

Employing Artificial Intelligence Applications to Support Inclusive Learning Practices among Student Teachers in Teacher Preparation Programs During Field Training

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ABSTRACT:

This study aimed to identify the reality of employing artificial intelligence applications in supporting inclusive learning practices among student teachers in teacher preparation programs during field training. In addition to revealing the differences in their responses according to gender, specialization, level of experience in using technology, and university. The study relied on the descriptive-analytical method, and a questionnaire consisting of (50) items distributed over five fields was used, which was applied to a sample of (200) students (male and female). The results displayed that the level of employment of artificial intelligence applications reached a high degree, as the total arithmetic average reached (3.72). Also, the results showed that there are positive trends among student teachers towards the use of these applications, while the teaching practices came to a moderate degree, as well as the challenges they face. Additionally, the results of the difference test showed that there were no statistically significant differences attributable to the variables of gender, specialization, and university. While statistically significant differences were found attributable to the variable of experience in using technology in favor of those with high experience. In light of these findings, the study recommended the need to promote practical training on the use of artificial intelligence applications in teacher preparation programs and to develop inclusive teaching practices based on these applications.

Keywords: Artificial Intelligence, Inclusive Education, Student Teachers, Field Training, Teacher Preparation Program

Introduction

In recent years, educational systems have witnessed rapid transformations driven by successive technological developments, especially artificial intelligence applications (AIA). Which have become one of the most prominent modern trends in the development of teaching and learning practices. These applications have contributed to a qualitative leap in teaching methods by providing flexible and adaptive learning environments that respond to the different needs of learners, and contribute to improving the quality of educational outcomes (Zawacki-Richter et al., 2019; Luckin et al., 2016).

In this context, the concept of inclusive education has emerged as one of the contemporary educational trends that seeks to achieve educational justice by integrating all students into one learning environment, while providing appropriate support to meet their diverse needs. Inclusive education aims to enable students to learn effectively regardless of their abilities or backgrounds, with a particular focus on students with disabilities and learning disabilities, who face additional challenges within the regular classroom (Ainscow, 2020; UNESCO, 2020).

The Arabic educational literature has also emphasized the importance of inclusive education in achieving equal educational opportunities. Al-Khatib (2018) indicates that this trend reflects a fundamental shift in the philosophy of education towards focusing on the learner and his individual needs. While Al-Zureikat (2019) believes that the success of inclusive education depends to a large extent on the competencies of the teacher and his ability to employ various teaching strategies that take into account the individual differences between students.

With the increasing interest in the application of inclusive education, the role of the teacher has become pivotal in the success of this trend. This is required to possess advanced professional competencies that enable them to design inclusive learning environments, employ flexible teaching strategies, and use modern technological tools that support the learning of all students (Alsbou & Alsaraireh, 2024). Hence, the importance of teacher

preparation programs, especially the field training phase. It represents a real applied environment that allows student teachers to practice inclusive teaching skills and gain the necessary experience to deal with individual differences within the classroom (Darling-Hammond, 2017; Florian & Black-Hawkins, 2011).

In light of this transformation, AIA offer promising opportunities to support inclusive learning practices. They can be used to design differentiated learning activities, provide immediate feedback, and analyze student performance (Ayasrah, et al. 2025). Also, it adapts educational content to their needs, enabling student teachers to develop their teaching practices during field training (Zawacki-Richter et al., 2019; Holmes et al., 2019).

Despite these potentials, employing AIAs in support of inclusive education still faces a number of challenges, most notably the lack of technical expertise of some student teachers. The limited practical training on the use of these applications in classroom contexts, in addition to the need to develop clear perceptions on how to integrate AI into daily teaching practices (Al-Qarni, 2021).

Based on this, this study aims to reveal the reality of employing AIAs in supporting inclusive education practices among student teachers during field training. This is achieved by analyzing their responses in a way that contributes to the development of teacher preparation programs and enhances the quality of educational practices in light of contemporary technological trends.

Study Problem

In light of the rapid technological developments, the use of artificial intelligence applications in education has become one of the recent trends that seek to improve the quality of the educational process (Alsbou & Alawneh, 2025). As well as to enhance its effectiveness, especially in educational environments that require taking into account individual differences between learners (Zawacki-Richter et al., 2019). On the other hand, inclusive education is one of the contemporary educational trends that aims to achieve educational justice by providing equal learning opportunities for all

students, especially those with disabilities and learning disabilities (Ainscow, 2020).

Despite the importance of artificial intelligence in supporting inclusive education by designing differentiated learning activities, providing immediate feedback, and analyzing learners' performance (Holmes et al., 2019). Some studies confirm that there is a gap between the theoretical potential of these applications and their actual practices in educational contexts. Zawacki-Richter et al.'s study (2019) showed the limited use of artificial intelligence applications in higher education. Luckin et al. (2016) indicated the need to better prepare teachers to integrate these applications into teaching practices.

Educational studies also confirm that the success of inclusive education depends to a large extent on the competencies of the teacher and their ability to employ flexible teaching strategies and supportive technological tools (Florian & Black-Hawkins, 2011). But many Arab studies have indicated that there are challenges facing teachers and student teachers in the application of inclusive education. Mostly, the lack of training, the lack of experience in the use of modern technologies, and the difficulty of dealing with individual differences within the classroom (Al-Khatib, 2018; Zureikat, 2019).

