrated that there were no statistically significant differences ($\alpha = 0.05$) related to the impact of the region and specialisation variable. However, they did find statistically significant differences ($\alpha = 0.05$) related to the impact of the gender, specialisation, and academic qualification variables. Specifically, these variables were found to have an effect on the degree to which school teachers utilised artificial intelligence applications and administrative technology, as indicated by high scores on the assessment tool. This finding contradicts the results of previous studies conducted by Al-Shadifat (2020), Al-Anzi (2018), and Al-Sarayrah and Abu Hamid (2016). These studies found statistically significant differences ($\alpha = 0.05$) related to the impact of region and specialisation, but no statistically significant differences ($\alpha = 0.05$) related to gender, specialisation, and academic qualification. The current study indicates that government school teachers have an average level of utilisation of artificial intelligence applications and administrative technology. Additionally, it suggests that school principals in Al-Kharj Governorate have an average level of technological competencies.

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