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Research paper

Exploring Iranian EFL Teachers' Trust in AI-based Education Technology

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Abstract

There has been an expanding tendency in English language education during the past few years as different digital tools are used more frequently. Artificial intelligence (AI) technology is one of the burgeoning educational innovations. It is frequently asserted that AI technology can transform the conventional educational environment through features like intelligent guiding, and personalized learning environments. Robotic educators, adaptive learning systems, and intelligent tutoring systems are examples of AI employed by teachers and students in the various contexts. This transition depends on trust, the fundamental principle of human interaction with AI. Higher Education has a substantial knowledge gap regarding teachers' feelings about AI-based educational technology. Consequently, this preliminary case study evaluates EFL instructors' trust in AI, specifically in Iranian English language teaching and learning. Ten EFL teachers participated in an online survey that served as the foundation for this investigation. Despite the small number of participants, the study examines the advantages of AI and perceived trust in it in a classroom setting. In addition, AI diagnosis was viewed with skepticism because current AI technology frequently comprises black-box models with unclear explanations of how the system's fundamental operations operate. The study concludes that implementing AI-based technology in education will never fully replace the conventional educational system regarding social contact, even in how teachers collaborate with AI to improve pedagogy.

Keywords: Artificial intelligence, Educational technology, Higher Education, Technology-enhanced learning

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Introduction

Digital technology forms a large part of our everyday life. It has reshaped how humans behave regarding communication and searching for information. This transformation means that the environment of schooling is starting to alter. Increasing numbers of instructional programs are integrating technology-enhanced learning into the curriculum.

Technology-enhanced learning aims to improve all aspects of the teaching and learning process by integrating digital technology (Tchounikine et al., 2009). Artificial Intelligence (AI) is part of this growing educational technology. It is described as "the area of computer science devoted to addressing cognitive issues commonly related to human intelligence, such as learning, problem-solving, and pattern recognition." (Chassignol et al., 2018, p. 17).

Today's university education sector uses AI technologies that educators and students find more distinctive. These technologies include Robotic educators, adaptive learning systems, and intelligent tutoring systems (Nwana,1990).

Studies also indicate that AI has additional areas of application that will reshape the educational landscape. The transformative power of technology is described by the Director-General of the United Nations Organization for Education as "*AI will fundamentally change education"* (UNESCO, 2022) by revolutionizing tools for teaching, modes of learning, information access, and teacher preparation. AI, therefore, has the potential to contribute to achieving global educational goals (Chassignol et al., 2018; Nwana, 1990; UNESCO, 2022).

However, today's AI technology still has limitations regarding complex tasks, which is a consequence of automation in terms of AI and digitization. The complexity means that AI methods today show a certain degree of uncertainty in the result, which Rossi writes about in her article (Rossi, 2018). A fundamental factor in reaching the full potential of AI is that teachers have trust

in both the technology and its use (Vincent, 2020). teaching robots and adaptive learning systems (Nwana,1990). This creates additional challenges that *"include privacy and security of data, but also possible misuse of data leading to bias against individuals or groups"* (Vincent, 2020, p. 3).

Trust is seen as the "cornerstone of humanity's relationship with AI" (Siau & Wang, 2018, p. 52) and constitutes a requirement in AI's future part of the education process. As AI applications become more and more common, the trust of educators, among others, will be critical to both the development and acceptance of the technology to achieve its full potential (Siau & Wang, 2018). This study has been conducted in higher Education in Iran. In this endeavor, AI significantly improves the quality of life by either developing automated processes or enhancing human intelligence (Varakantham et al., 2017). This underlines how central AI is to the country's development in all sectors.

Concerning the relevance of AI in the future development of a 'smart' nation, research shows that trust is a primary factor in the use of information systems. It is fundamental to adopting new technology (Li et al., 2008). Due to the uncertainty complex AI exhibits today, the trust of teachers as users of the technology is central. There is a lack of knowledge about teachers' views on AI-based technology in Education (Kim & Kim, 2022). Therefore, based on a developed instrument for this measure, this case study aims to fill this knowledge gap to map the technology's potential in pedagogy. The research question that this study aims to answer is thus:

1. Do higher education EFL teachers in the context of Iran trust in AI-based education technology?

Literature review

The work is done in the field of research known as technology-enhanced learning (TEL). The intersection of various fields, including pedagogy, psychology, computer science, psychology,

philosophy, and communication, describes the area. It aims to improve all aspects of the teaching and learning process by integrating technology. This technology is made up of educational technology, also known as *educational technology*, which combines educational theory and practice with digital systems to improve learning (Tchounikine et al., 2009).