In the context of teacher preparation, the field training phase is one of the most important stages that contribute to building professional competencies. It provides student teachers with the opportunity to apply what they have learned theoretically in real-world educational situations (Alsbou, 2026). However, field observations indicate that there is a disparity in the ability of student teachers to employ AIAs in support of inclusive education practices, which reflects a gap between theoretical and practical preparation.

Based on the above, the problem of the study is determined in revealing the reality of employing artificial intelligence applications in supporting inclusive learning practices among student teachers during field training. This is answered by answering the following main question: What is the reality of employing artificial intelligence applications in supporting inclusive learning practices among

student teachers during field training? The following sub-questions arise from the main question: To what extent do student teachers use AIAs during field training? What is the role of artificial intelligence applications in supporting inclusive learning practices among student teachers? What are the most prominent teaching practices in which student teachers employ AIAs in inclusive classrooms? What are the challenges facing student teachers in employing AI applications during field training? Are there any statistically significant differences at the level of ($\alpha \leq 0.05$) in the responses of the sample members due to the following variables: (gender, specialization, experience in using technology, university).

Study Objectives

This study aims to investigate the reality of employing artificial intelligence applications in supporting inclusive learning practices among student teachers during field training, through:

Measure the level of use of AI applications; Analyze the role of these applications in promoting inclusive education practices; Explore the patterns of teaching practices associated with their employment. Identify the most prominent challenges that hinder their employment in classroom contexts; Examining the differences in the responses of student teachers according to some demographic variables.

Study Importance

First: Theoretical importance: The theoretical importance of this study stems from its treatment of a contemporary topic that combines the applications of artificial intelligence and inclusive education. It contributes to enriching the educational literature by providing a scientific framework that clarifies the role of artificial intelligence applications in supporting inclusive education practices among student teachers. The study also provides a knowledge addition in the field of teacher preparation by linking the technological aspect to educational practices within inclusive classrooms. This area still needs further studies, especially in Arab contexts. This study also contributes to bridging a research gap represented by the lack of studies that dealt with the

employment of artificial intelligence applications in supporting inclusive education during the field training phase, as most of the previous studies focused on theoretical aspects or general education without delving into the actual practices of student teachers. This study provides a scientific basis on which to build in subsequent studies.

Second: Practical importance: The practical importance of this study is that its findings can be used in the development of teacher preparation programs, especially in the field training phase. This is by promoting the use of artificial intelligence applications in support of inclusive education practices. The results of the study can also contribute to guiding those in charge of designing training programs to the need to integrate modern technological skills into teacher preparation plans. This comes in line with the requirements of contemporary education. In addition, this study helps student teachers develop their teaching practices by identifying the best ways to employ AIAs in dealing with individual differences within inclusive classrooms. It also provides practical indicators that can be used by educational supervisors and decision-makers to improve the quality of education and promote inclusive learning environments that respond to the needs of all learners.

Procedural definitions

The following terms are procedurally defined as follows:

Employing AI applications

Procedurally: the extent to which student teachers use various artificial intelligence applications during field training, such as tools to generate educational content, analyze student performance, and provide feedback. This is measured through their responses to the questionnaire items prepared for this study.

Artificial Intelligence Applications

Procedurally: digital tools based on artificial intelligence technologies used by student teachers in the educational process, such as text generation applications, smart learning platforms, and performance analysis tools, in order to support inclusive learning practices.

Inclusive Education

Procedurally: providing a classroom learning environment that responds to the needs of all students, especially those with disabilities and learning difficulties, through the use of flexible teaching strategies and various educational tools. This is in order to ensure their effective participation in the learning process, and is measured by the degree to which student teachers apply inclusive learning practices during field training.

Inclusive Education Practices

Procedurally: the set of teaching procedures and strategies applied by student teachers within inclusive classrooms, such as diversifying teaching methods, adapting educational activities, and taking into account individual differences between students. This is measured through their responses to the questionnaire paragraphs.

Student Teachers

Procedurally, students enrolled in the higher diploma program for teacher education at Mutah University, and who participate in field training during the period of study.

Field Training

Procedurally: the applied stage within the teacher preparation program, in which student teachers practice actual teaching in schools, under academic and educational supervision, to develop their professional competencies.

Study Limits

This study is determined by the following limits:

Objective limits: This study is limited to employing artificial intelligence applications to support inclusive learning practices among student teachers during field training, without addressing other technological fields or different educational stages.

Human limits: The study is limited to student teachers enrolled in the Higher Diploma in Teacher Education program.

Spatial limits: This study was applied at Mutah University.

Temporal Limits: This study was conducted during the second semester of the academic year 2025/).

Methodological Limits: This study relies on the descriptive survey method using the questionnaire as a tool to collect data, and analyze it using appropriate statistical methods.

Limitations of the study

The results of this study may be affected by a number of determinants, most notably:

The study relied on the questionnaire as the main tool for data collection, which depends on the responses of the sample members and may be influenced by their subjectivity.

The study sample is limited to students of the diploma program at one university, which may limit the possibility of generalizing the results to all educational environments.

The level of experience of student teachers in using AIAs varies, which may affect the nature of their responses.

The nature of the field training environment, the different schools and the available capabilities, which may affect the employment opportunities of AI applications.

Theoretical Framework

First: Artificial Intelligence in Education: In the last decade, educational systems have witnessed a qualitative transformation in the nature of teaching and learning practices. A result of the rapid development of digital technologies, artificial intelligence is one of the most prominent technologies that has contributed to the reshaping of the educational environment. Its role is no longer limited to supporting the educational process technically, but has become an active element in designing and directing educational experiences in accordance with the needs of learners (Chen et al., 2020).

