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Investigating the Potential of Integrating Generative AI Tools into Teacher Training and Professional Development Programs

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The field of education is being transformed by artificial intelligence (AI). In order to enhance teaching and learning experiences, educators and professionals in educational evaluation need to stay updated with the rapid advancements in AI technology. AI-driven educational assessment systems offer multiple benefits, including enhanced test efficiency and precision, personalized feedback for students, and the ability for teachers to adapt their lesson plans to meet individual student needs. Consequently, AI possesses the capability to fundamentally alter the delivery and assessment of education, ultimately enhancing student learning outcomes. This essay explores the diverse applications of artificial intelligence (AI) methods in the assessment and quantification of educational outcomes. It addresses, in particular, the use of big language AI models in classroom assessment, particularly in test purpose determination. The report concludes by outlining solutions to these problems and boosting AI's efficiency in educational assessment. In conclusion, there are advantages and disadvantages of utilizing AI in educational assessment. As a result, stakeholders, legislators, and educators must collaborate to create plans that balance the dangers involved with maximizing the advantages of AI in educational evaluation. In the end, integrating AI into assessment in education has the potential to revolutionize the field, enhance student learning, and provide pupils with the tools they need to thrive in the twenty-first century.

1. Introduction

Artificial Intelligence (AI) has greatly enhanced various facets of daily life, including living conditions, educational settings, and professional environments. Its integration into everyday tasks is seamless, evident in applications like smart home devices and chatbots. The latest generation of generative AI tools, exemplified by Chat GPT and DALL-E2, built upon Large Language Models, promises a transformative impact across multiple domains. Particularly within the educational sector, scholars and practitioners engage in extensive discussions regarding the profound implications of these tools on teaching methods, learning experiences, and assessment practices, as emphasized there (Kohnke et al. 2023).

In today's learning contexts, generative artificial intelligence (GAI) has to be included in the curriculum. This research paper uses a combination of quantitative and qualitative research methods to extensively examine the effects of implementing GAI in the Saudi Arabian setting of higher education (Alammari, 2023). The power of artificial intelligence in education (AIEd), highlighting how it might improve learning outcomes by providing students with interesting, adaptable, and personalized learning experiences. In addition to helping students, AIEd also helps teachers provide individualized support (Dolmark et al. 2022).

To allay these worries, implementing AI in educational contexts needs to be done so with caution and careful thought (Zawacki-Richter et al., 2019). Georgia Tech, for instance, received praise from students for introducing a virtual teaching assistant that was powered by IBM's Watson platform (Maderer, 2018). A great deal of research on incorporating AI into education indicates that it can have a big impact on the administration and design of educational institutions (Popenici & Kerr, 2017). Teachers and students may experience trust concerns as a result of a lack of transparency, particularly if the decisions made by AI systems have an impact on their evaluations or recommendations (Burrell, 2016).

Although there has been a significant improvement in educators' digital abilities and the ubiquitous use of technology, which has been expedited by the COVID-19 epidemic, language teachers may still need specialized digital skills that are specifically designed for integrating artificial intelligence (AI) (Kohnke et al., 2023). Generative AI tools are a notable improvement over earlier AI technologies. They utilize deep learning models to create content that closely approaches human talents. This comprises a diverse range of outputs, such as music, code, photos, text, simulations, 3D objects, and videos. These outputs are capable of responding to complex cues in different languages, instructions, and queries (Lim et al., 2023).

Prior studies have investigated how traditional artificial intelligence (AI) improves education by optimizing various instructional methods, including face-to-face, blended, and online formats (Kexin et al., 2020). It also simplifies tasks to reduce workload pressures (Weng & Chiu, 2023) and enhances data analysis procedures (European Commission, 2022). AI-driven systems can aid educators in analyzing student learning data to discover effective teaching methods,

automating the production of assessments, and delivering prompt feedback and grading (Chaudhry & Kazim, 2021).

1.1 Objectives of Study

i) When implementing AI in the classroom, what digital abilities and pedagogical expertise are necessary for instructors to possess?

ii) What strategies may professional development programs use to address teachers' worries about the deployment of AI technologies and address their challenges?

1.2 Research Questions

The present study addresses the following questions:

i) What digital competencies and pedagogical knowledge do teachers require in the implementation of AI in teaching practice?

ii) How can professional development programs employ to tackle teachers' challenges and address concerns regarding the adoption of adoption of AI technologies?