Artificial intelligence (AI) is a technology or scientific discipline that aims for machines to imitate human natural intelligence. AI research began in the 1950s and encompasses two main areas. One area of research consists of data analysis and correlation. It is often applied in situations with a vaguely defined or incomplete understanding of the problem. This area of AI requires large amounts of data. It is often difficult to explain, which always entails a certain degree of uncertainty in the results. This uncertainty, coupled with the difficulty of automating complex tasks, constitutes some negative aspects of AI and automation (Rossi, 2018; Vincent, 2020). The second part is deterministic, based on rules, logic, and symbols. Therefore, it always finds a solution if the problem has been adequately defined. The application of these types of AI, however, requires that all outcomes of the problem at hand can be predicted. In order to optimize the advantages and minimize the disadvantages, the two research areas within AI are increasingly applied in combination (Rossi, 2018).

Many successful AI applications have emerged in recent years because of improved algorithms, more powerful computers, and more data. In applications like speech-to-text, text understanding, image interpretation, and more where machine learning techniques are appropriate, this entails an AI capability comparable to the human level. However, this success enables implementing AI systems in existing scenarios in connection with a usually high degree of uncertainty. However, current application-specific AI technology barely scratches the surface of

the possibilities Rossi (Rossi, 2018) claims. However, the technology's potential is not yet realized, which makes understanding its limitations important.

A study published in 2020 found that In Education, notably by educational institutions, AI has received widespread acceptance and use in various ways. When AI first emerged, computer-related innovations like the World Wide Web were its primary components, then took the form of intelligent educational systems and online learning platforms, now appearing in built-in computer systems such as teaching assistants or instructors (Chen et al., 2020). This takes, for example, the form of web-based chatbots and humanoid robots, which independently and in conjunction with teachers perform the teacher's tasks.

Through these platforms, teachers can more efficiently and effectively perform various administrative functions to achieve a higher quality in their teaching. The curriculum and content can be tailored and adapted in line with the needs of the students thanks to the systems use of machine learning. Furthermore, this has promoted learning and retention, consequently improving the overall quality of learning associated with the teachers' experience.

Thus, the AI tools already used in the educational process include content creation, teaching strategies, student assessment, and teacher-student communication. Based on publications, AI will continue to reshape the traditional educational landscape through personalized learning environments and intelligent guidance and assessment systems (Chassignol et al., 2018).

The degree of trust a person has in someone, or something is decisive for how the person in question behaves. Trust is essential in all interactions since it is the primary driver of acceptance. For instance, trust can influence how individuals use technology. Trust is defined by Siau et al. (Siau & Wang, 2018) as:

i. a group of particular convictions about goodness, skill, character, and predictability (trust in beliefs)

ii. the readiness of one party to rely on another in a dangerous circumstance (reliance on intent)

iii. A combination of these elements. There, trust is described as *"A party's readiness to be exposed to the conduct of another party based on the expectation that the other will take a particular action that is important to the fiduciary, regardless of the ability to monitor or control the other party"* (Siau and Wang, 2018, *p* . 48).

According to a study based on support from China, AI is starting to be implemented in the education sector. However, these systems are not used to any great extent in practice. Qin et al., 2020 believe that the acceptance of the technology is driven forward by, among other things, trust. Previous experiences with AI-based systems in reality and fiction influence the perception of AI in an educational context. Thus, trust in AI-based educational technology is colored by the individual's previous interactions with AI. Individuals aware of how AI-based technology works will generally have greater trust in that technology (Araujo et al., 2020). This positive association with the benefit of educational technology depends on the level of Education. In contrast, the usefulness and perceived fairness of the technology depends on expertise in a specific field, such as computer programming, artificial intelligence, or algorithms.

AI can transform today's education landscape (Chassignol et al., 2018). Today, AI-based educational technology creates educational materials, instructional strategies, evaluation of student progress, and teacher-student interaction. In the future, technology can help interpret students' difficulties and understand how to support them in designing a new educational experience. The educational environment is facing a change where the development of massive open online

courses, intelligent tutoring systems, and personalized learning environments is enabled without replacing social interaction (Chassignol et al., 2018).

AI can improve both educational processes and outcomes in the classroom. However, the evidence for the effectiveness of AI is still limited. AI-based educational technology has several dimensions.