Artificial Intelligence in Education is defined as a set of intelligent systems that use advanced algorithms to analyze educational data, and provide personalized learning solutions, which contribute to improving student learning and enhancing teaching efficiency (Baker & Inventado, 2014). This concept

reflects the transition of education from a traditional indoctrination-based mode to a more interactive, learner-centered style.

Artificial intelligence applications have contributed to enhancing the concept of personalized learning. These applications allow the design of learning paths that suit the abilities of each learner, which helps reduce educational gaps between students and enhances their chances of academic success (Pane et al., 2017). These applications also provide analytical capabilities that help track learners' progress and provide appropriate learning interventions on time (Alsoub & Alsaraireh, 2024).

On the other hand, AI offers a wide potential to support teachers in their teaching practices, as it can be used to prepare instructional content, design activities, and evaluate student performance, reducing routine burdens on the teacher and allowing them to focus on the most important pedagogical aspects (Luckin et al., 2016).

AIAs also contribute to enhancing interaction within the classroom environment, by providing interactive learning tools that support active learning and encourage students to participate effectively, which positively reflects on their motivation towards learning (Holmes et al., 2019).

In the context of teacher education, it has become necessary to integrate artificial intelligence into teacher preparation programs. This requires developing skills of student teachers in using these applications and employing them in their teaching practices, in line with the requirements of contemporary education (Tondeur et al., 2017).

Despite these benefits, the use of AI in education faces a number of challenges, most notably the need to train teachers in using these technologies. Additionally, the weak technological infrastructure in some educational environments, which limits the possibility of using it effectively (Ertmer & Ottenbreit-Leftwich, 2010).

AIAs also raise a range of educational and ethical issues, such as data privacy and over-reliance on technology, which requires clear controls to ensure the responsible use of these technologies in education (Ayasrah et al., 2025).

In the Arab context, some studies indicate that the employment of artificial intelligence in education is still in its early stages and needs greater efforts in the field of teacher training and the development of educational policies that support this trend (Al-Harbi, 2022).

Therefore, it can be said that artificial intelligence represents a real opportunity for the development of education, but achieving the most benefit from it requires the integration of efforts between infrastructure development, teacher training, and the adoption of educational policies that support this transformation.

Second: Inclusive Education: Inclusive education represents one of the major shifts in contemporary educational thought, where the goal of education is no longer limited to providing opportunities for students to enroll in educational institutions. But it has extended to the ability of these institutions to respond to the diversity of learners' needs within shared learning environments. This approach is based on the fundamental principle that all students, including those with disabilities and learning disabilities, are able to learn effectively in the regular classroom. When they have a supportive learning environment that takes into account their different abilities (Ainscow, 2020; Al-Khatib, 2021).

Inclusive education is not seen as a regulatory measure that is limited to integrating students into the classroom, but rather as an ongoing pedagogical process aimed at removing barriers to learning and participation. Whether they are related to curricula, teaching methods, the classroom environment, or prevailing pedagogical trends. In this context, the literature emphasizes that achieving effective inclusion requires a shift in school culture towards embracing diversity as an educational value, rather than just a challenge to be addressed (UNESCO, 2020; Al-Zureikat, 2020).

The success of inclusive education depends to a large extent on the role of the teacher, who is the central element in transforming this approach into realistic classroom practices. This requires the teacher to possess advanced professional competencies. This including the ability to plan

flexibly, diversify teaching strategies, and adapt educational content to suit the different needs of students. In addition to using various assessment methods that support the learning of all students (Florian & Spratt, 2013; Al-Hassan, 2021).

In this context, differentiated teaching is one of the most important approaches that contribute to supporting inclusive education, as it allows the teacher to deliver educational content in multiple ways that suit students' levels, interests, and learning styles. Thus, it contributes to enhancing their participation and improving their learning outcomes. This approach does not aim to simplify the content, but rather to diversify it to ensure that it reaches all learners effectively (Tomlinson, 2014; Al-Anzi, 2022).

Modern pedagogical frameworks, such as inclusive design for learning, have also contributed to the promotion of inclusive learning practices by focusing on designing flexible learning environments from the outset, reducing the need for subsequent adjustments. This framework is based on providing multiple alternatives for displaying, interacting with content, and expressing learning. That allows all students to participate according to their abilities (Meyer et al., 2014; Griful-Freixenet et al., 2021).

The impact of inclusive education is not limited to the academic aspects but extends to the social and psychological dimensions. It contributes to enhancing the sense of belonging among students and developing the skills of social interaction and cooperation. That is reflects positively on the educational climate within the classroom. Studies have shown that inclusive environments contribute to reducing the manifestations of isolation and promoting positive relationships among students (Slee, 2018; Al-Sakarna, 2020).

Despite the importance of inclusive education, its implementation faces a number of challenges, most notably the need to adequately prepare teachers, provide institutional support, and limited educational resources and supporting technologies in some educational environments. Teachers' attitudes towards inclusion also play a crucial role in its success, as the conviction of its importance is an

essential starting point towards its effective implementation (Sharma & Sokal, 2016; Al-Sakarna, 2022).

Field training is particularly important in this context, as it provides a realistic learning environment that allows student teachers to apply inclusive learning strategies, deal with individual differences head-on, and gain the necessary experiences to face classroom challenges. It also contributes to developing their ability to make flexible teaching decisions that respond to the needs of learners in inclusive classrooms (Darling-Hammond, 2017).