Technology can be considered reliable if it performs what it is supposed to perform correctly and if there is trust that people will use it fairly and appropriately. This means there is a possibility that the AI performs its task correctly but that operators abuse this. Vincent-Lancrin et al. described (Vincent, 2020, p. 14) this as "So *it is not only AI that needs to be reliable but also the interaction between humans and AI."*

Education is a sector with low investment in research and development and therefore finds it difficult to examine the reliability of the AI applications that are currently considered promising, neither in terms of technical reliability nor the likelihood of malicious use by actors in the education sector. In a sector with economic constraints, this is of the utmost importance to investigate (Vincent, 2020).

There is support that AI can offer new opportunities for higher education teaching and learning. However, the technology's limitations for AI solutions in complicated fields must be understood. The partially constrained reliability, technical capabilities, and multi-domain applicability of AI for classroom usage are some of its drawbacks and difficulties. An example is a challenge described in the book *The Black Box Society* (Pasquale, 2015).

It applies to all implementations of AI, including the education sector. The book describes hidden algorithms with a deliberate lack of transparency about their work. However, this does not always have to be a bad thing. The book's author, Pasquale, notes that there are examples when

poor transparency is desirable. Big tech companies like Google and Twitter are deliberately vague about how their models that identify spam work, precisely to discourage spam from conforming to these rules. However, Pasquale continues that low transparency can hide conflicts of interest and potentially malicious intent. Thus, this is an apparent vulnerability that should be considered when implementing AI in Higher Education.

Popenici and Kerr, in their article (Popenici & Kerr, 2017), also highlight the importance of universities maintaining self-determination over the tools they use. AI models trained for projects in private business often have different incentives than academia. These often contradict the universities' role of encouraging dissent.

Popenici and Kerr argue that higher learning will die out if the freedom to think and investigate is not respected. Cathy O'Neil writes in her book *Weapons of math destruction* (O'Neil, 2016) about several risks with intelligent systems. Among other things, O'Neil writes about how fifth-grade teachers, despite excellent credentials, were fired based on a poor grade from an algorithm-based evaluation. To make it fairer, a digitized method was used to rescale several parameters into numbers. These systems received no feedback and thus trained their models on data that could not be confirmed correct. This means that this model 'defines its reality' and uses it to justify its results, which resulted in the AI making unfavorable decisions that hurt teachers, according to O'Neil. Again, this shows current AI models' limitations and their many unintended consequences on humans.

In summary, it can be concluded that AI opens up both new opportunities and challenges for higher Education. The challenges make it essential to consider that Education is a human-centered ambition, not a technology-centered solution.

The great interest in AI may lead to the introduction of unquestioned technology that can omit the subjective reality of individuals in universities. Higher Education can be broken down into knowledge delivery and memory, making it particularly important to be skeptical of the implementation of technology in the sector. Therefore, academic skepticism is required to preserve higher Education's goal of creating educated minds of responsible citizens with humane public values (Popenici & Kerr, 2017; Celik et al., 2022).

Data-driven innovations comprising robots, adaptive learning systems, and intelligent tutoring systems provide some progress in Education (Nwana,1990) and show the potential to reform the education sector (Viberg et al., 2018). However, trust is required from teachers as practitioners to reach the full potential of AI-based educational technology. Confidence in the technology is also central to how teachers perceive it and may control their interaction with it, which is a critical element of the technology's intended use (Nazaretsky et al., 2022). Despite this, there is a significant knowledge gap surrounding how higher education professors feel about using AI-based technologies, which is what this work intends to close.

Method

Participants

The survey was answered by teachers teaching at private Institute in Esfahan (N=10). The study participants comprised one group of individuals, of which eight identified themselves as male and as female.

The majority (6) were between 45 and 65 years old, while the remaining (4) participants were 30 to 50 years old. Furthermore, six of the participants in the study had up to 8 years of experience in teaching and teaching with the help of technology. The remaining four participants had 20 to 29

years of experience teaching. The study involved ten teachers who teach English language in private language institute.

Table1
Demographic information of the participants

N	Age	Gender	Experience of Education	Educational discipline
T1	45-65	M	1-8	ELT
T2	30-50	W	1-8	ELT
T3	30-50	M	1-8	ELT
T4	45-65	M	20-29	ELT
T5	45-65	M	20-29	ELT
T6	45-65	W	20-29	ELT
T7	30-50	M	1-8	ELT
T8	45-65	M	1-8	ELT
T9	30-50	M	1-8	ELT
T10	45-65	M	20-29	ELT

Materials and Instruments

Nazaretsky et al. developed a survey instrument used in this study to gauge teachers' trust in AI-based instructional technology. The instrument's premise is that trust is decisive in the user's perception of technology.