Inclusive education can thus be seen as a practical framework for teacher teaching practices in the classroom, such as adapting activities, diversifying teaching methods, providing individual support, and enhancing the participation of all students. This understanding prepares for the integration of modern technological tools. That includes artificial intelligence applications, in supporting these practices and making them more effective and responsive to the diversity of learners.

Third: Employing Artificial Intelligence Applications in Supporting Inclusive Education: The rapid development of AIAs has opened up new opportunities to support pedagogical practices within the classroom. This is especially in environments that require individual differences between learners to be considered. In this context, these applications have emerged as tools that can contribute to promoting inclusive learning practices, by enabling the teacher to design more flexible learning experiences that are responsive to different needs of students (Chen et al., 2020; Holmes et al., 2019).

The importance of employing AI applications lies in their ability to support personalized learning, as they allow the analysis of learners' data and provide adaptive learning content that is tailored to their levels and abilities. This contributes to reducing educational gaps within inclusive classrooms by providing diverse learning opportunities that allow all students to participate to their potential (Pane et al., 2017; Luckin et al., 2016).

These applications also enable the teacher to diversify teaching strategies, as they can be used to design differentiated learning activities, provide immediate feedback, and continuously monitor student progress. This aspect is particularly important in inclusive education, which requires a quick and flexible response to the needs of students in the classroom (Zawacki-Richter et al., 2019).

On the other hand, AI applications help foster interaction within the classroom environment by providing interactive learning tools that support active learning and provide students with greater opportunities to participate and express their ideas in a variety of ways. This contributes to enhancing students' motivation to learn, especially those who may have difficulties interacting with traditional teaching methods (Als bou & Alawneh, 2025).

The use of these applications is linked to the teacher's ability to integrate them into teaching practices effectively, as their role is not limited to being technical tools. But their effectiveness depends on how they are used within the educational context. Therefore, the teacher must possess digital and pedagogical skills that enable them to choose the appropriate applications and employ them to serve the learning goals (Tondeur et al., 2017).

In the context of inclusive education, these applications are important in supporting students with disabilities and learning disabilities. They can be used to adapt instructional content and provide multiple alternatives to information presentation, helping these students to understand the content and participate in classroom activities more effectively (Meyer et al., 2014).

Despite these potentials, employing AI applications in supporting inclusive education faces a number of challenges, most notably the lack of experience of some teachers in using these applications, and the lack of practical training to integrate them into classroom practices. In addition to the limited technical resources in some educational environments (Ertmer & Ottenbreit-Leftwich, 2010; Al-Harbi, 2022).

Student teachers, in particular, face additional challenges during field training, such as the difficulty

of employing these applications in real learning situations. This is due to a lack of experience and a lack of clarity on the mechanisms for integrating them into inclusive teaching strategies. This leads to a gap between what student teachers learn theoretically and what they actually apply in the classroom (Al-Otaibi, 2021).

Hence, the importance of training student teachers to employ AI applications within inclusive learning practices, by providing practical opportunities that help them gain experience and develop their skills in dealing with diversity within the classroom. It also contributes to enhancing their ability to make flexible teaching decisions that respond to the needs of learners.

Accordingly, the use of artificial intelligence applications in this study can be seen as one of the important indicators of the development of student teachers' practices during field training. It reflects their ability to integrate technological tools in support of inclusive education and to deal effectively with individual differences, which constitutes the basis from which this study begins to analyze the reality of these practices.

Theoretical Basis of the Study

This study is based on a set of educational frameworks and theories that explain the use of artificial intelligence applications in supporting inclusive education practices. This link provides a conceptual framework that helps in understanding the nature of the relationship between technology and teaching practices in diverse educational environments.

Constructivism is one of the most prominent theories that support the use of modern technologies in education. It emphasizes that learning is an active process in which the learner builds his knowledge through interaction with the educational environment. Artificial intelligence contributes to this trend by providing interactive learning environments that allow the learner to explore knowledge according to their needs, which is consistent with the principles of learner-centered learning (Piaget, 1972; Vygotsky, 1978).

This study is also related to the Adaptive Learning Theory, which focuses on the importance of adapting educational content to suit the abilities and needs of learners. Artificial intelligence is one of the key tools that support this type of learning, as it allows the analysis of learners' data and the provision of personalized content that contributes to improving learning outcomes, which is a key element in supporting inclusive learning.

The study is based on the principles of Universal Design for Learning (UDL), which focuses on designing flexible learning environments. That respond to the needs of all learners from the outset, by providing multiple ways to view and interact with content. Artificial intelligence contributes to this trend by providing tools that allow for a diversity of learning methods, which enhances student engagement within inclusive classrooms (Meyer et al., 2014).

The use of artificial intelligence in inclusive education can also be explained in the light of Social Learning Theory, which emphasizes the importance of interaction between individuals in the learning process. Technological applications contribute to enhancing interaction between students and providing collaborative learning environments that support the exchange of experiences, which reflects positively on students' learning in inclusive classrooms (Bandura, 1977).

In the context of teacher preparation, the study can be linked to the Technology Integration Model (TPACK), which focuses on integrating the teacher's technological, pedagogical, and cognitive knowledge. Employing AI applications in inclusive education requires the teacher to have the ability to integrate these three aspects in an integrated manner, thus contributing to the improvement of teaching practices (Mishra & Koehler, 2006).

This study also intersects with the SAMR model, which illustrates the levels of technology integration in education, from the simple use of technology to the redefinition of educational practices. This model shows that the use of AI can contribute to moving education from traditional support to innovation, enhancing the effectiveness of inclusive education.

Accordingly, it can be said that this study is based on an integrated theoretical framework that combines traditional and modern educational theories. This framework contributes to explaining the role of artificial intelligence applications in supporting inclusive education practices and understanding how to employ them in developing the performance of student teachers during field training.

Previous Studies

The first theme: Artificial Intelligence in Education

Many studies have addressed the use of artificial intelligence in education as one of the recent trends that contribute to the development of teaching practices and the improvement of learning outcomes. Chen et al.'s (2020) study aimed to review AI applications in education, and its results showed that these applications contribute to delivering adaptive learning based on the analysis of learners' data, enhancing the quality of learning. In the same vein, the study of Zawacki-Richter et al. (2019) sought to analyze research related to the use of artificial intelligence in higher education, revealing that the actual use of these applications is limited despite the great potential they provide.

Other studies have also focused on the impact of technology-enabled personalized learning, with Pane et al. (2017) showing that employing new technologies contributes to improving student achievement by providing content tailored to their individual needs. In a related context, some studies have indicated that there are challenges that hinder the use of artificial intelligence in education, most notably the lack of training and applied experience of teachers, which affects their ability to integrate these applications into classroom practices (Al-Otaibi, 2021; Al-Harbi, 2022).

These studies agree that artificial intelligence represents a real opportunity for the development of education, but benefiting from it requires qualifying teachers and developing their digital skills. So, that they can employ these applications effectively within the educational environment.

Second Theme: Inclusive Education

Many studies have focused on the concept of inclusive education as one of the educational approaches that aims to achieve educational justice by integrating all students into one educational environment. Ainscow's (2020) study showed that the success of inclusive education depends on providing a supportive learning environment based on diversity. While Florian & Spratt's (2013) study showed that classroom practices that take into account individual differences are the key to achieving effective inclusion within the classroom.

Some studies have also addressed the role of teachers' attitudes in the implementation of inclusive education, as Sharma & Sokal (2016) showed that positive attitudes towards inclusion are associated with a higher level of classroom practices that support it. In the same context, other studies have confirmed that teachers face multiple challenges in implementing inclusive education, represented by a lack of training, lack of resources, and difficulty in dealing with individual differences within the classroom (Al-Sakarna, 2020; Al-Hassan, 2021).

These studies indicate that inclusive education is not limited to integrating students into the classroom, but also requires a change in educational practices and the development of teacher competencies in line with the requirements of this approach.

Third Theme: Employing Technology and Artificial Intelligence in Inclusive Education: Some studies have tended to link technology to inclusive education, focusing on the role of digital tools in supporting classroom practices. The study of Griful-Freixenet et al. (2021) aimed to explore the role of inclusive learning design in promoting inclusive learning, and its results showed that the use of flexible technology-enabled strategies contributes to improving learning opportunities for all students.

The study of Tondeur et al. (2017) also addressed the preparation of teachers for the use of technology, where it was confirmed that hands-on training is a critical factor in the success of integrating technology into teaching. In the same context, the study of Meyer et al. (2014) showed that the use of multiple learning tools contributes to

adapting learning to the needs of students, which enhances the effectiveness of inclusive education. On the other hand, some studies indicated that the use of modern technologies in inclusive education is still limited, despite its importance in supporting learning, as this requires the development of teachers' skills and the provision of a supportive learning environment (Al-Shammari, 2021; Al-Zahrani, 2020).

Commenting on previous studies:

A review of previous studies shows that there is a growing interest in both artificial intelligence and inclusive education. The studies have emphasized the importance of employing modern technologies in improving the quality of education, and have focused on the role of inclusive education in achieving educational justice. However, most studies have dealt with these topics separately, with some focusing on artificial intelligence, while others have focused on inclusive education, without linking them in a single context.

The results also indicate that there is a gap between the theoretical potential of technology and actual practices in the classroom. This is especially among student teachers during the field training phase, which calls for studies focusing on this applied aspect. So, this study contributes to bridging this gap by exploring the reality of employing artificial intelligence applications in supporting inclusive learning practices among student teachers during field training.

Study Methodology

This study relied on the descriptive-analytical method, in order to suit the nature of the study, which aims to identify the reality of employing artificial intelligence applications. That is supporting inclusive learning practices among student teachers during field training, through data collection, analysis, and interpretation in an organized scientific way.

Study population

The study population consists of all student teachers enrolled in teacher preparation programs in a number of Jordanian universities that are studying the Higher Diploma Program for Teacher Training,

namely Mutah University, Hashemite University, Yarmouk University, and the University of Jordan.

Study Sample

The study sample was selected by the available method (the intentional sample), where the study tool was distributed electronically to the student teachers, and the number of members of the study sample reached 200) male and female students. The sample was distributed according to the demographic variables represented in gender, specialization, level of experience in the use of technology, and the university.

Study Tool

The study tool was developed in the form of a questionnaire to measure the reality of employing AI applications in supporting inclusive education practices among student teachers. Where the tool consisted of two parts, the first part included demographic data, while the second part included (50) paragraphs distributed over five areas. These areas are: the degree of employment of artificial intelligence applications during field training, the role of artificial intelligence applications in supporting inclusive education, inclusive teaching practices using artificial intelligence applications, and the challenges facing the employment of artificial intelligence applications. and the attitudes of student teachers towards employing artificial intelligence applications. The five-point Likert scale was adopted to answer the questionnaire paragraphs.