AI-specific misconceptions, fears, and myths among practitioners characterize the issue of AI-powered learning analytics tools. The purpose of the instrument is to provide a tool to measure the trust and attitudes of teachers regarding adopting AI-based educational technology. The authors describe the instrument as *"reliable to investigate the role of teachers' trust in artificial intelligence-based educational technology and the factors that influence it"* (Nazaretsky et al., 2022, p. 1). The instrument consists *of* 25 questions about teachers' views and convictions on using AI-based classroom tools. Each question was answered according to a Likert scale from 1 to 5. The employed five-point scale was as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. There are three sections for questions: *perceived benefits of AI*

in an educational setting, reasons not to trust AI diagnosis, and *working with AI to improve pedagogy.*

Data Collection Procedure

An exploratory case study method was applied to investigate teachers' trust in AI. Case studies as a research method are described as exploring a small number of specific occurrences or situations and their relationships in the context of contemporary natural phenomena. (Zainal,2007, pp. 1–2). Before data collection began, pilot research was carried out to ensure the survey's questions were straightforward. The study was then conducted via a digital survey sent out by the authors to the teaching staff at institute.

Before the participant disclosed any information, consent was requested to protect ethical aspects. The survey was based on a previously developed instrument (Nazaretsky et al., 2022) to gauge instructors' trust in AI-based instructional technology.

Data Analysis Procedure

The method for analyzing the study results consisted of compiling the collected data to clarify the general opinion expressed by the participants. This was analyzed in connection with the participant's existing perception of their knowledge of AI, their demographic information, trust parameters from the Likert scale, and other possible patterns that are noticed. This was also related to existing research.

Results

The following results section is divided into three parts. The three parts are based on the subject areas from the instrument and consist of: 1. Perceived benefits of AI in an educational environment, 2. Reasons not to trust AI diagnosis, and 3. Working together with AI to improve pedagogy.

4.1. Perceived benefits of AI in an educational environment

Table 2
Perceived benefits of AI in an educational environment

N	QUESTIONS	Negative	Positive
Q1	AI can help with the formative evaluation of complex activities and provide real-time customized feedback suggestions.	**3**	**6**
Q2	AI can help create automated systems that assign students unique learning routes. self-learning	**0**	**9**
Q3	AI can assist in developing intelligent agents that can serve as study partners or teaching helpers.	**2**	**5**
Q4	AI can identify student challenges to assist teachers in distributing tailored tasks that are appropriate for each student.	**2**	**6**
Q5	With tasks like recognizing students who are not on task, AI can assist teachers in managing the classroom.	**0**	**9**
Q6	AI can assist teachers with planning duties like creating classes and warm-up exercises.	**1**	**6**
Q7	by deploying AI-based avatars to practice and simulate teaching, AI can enhance teacher education. scenarios	**1**	**4**

Question 1 is about whether AI can help with the formative evaluation of challenging activities and provide real-time customized feedback suggestions. A neutral attitude to this statement was unusual (1); the participant gave for neutrality because he believed that AI is best used for routine tasks rather than complex problem-solving.

A three number of participants felt that they disagreed with the above statement because AI is not considered to have achieved the degree of certainty in making correct assessments of open questions, the quality of scientific reasoning, etc. AI models were still considered to need human validation. It is also argued in the free text answers that factors such as the students' maturity when accepting feedback are often not considered. The majority (6) of the participants thought the statement above was true. However, the challenge was finding a suitable application. It was also claimed that course recommendations can currently help students.

Regarding question 2, nine number of the participants agreed that AI can help develop automated systems to promote student self-learning by assigning individualized learning paths. This was justified by the fact that standardized learning paths should be able to be defined. Moreover, this technology is already established today but requires human validation.

Question 3 concerns whether AI can help create intelligent agents acting as learning buddies or teaching assistants. Participants mentioned current implementations in games, mathematics, and coding. (5) agreed with the statement and believed that today's applications in narrow domains such as mathematics and programming were successful. In games, doubts were raised about an ethical aspect of harassment, which also required human validation.

The majority (6) of participants agreed with the statement in question 4 that AI can help diagnose students' difficulties and help teachers decide on measures matching individual needs. In connection with this, the need for human validation is also raised to a certain extent. A smaller proportion of participants (2) felt that this was unlikely in Higher Education which is more advanced, and therefore considered themselves neutral to the statement. Other participants (2) raised some uncertainty about whether this is possible and therefore disagreed Q4 with the statement.