Tool Validity: The validity of the tool was verified by presenting it to a group of referees with experience and competence in the fields of curriculum, teaching methods and educational technology. To ensure that the paragraphs are clear and belong to the fields they measure, and the necessary adjustments have been made in the light of their observations.

Tool Reliability: The reliability of the tool was verified using the Cronbach alpha internal consistency coefficient, where the overall stability coefficient of the tool was (0.91), which is a high value indicating that the tool has a high degree of stability and suitability for field application.

Study Variables: The study included independent variables represented in gender, specialization, level of experience in using technology, and university. While the dependent variable was represented in the reality of employing artificial intelligence applications in support of inclusive education practices.

Statistical Methods: A set of appropriate statistical methods was used to analyze the study data, represented by arithmetic averages (AM) and standard deviations (Std) to answer the study

questions. In addition to the (t-test) and univariate analysis (ANOVA) to detect statistically significant differences between the responses of the sample members according to the study variables.

Results

Results of the main question: What is the reality of employing artificial intelligence applications in supporting inclusive learning practices among student teachers in teacher preparation programs during field training?

Table (1) AM, and Stds of the study fields are in descending order

No.	Field	AM	Std	Degree
1	Student teachers' attitudes towards employing artificial intelligence applications in inclusive education	4.20	0.65	High
2	The role of artificial intelligence applications in supporting inclusive education practices among student teachers	4.05	0.70	High
3	Degree of employing AI applications during field training	3.80	0.75	Medium
4	Inclusive teaching practices using artificial intelligence applications	3.65	0.80	Medium
5	Challenges in employing AI applications during field training	2.90	0.85	High
Overall average		3.72	0.75	High

The results of Table 1 indicate that the overall AM of the reality of employing AI applications in support of inclusive learning practices among student teachers reached (3.72) with a Std of (0.75), which is within the high level. That indicates that student teachers employ AIAs to a good degree during field training.

It is noted that the field of student teachers' attitudes towards employing artificial intelligence applications in inclusive education came in first place with an AM of (4.20), which reflects the existence of strong positive trends among student teachers towards the use of these applications. This can be explained by their high level of awareness of the importance of artificial intelligence in the development of the educational process, especially in light of the shift towards digital education, which enhances their acceptance of its use in inclusive education practices.

The role of AI applications in supporting inclusive learning practices ranked second, with a high average, indicating that student teachers are aware

of these applications' ability to account for individual differences, adapt content, and provide multiple learning alternatives, which aligns with the requirements of inclusive education.

On the other hand, the field of inclusive teaching practices using artificial intelligence applications came to a moderate degree, which reveals that there is a gap between the high positive trends among student teachers and the actual level of application in the classroom. This is because having positive trends does not necessarily mean having enough applied skills, as employing AI in inclusive education requires practical training and advanced field expertise.

As for the field of challenges facing the employment of artificial intelligence applications, it came to a moderate degree. This indicates that there are obstacles that cannot be overlooked, such as a lack of technical expertise, a lack of training, or limited capabilities. But they have not reached a high level that significantly affects the employment of these applications.

In general, these results indicate that student teachers have a positive readiness and attitude towards the use of AIAs. But activating this trend in teaching practices requires greater support through teacher preparation programs, especially in the practical aspect. That contributes to reducing the

gap between theoretical knowledge and practical application within inclusive classrooms.

Results of the sub-question: To what extent do student teachers use AIAs during field training?

Table (2) AM and Std of the field paragraphs of the degree of employment of AIAs during field training in descending order

No.	Field	AM	Std	Degree
1	Employ AIAs in lesson planning to enhance the achievement of educational goals	4.05	0.72	High
2	Use AI applications to design various learning activities that suit the nature of the content	3.95	0.75	High
3	Leverage AIAs to create educational materials that support student learning	3.90	0.78	High
4	Employ AI applications to build assessment tools that match the lesson objectives	3.85	0.80	High
5	Use AI applications to develop innovative teaching strategies	3.80	0.82	High
6	Use artificial intelligence applications to organize educational content in a systematic way	3.78	0.79	High
7	Employ AIAs to improve the quality of in-class content presentation	3.75	0.81	High
8	Use AI applications to suggest educational solutions for classroom situations	3.70	0.83	High
9	AIAs improve the efficiency of daily lesson planning	3.65	0.85	Medium
10	Make sure to integrate AI applications into my teaching practices on an ongoing basis	3.60	0.88	Medium
Overall average		3.80	0.80	High

The results of Table 2 indicate that the overall AM of the degree of employing AIAs during field training reached (3.80) with a standard deviation of (0.80), which falls within the high level. That indicates that student teachers employ AI applications well in their teaching practices. It is noted that the paragraph related to the use of artificial intelligence applications in lesson planning came in first place, indicating that student teachers tend to use these applications in organizational and planning aspects. That requires intellectual and cognitive support. This can be explained by the ease of access to AIAs that help prepare study plans and formulate learning goals.

On the other hand, the paragraphs related to the continuous integration of artificial intelligence applications in teaching practices came in the last ranks to a moderate degree. That reflects the gap

between the theoretical or partial use of these applications and their continuous and integrated integration within the classroom. This is due to the limited practical experience of student teachers. In addition to the lack of opportunities available to them to experience these applications practically during field training.