AI can help teachers with actions for managing the classroom, like recognizing the students. Those who are out of phase with their tasks were touched on in question 5. The majority (9) of the participants agreed with this statement. It was also mentioned that it is used today and works. As well as, intelligent tutoring systems only capture keystrokes or activities that take place on digital platforms, meaning it does not consider students' physical behavior. Because of this, a lack of interest in applying it in higher Education is highlighted.

Most participants (9) agreed or were neutral that AI can help teachers plan responsibilities like organizing lessons and activities before class, which was addressed in question 6. It was also highlighted that this would require changed working methods for the instructors but that there is a use for the technology. Some participants, however, saw a lack of need for AI because it was considered simple activities.

Furthermore, half of the participants (5) considered themselves neutral to question 7 which concerns the ability of AI to improve teacher education, for instance, by simulating and practicing instructional scenarios with AI-based avatars. The technology is unlikely to be considered sufficiently "authentic." The teacher, who felt that he disagreed with this (1), felt that there was uncertainty about how the application of AI would affect professionalism.

The only further advantages of applying AI to education beyond what was mentioned above was that it can support self-learning as well as career planning, analysis of educational research and personal knowledge flow.

Reasons not to trust AI diagnosis

Table 3
Reasons for not trusting AI diagnosis

N	QUESTIONS	Negative	Positive
Q8	Differences between the teacher's assessment and the AI diagnostic	**0**	**8**
Q9	AI developers lack academic credentials.	**0**	**8**
Q10	AI algorithms do not understand the social, emotional, and motivational components that are crucial in decision-making.	**1**	**8**
Q11	The real experience and intuition of teachers is superior to that of a computer	**0**	**8**
Q12	The learner's past outside of the system is unknown to AI algorithms.	**3**	**6**
Q13	Lack of openness in AI decision-making	**0**	**7**
Q14	gives AI control and autonomy instead of instructors' autonomy	**4**	**3**
Q15	Less need for instructors as AI grows more widespread	**7**	**0**
Q16	Privacy risks associated with data utilization affect both teachers and students.	**3**	**6**

Eight of the participants agreed that there is a discrepancy between the AI diagnosis

Moreover, the teacher's opinion is addressed in question 8. The opinion was thought to be due to the difficulty of measuring abstract things, such as students' perceptions, and AI models are not always accurate. Consequently, teachers must still validate the results and fine-tune the models. The minority (2) who considered themselves neutral to the statement expressed that they found it difficult to understand.

Most participants (8) agreed that AI developers lack training experience, which is addressed in question 9 because they are widely different disciplines. It is also noted that this does not only apply to Education but is a lack of domain-specific experience in all sectors. The individuals who develop AI models were considered to need deep knowledge and practical experience in classroom teaching.

Furthermore, a majority (8) of the participants felt that question 10 was true. Participants argued that AI algorithms cannot comprehend motivational, social, and emotional components crucial in teaching.

Motivational factors were considered difficult to learn by current AI methods. The opinion was also based on the fact that AI may have the ability to model patterns but cannot necessarily explain the reason why specific patterns arose. Often this is answered by looking at other aspects of students and the learning environment. There are no technologies or means to collect such data today. Another aspect that is raised is the ethical issues that arise around data privacy.

Eight of the participants agreed with question 11 that teachers' experience and intuition are superior to a computer. Like the previous answer, it was considered that no technologies currently enable this data collection. It was therefore considered impossible to collect all teachers' experiences to feed AI models then.

Six of the participants agreed that AI systems are unaware of the learner's past behavior outside the system, which is addressed in question Q12. The student's history was considered individual, and the AI was judged to lack the ability to reflect this. Three of them opposed the statement as they believed the instructor also does not know the student's past outside the system.

The majority (7) of participants felt a lack of transparency surrounding AI's decision-making process, which is discussed in question 13. This was motivated by the fact that more explanation-based systems, that is, an intelligent system that can learn by observing examples, will need to be developed to fill this gap.

Question 14 concerns whether there is a reason not to trust that an AI diagnosis is autonomous and control is taken away from teachers and given to the AI. Here, a majority (4) of the participants disagreed. This was justified because AI can never take over the instructor role. The minority (3) who considered the statement true justify this by saying that AI cannot replace humans. Further, they felt that AI's presence would further highlight humans' superiority as AI can maximally assist human decision-making and perform automation.