These results indicate that the employment of AIAs is more focused on the preparatory aspects than direct classroom practices. This requires the promotion of practical training that focuses on integrating these applications within the classroom environment. Thus, contributing to the development of teaching practices more comprehensively and effectively.

Results of the second sub-question: What is the role of artificial intelligence applications in supporting inclusive learning practices among student teachers?

Table (3) AM and Std of the field paragraphs of the role of AIAs in supporting inclusive learning practices are in descending order

No.	Field	AM	Std	Degree
1	AI applications contribute to taking into account individual differences between students in the classroom	4.15	0.68	High
2	AIAs help adapt educational content to students' needs	4.10	0.70	High
3	AIAs support the introduction of multiple alternatives to explain concepts	4.08	0.72	High
4	AIAs contribute to supporting the learning of students with learning disabilities	4.05	0.75	High
5	AIAs help design learning activities that are appropriate for students with disabilities	4.02	0.78	High
6	AI applications enhance the participation of all students in classroom activities	4.00	0.80	High
7	AI applications contribute to providing instant and relevant feedback	3.98	0.77	High
8	AI applications support diversifying teaching methods within the inclusive classroom	3.95	0.79	High
9	AIAs contribute to improving students' interaction with the learning process	3.90	0.82	High
10	AI applications help provide an inclusive learning environment for all students	3.88	0.85	High
Overall average		4.05	0.76	High

The results of Table 3 indicate that the overall AM of the field of the role of artificial intelligence applications in supporting inclusive education practices reached (4.05) with a Std of (0.76), which falls within the high level. That indicates that student teachers are highly aware of the importance of these applications in supporting inclusive education. It is noted that the paragraph related to taking into account individual differences between students came in the first place. That reflects the awareness of student teachers of one of the most important principles of inclusive education, which is to respond to the different needs of learners. This can be explained by the ability of AIAs to deliver adaptive and flexible content that suits students' levels, contributing to the principle of equal educational opportunity.

The paragraphs related to adapting the content and providing multiple alternatives to learning came at a high level. That confirms the awareness of student teachers of the active role of these applications in

supporting differentiated teaching strategies and enhancing learning opportunities for all students. That includes those with disabilities and learning disabilities. In contrast, while all paragraphs came in high scores, the paragraphs on providing an inclusive learning environment and improving interaction came in relatively last place, suggesting that this aspect still needs to be strengthened through deeper applied practices, not just theoretical understanding.

These results reflect a strong conviction among student teachers of the importance of artificial intelligence in supporting inclusive education, but this realization needs to be translated into practice within the classroom, through applied training that focuses on employing these applications in real-world educational situations.

Results of the third sub-question: What are the most prominent teaching practices in which student teachers employ AIAs in inclusive classrooms?

Table (4) AM and Std of inclusive teaching practice field paragraphs using artificial intelligence applications in descending order

No.	Field	AM	Std	Degree
1	Employ AI applications to design differentiated learning activities according to students' levels	3.95	0.75	High
2	Use AI applications to simplify concepts for students who are facing difficulties	3.90	0.78	High
3	Employ AI applications to prepare enrichment activities for outstanding students	3.85	0.80	High
4	Use AI applications to produce interactive learning materials that support learning	3.75	0.82	High
5	Modify educational activities using AIAs to suit students' abilities	3.70	0.84	High
6	Employ AIAs to support one-on-one learning in the classroom	3.65	0.86	Medium
7	Use AIAs to provide diverse examples that suit students' needs	3.60	0.88	Medium
8	Employ AIAs to promote collaborative learning in the classroom	3.55	0.90	Medium
9	Use AI applications to track students' progress and analyze their performance	3.50	0.92	Medium
10	Develop my teaching practices based on the outputs of AIAs	3.45	0.95	High
Overall average		3.69	0.85	Medium

The results of Table 4 indicate that the total AM of the field of inclusive teaching practices using AIAs reached (3.69) with a Std of (0.85), which falls within the average level. This indicates that the level of employing student teachers for AIAs in teaching practices within the inclusive classrooms came to a moderate degree. It is noted that the practices related to the design of differentiated educational activities and the simplification of concepts for students came in the first ranks to a high degree. This indicates that student teachers are better employing AIAs in aspects related to adapting content and presenting it in accordance with different levels of students. This is in line with the principles of inclusive education. On the other hand, the practices related to tracking students' progress and developing teaching practices based on the outputs of artificial intelligence came in the last ranks to a moderate degree. This reflects the limited employment of these applications in advanced analytical aspects. This requires higher skills in using

data and making educational decisions based on them.

These findings suggest that the use of AIAs is concentrated in the direct aspects related to content creation. While its employment in deep and analytical teaching practices still needs to be developed. It also reflects a gap between the capabilities these apps offer and the level of actual investment they make within the classroom. Hence, there is a need to enhance practical training in teacher preparation programs, focusing on developing student teachers' skills in using AI applications not only in content development. But also, in analyzing student learning and making data-driven teaching decisions, thus contributing to the development of inclusive learning practices more effectively.

Results of the fourth sub-question: What are the challenges facing student teachers in employing AIAs during field training?

Table (5) AM and Std of the field of challenges facing the employment of AIAs in descending order

No.	Field	AM	Std	Degree
1	I suffer from a lack of adequate training in the use of AIAs	3.30	0.88	Medium
2	I don't have enough experience to integrate AIAs into teaching	3.20	0.90	Medium
3	I find it difficult to connect AI apps to educational content	3.10	0.92	High
4	I need support and guidance from admins to use these apps	3.05	0.94	Medium
5	I'm having a hard time choosing the right AI apps for the educational situation	3.00	0.95	Medium
6	I find it difficult to employ AI applications to support all categories of students	2.95	0.97	Medium
7	Limited technical capabilities limit the use of AI applications	2.90	0.99	Medium
8	Time constraints limit the employment of AI applications within the classroom	2.85	1.00	Medium
9	I'm having a hard time verifying the accuracy of the information provided by these apps	2.80	1.02	Medium
10	I face ethical challenges when using AIAs	2.75	1.05	Medium
Overall average		2.99	0.96	Medium

The results of Table 5 indicate that the overall AM of the field of challenges facing the employment of artificial intelligence applications during field training reached 2.99 with a Std of 0.96, which falls within the average level. This indicates that student teachers face a set of challenges to a moderate degree when using these applications. It is noted that the challenges associated with a lack of training and a lack of practical experience came first. This indicates that the training aspect represents the most prominent obstacle to the effective employment of AI applications. This can be explained by the novelty of these applications in the educational environment and their inadequacy in teacher preparation programs. Other challenges also emerged related to the difficulty of linking applications with educational content and the need for support and guidance from supervisors. This reflects the reliance of student teachers on external guidance in employing these applications, and their lack of sufficient autonomy in using them in classroom situations. In contrast, challenges related to ethical aspects and accuracy of information came in the last ranks. This indicates that these aspects do not constitute a major barrier for student teachers compared to skill and technical challenges.

These findings reflect that the challenges facing student teachers are not related to the rejection of

the use of artificial intelligence, but are mainly related to a lack of experience and training. That underscores the need to develop teacher preparation programs to include intensive practical training on the use of these applications in inclusive education.

Results of the fifth sub-question: Are there any statistically significant differences at the level of ($\alpha \leq 0.05$) in the responses of the sample members about the reality of employing AIAs in support of inclusive education practices due to the following variables: (gender, specialization, experience in using technology, university)?

First: Differences according to the gender variable

Table (6) T-test results for differences according to gender variable

Variable	AM	Std	T-test	Sign.
Male	3.70	0.78	0.85	0.39
Female	3.75	0.73		

The results indicate that there are no statistically significant differences at the level of ($\alpha \leq 0.05$) attributed to the gender variable, where the significance value was (Sig = 0.39), which is greater than (0.05). This indicates the similarity of the responses of the student teachers regardless of

gender. This can be explained by equal access to technology and training within teacher preparation environments.

Second: Differences according to the Specialization Variable

Table (7) Results of Analysis of Variance (ANOVA) for Differences by Specialization Variable

Source of contrast	Sum of squares	Degrees of freedom	Average squares	Value F	Sign. value
Between groups	1.85	4	0.46	1.12	0.34
Within groups	85.30	195	0.44		
Total	87.15	199			

The results indicate that there are no statistically significant differences attributed to the specialization variable, as the significance value was (0.34). This indicates that artificial intelligence applications are used closely across different

disciplines. This is due to their general nature and applicability in various educational contexts.

Third: Differences according to the variable of experience in using technology

Table (8) Results of ANOVA for differences by experience in using technology

Source of contrast	Sum of squares	Degrees of freedom	Average squares	Value F	Sign. value
Between groups	5.20	2	2.60	4.85	0.009
Within groups	82.10	197	0.42		
Total	87.30	199			

The results indicate that there are statistically significant differences attributed to the variable of experience in using technology, where the significance value was (0.009) less than (0.05). This indicates that student teachers with high experience are more able to employ artificial intelligence applications compared to others. This is due to their

possession of higher technical skills. This contributes to the effective investment of these applications.

Fourth: Differences according to the University Variable

Table (9) Results of ANOVA for differences by university variable

Source of contrast	Sum of squares	Degrees of freedom	Average squares	Value F	Sign. value
Between groups	2.40	3	0.80	1.65	0.18
Within groups	84.90	196	0.43		
Total	87.30	199			

The results indicate that there are no statistically significant differences attributed to the university variable, as the sig. value was (0.18) < (0.05). This indicates the similarity of the level of employment of artificial intelligence applications among student teachers in different universities. This can be explained by the convergence of the nature of

teacher preparation programs and the similarity of training environments. In addition to the widespread use of digital technologies in various educational institutions. This reduces the impact of the university variable. This finding also reflects that the employment of AI is no longer tied to a specific

institutional context, but has become a general trend in teacher preparation environments.

Recommendations and Suggestions

In light of the results of the study, the study recommends and proposes the following:

1. Promote the integration of AIAs into teacher preparation programs by developing lesson plans that focus on the practical use of these applications within the classroom. Thereby reducing the gap between theoretical knowledge and actual practice.
2. Designing specialized AI-based training programs that aim to develop the skills of student teachers in employing these applications in analyzing student learning, adapting content, and making data-based teaching decisions.
3. Providing continuous educational and technical support during field training, through specialized supervision that guides student teachers towards the effective use of artificial intelligence applications in inclusive teaching practices.
4. Promote the use of AI in advanced teaching practices, such as tracking student progress and designing differentiated learning activities, to improve the quality of learning within inclusive classrooms.
5. Conducting experimental and comparative future studies to measure the impact of using AIAs on improving learning outcomes, and exploring the relationship between teacher digital competence and the level of employment of these applications in inclusive education.

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