Furthermore, participants also disagreed that fewer teachers would be required as AI becomes more prevalent if quality education is to be maintained, as touched upon in question 15. They felt the need for human teachers would be further strengthened by including more AI in classroom teaching. AI's ability to automate tasks and make decisions will free up time for teachers. This can mean additional time to focus on other tasks or research activities that require high levels of human intelligence. This was considered to be able to bring about a ground-breaking innovation in Education that teachers had not considered before.

Finally, six number of the participants in the study agreed with question 16 about the use of data involving risks for teachers' and students' privacy. The other four participants disagreed with this statement or considered themselves neutral.

Other reasons not to trust the Unmentioned applications of AI in education could be that AI models are often black-box models. This type of model means that a unit, i.e., a system or object, produces information without reproducing information about its internal workings.The explanations for its conclusions, therefore, remain hidden (Guidotti et al., 2019).

participants believed trust and reliable AI would develop in the future, both about each other and student feedback.

Work together with AI to improve pedagogy

Table 4
Work together with AI to improve pedagogy

N	QUESTIONS	Negative	Positive
Q17	In my classroom, I trust entirely using AI-based individualized learning technologies.	**3**	**4**
Q18	I am confident that when and if AI-based tools for personalization become available, I will effectively employ them in my classroom.	**3**	**6**
Q19	When and if AI-based tools for personalization become available to me, I will employ them in my class.	**2**	**7**
Q20	I am confident that implementing AI-based personalization tools in my classroom will necessitate that I make a significant investment.	**3**	**6**
Q21	AI-based technologies for tailored learning will win my entire trust when they become more prevalent.	**1**	**6**
Q22	My ability to trust an AI-based tool will increase as I learn how it makes judgments.	**3**	**7**
Q23	I will be able to trust the AI tool's insights more when more data is available.	**3**	**6**
Q24	I trust recommendations from AI-based tools at least as much as recommendations from other teachers.	**5**	**4**
Q25	I trust recommendations from a single AI-based tool at least as much as I do recommendations from a single expert.	**1**	**3**

On question 17, there was no clear majority for either a positive (4), neutral (3), or negative (3) stance on whether participants have complete trust in employing AI-based personal learning tools in the classroom.

The neutral attitude was justified because this depends on the system's quality. Those participants who felt they did not fully trust using AI-based systems judged that human validation would still be required regarding recommendations and analysis results.

Furthermore, six of the participants felt optimistic that they will successfully use AI-based solutions for personalization in the classroom When and if they are made available to them. This is addressed in question 18. The proportion who disagreed with (3) the above statement justified this by saying that it only becomes a source of distraction. This is because AI models require much time for human validation. This is supported by the fact that it is more time efficient for teachers to rely on their human intelligence to analyze and personalize Education.

Most participants (7) also agreed they would employ personalized AI capabilities in their classroom when and if they become available, which is discussed in question 19. Part (1), who considered themselves neutral to the claim, justified this by being open to testing but did not consider themselves comfortable with a lack of knowledge of its internal workings, i.e., black-box models.

Regarding using personalized AI-based technologies in their classroom, i.e., in question 20, half of the participants (6) agree that it will require the teacher to alter their pedagogy fundamentally. The remaining proportion who considered themselves neutral to the statement believes that this depends on what purpose the AI tools are intended for. It was also added that teachers have already implemented agile technology tools in their teaching.

Six number of the participants responded positively to question 21 regarding AI-based tools for personal learning will gain their complete confidence as it becomes more common. The percentage who considered themselves neutral to a statement (3) bases this on the results of previous implementation in their specific teaching.

Regarding question 22, most participants (7) believed that the more they understand how a tool that uses AI makes judgments, the more they can trust it. This is justified by associating with the black-box model.

Furthermore, most participants (6) believed that the more data an AI tool can access, the more they can trust its insights, addressed in question 23. The answers to the question show support that AI tools have a positive impact on learning and that they will create greater trust in the technology. The participants believe that results and tests at the course level are necessary.

Five number of the participants consider that they do not trust recommendations from at least as much as they do a referral from another teacher; they trust an AI-based tool. This is touched on in question 24. Other teachers with many years of teaching experience behind them have unbeatable skills and knowledge compared to today's AI technology. A positive attitude was also expressed that an AI-based tool would be equivalent to a recommendation from another teacher due to AI being considered unbiased. Those participants who felt that trust in an AI-based tool was equivalent to trust in another teacher justified this by saying that it depends on the specific AI system and the other teacher.

Finally, most participants (6) are neutral regarding question 25, regarding the trust for recommendations. They would put as much trust in an AI-based tool as in a professional suggestion. This is because researchers do not necessarily have practical classroom experience. The trust for teachers is thus more significant than the scientists who lack teaching experience.

The minority (3) who agreed with the statement considered that they trust the AI tool as much as an expert, as earlier knowledge-based systems, also called Knowledge-Based Systems (KBS), have an easier time capturing experts' knowledge.

In summary, participants more often agree with the statements than oppose them. Mainly, the participants agree with the first part that AI is thought to have advantages in a learning environment. This is followed by part two, where the participants agreed on the reasons for not trusting AI diagnosis. Finally, they agree somewhat less with the statements concerning teachers working together with AI to improve pedagogy.

Discussion

The current study sought to address a critical knowledge gap concerning the trust levels that higher education English as a Foreign Language (EFL) instructors in Iran place in AI-based educational technology as part of their teaching practice. This research endeavor aimed to answer a fundamental question: " Do higher education EFL teachers in the context of Iran trust in AI-based education technology?"

The findings of this investigation unveiled that educators can derive significant benefits from the integration of AI into various educational processes, creating a more efficient and effective learning environment. Nevertheless, a notable lack of trust was observed when it came to AI models perceived as "black-box models," wherein the inner workings of the technology remained concealed, potentially due to a lack of awareness surrounding the technology. Furthermore, it was apparent that teachers had greater faith in recommendations from their peers compared to recommendations generated by AI-based tools, particularly when the teacher's extensive teaching experience provided unparalleled expertise.

The study also illuminated that instructors exhibited considerable trust in the advantages of AI in an EFL learning setting, particularly in the realm of automated systems that facilitate self-directed student learning through prescribed learning paths. However, it is worth noting that drawing generalized conclusions for all teachers may be precarious due to the relatively limited participation in the study. The findings of this research underscored a notable discrepancy based on the specific discipline in which participants were engaged. As such, certain participants exhibited a more positive attitude toward the potential benefits of AI in educational environments (Chassignol et al., 2018). These results align with previous research by Qin et al. (2020), who contend that a deeper understanding of AI's functionality and advantages engenders greater confidence in its implementation, particularly in EFL education (Araujo et al., 2020).

One noteworthy outcome of the study was the apprehension expressed by teachers regarding black-box AI models, which they viewed as a reason not to trust AI in education. These models fall within the AI research domain characterized by examples, data analysis, and correlation. In a 2021 study by von Eschenbach (von Eschenbach, 2021), the research study explored the reasons underlying the lack of trust in AI, with a primary focus on the connection between black-box models and trust. Employing a philosophical analysis of trust, the study compellingly argued that transparency is a crucial factor in establishing trust. Trust, as per the study, necessitates a comprehensible understanding of how a system operates; black-box models, by nature, lack this transparency and, therefore, fall short of meeting the criteria for trustworthiness. This lack of transparency, as elucidated by the study, may be attributed to the reservations expressed by teachers regarding their trust in AI diagnosis. It is postulated that non-transparent systems could potentially harbor detrimental agendas, such as AI being employed as a weapon, thus giving rise to distrust (von Eschenbach, 2021).

The investigation also substantiates the proposition that AI can never entirely replace the role of an instructor. This perspective is in line with prior research (Chassignol et al., 2018), which examined trends in AI in education and argued that while AI has significantly transformed the educational landscape, the aim should not be to replace all forms of social interaction with AI. The findings concur with the present study, where it is evident that a teacher's experience and intuition are valued more highly than an AI model. Nonetheless, it is essential to consider that, since the study's respondents were teachers themselves, this skepticism regarding AI replacing instructors may be influenced by their self-interest. Moreover, the study highlighted the significance of transparency in AI models in determining teachers' trust in technology. In the context of the black-box problem in AI, the study recommended that one potential solution could involve developing models that "open the black box" (von Eschenbach, 2021, p. 1) by rendering the complex decision-making processes more understandable to observers. Nevertheless, it was noted that, in the current technological landscape, the ability to make black-box models more transparent to the majority of human observers is limited (von Eschenbach, 2021).

The study's results also underscore the notion that the more information available regarding an AI tool's internal operations, the more reliable it becomes. The study suggested that a lack of trust in black-box models might be a contributing factor to the wariness of AI recommendations. A substantial portion of the study's participants conveyed a lack of trust in AI-generated recommendations, placing trust in an AI-based tool on par with trust in a teacher's recommendation. This phenomenon could be attributed to the extensive teaching experience that educators possess, which renders their recommendations equally credible. It is important to recognize that what individuals typically seek in technological contexts is interpretability or understanding, rather than mere disclosure of the black box's inner workings (Guidotti et al., 2019;

von Eschenbach, 2021). In the context of evaluating an individual's trustworthiness, whether that individual is human or AI, a fundamental requirement is understanding the underlying motives, as well as the individual's competence (Guidotti et al., 2019). Consequently, individuals naturally seek information that aligns with perceived personal interests, resulting in actions that are consistent with those interests. As long as the judgment is perceived as sound and in line with self-interest, a global interpretation of AI models is not essential for establishing trust (von Eschenbach, 2021).

A critical area for potential improvement in the study pertains to the survey's participation rate among teachers, which could significantly bolster the credibility of the results. To enhance the response rate, the study suggested adopting a validated data collection method (Bälter et al., 2005) and potentially conducting a quantitative survey. Such an approach would emphasize numerical results and provide a more straightforward framework for comparisons with other studies (Nazaretsky et al., 2022). Additionally, another means of accumulating a more substantial dataset could involve executing a qualitative interview study based on the instrument's questions, rather than relying solely on a quantitative survey. This approach would yield a more nuanced understanding of the factors influencing instructors' trust in AI-based educational technology and would enable in-depth exploration through follow-up questions during interviews. Physical studies have also been shown to enhance diversity among participants, as internet access tends to be significantly worse among low-income and minority groups (Lourenco & Tasimi, 2020).

In conclusion, the study provides valuable insights into the complex relationship between higher education EFL instructors in Iran and their trust in AI-based educational technology. It emphasizes the significance of transparency and understanding in AI models, acknowledges the limitations of AI in completely replacing instructors, and underscores the need for further research

to ensure a more comprehensive and representative sample. Additionally, it suggests potential improvements for future research methodologies to enhance the credibility of findings and highlights the importance of accessibility in technology-related studies.

Conclusion

The current study investigated EFL teachers' trust in using AI in educational technology in higher Education. The result shows that these teachers have tremendous trust in the perceived advantages of AI in a learning environment. Furthermore, a lack of trust is also shown in reasons not to trust AI diagnosis. This is based on the lack of transparency in the current available AI systems that frequently use black-box models. In addition, trust in technology is strongly associated with the amount of information about the internal workings of the educational technology in question. Finally, it is argued that using AI-based technology in higher education can never replace the conventional education system in social interaction, which is relevant to how professors use AI to improve pedagogy.

The study has also shown that the instrument to gauge teachers' trust in artificial intelligence-based educational technology contributed good insights to portray the specific institution's attitude to the technology. However, the reliability of this claim is low, as this study had only ten participants, and the instrument's effectiveness in higher education has not been demonstrated before.

However, the results of the conducted study can be compared with similar studies in countries other than Iran.AI has a potentially transformative power that spans many economic and social sectors, including education. This study examines the trust instructors in higher education have in AI-based learning tools. This exploratory case study provides a comprehensive look at the void that forms the fundamental principle guiding humanity's interaction with artificial intelligence

(Siau & Wang, 2018). Similar research studies in other countries would be relevant in studying the cultural differences between countries. Based on this, a more nuanced picture of teachers' views on AI-based educational technology could be formulated.

The most significant limitation of the study is the relatively small participation of teachers. With only 10 participants, the sample size is not representative of the broader population of higher education EFL teachers in Iran. This limited sample may not adequately capture the diverse range of perspectives and experiences within this group. Due to the small sample size and the specific context (Iran), it's challenging to generalize the study's findings to a broader population of EFL teachers in different cultural and educational settings. The study's results may not be applicable to other regions or contexts. The study involved teachers who volunteered to participate. These participants may have unique perspectives or a particular interest in AI-based technology, potentially introducing self-selection bias. Those who chose to participate may already have a predisposition towards AI technology, leading to a lack of diverse opinions.

The study focused on EFL teachers in Iran, and cultural and regional factors can significantly influence attitudes toward technology. The findings may not be applicable to other countries or regions with different cultural and educational contexts. The participants were aware that the study aimed to investigate trust in AI-based technology, which may have influenced their responses. They may have been more cautious or inclined to express positive attitudes due to this awareness, leading to response bias. While the study discusses the influence of teaching experience on trust in AI, it does not delve deeply into the specific factors or experiences that shape this trust. A more in-depth exploration of the relationship between teaching expertise and trust in AI could provide valuable insights.

Author Contributions

Authors have analyzed the collected data and contributed the development of the paper.

Declaration of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Statement

Derived data of this study are made available by the authors, without undue reservation.

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