2. Literature Review

In 1956, McCarthy provided a definition for Artificial Intelligence (AI) as "the field of study and application of creating machines that possess the ability to exhibit intelligent behaviour" (McCarthy, 2007, p. 2). This event marked the beginning of AI research, happening at the same time as the creation of the "thinking machine" by Newell and Simon. This was the first computer program designed to imitate human intelligence in order to solve difficult issues. In recent years, educators and researchers have focused more on AI in Education (AIED), using AI-based technologies as intelligent tutors, tools/partners, and policy advisers to improve teaching, learning, and decision-making (Hwang et al., 2020).

The acknowledgment of artificial intelligence's potential in education has resulted in a significant increase in interest in artificial intelligence in education (AIED) from researchers, policymakers, and practitioners. This emphasis has stimulated the development of AI-powered educational technologies, such as intelligent tutoring systems and recommendation engines. These technologies offer individualised support by supplying customised learning materials, assessing areas of proficiency and areas for improvement, and identifying students who may be at risk of encountering academic difficulties (Hwang et al., 2020; Williamson & Eynon, 2020). Studies in the field of Artificial Intelligence in Education (AIED) have investigated different aspects, such as the impact of AI on student learning, instructional strategies, methods of assessment, and educational decision-making (Chiu et al., 2023). However, there has been a lack of focus on the digital skills that instructors need to effectively use AI-powered learning platforms, especially when it comes to using generative AI tools.

AI technologies provide educators with the chance to improve educational approaches by offering personalized support, enabling smooth communication, and providing insights through

learning analytics (Ng et al., 2023). Despite the potential advantages, numerous educators still exhibit reluctance in embracing AI-driven technology due to a range of challenges, such as apprehensions around job displacement, ethical considerations, inadequate infrastructure, and insufficient understanding. Some educators may also feel unprepared to adequately utilize AIED techniques, as insufficient institutional support and training worsen the problem. In order to tackle these difficulties, it is essential to provide teachers with the requisite digital skills needed to successfully incorporate AI into teaching methods.

This involves offering professional development opportunities, cultivating favourable attitudes towards AI, setting explicit norms on data privacy and ethical usage, and obtaining money for resources and equipment. To overcome reluctance and promote responsible deployment, it is crucial to highlight the ethical use of AI and acknowledge its supportive role in conjunction with instructors' experience. Engaging in partnerships with governments and business organizations is crucial to aid this process (Zhang & Aslan, 2021).

3. Research Methodology

The present study aligns with the qualitative interpretive paradigm and utilizes the technique recommended by academicians (Denzin & Lincoln, 2011). The goal of the study was to explore the various viewpoints of English language instructors. This was achieved by conducting semi-structured interviews at the University of Central Punjab in the spring of 2023. The objective was to gather extensive understanding of the actual experiences and perspectives of the participants, as highlighted by Creswell (2008).

3.1 Research Context and Participants

The present research recruited ten educators affiliated with the English Language Centre, a department within a university that is one of eight institutions providing undergraduate and postgraduate programs in a range of subjects, all taught in English. The English Language Centre serves a vital role in aiding students in adapting to university life and the English-medium academic setting. All participants had comparable academic backgrounds, having attained either a master's or doctoral degree in the instruction of the English language. The participants included ten instructors, evenly divided between genders, with ages ranging from 36 to 57. Their collective teaching experience spanned from 10 to 32 years. Consent was obtained from all participants, and pseudonyms were assigned to maintain confidentiality. Although some individuals had prior exposure to AI tools, none of them had previously integrated AI in Education (AIED) into their teaching methodologies.

3.2 Data Collection and Analysis

This study utilized an interpretive framework to examine instructors' perspectives and encounters on AI in Education (AIED). To extensively investigate the topic, individual semi-structured interviews were conducted using a qualitative research approach to address two specific study topics (Cohen et al., 2011). The researchers employed convenience sampling, where the first

author personally invited professors from the English Language Centre at the University of Central Punjab to take part in the study. Generative artificial intelligence (AI) refers to algorithms, like ChatGPT, that have the ability to create a wide range of content, such as voice, code, graphics, text, simulations, and movies (McKinsey & Company, 2023).

The interview guide consisted of targeted inquiries that addressed the requisite digital proficiencies for successful integration of AI in teaching, essential pedagogical factors for incorporating AI in the classroom, encountered challenges in adopting AI technologies, the impact of existing digital competencies and pedagogical expertise on AI utilization, significant subjects or abilities for an AI-centered professional development program, and effective training or support encounters.

The interviews, which were conducted in English and lasted between 28 and 42 minutes, were recorded and analyzed using manual iterative thematic analysis to provide a full comprehension of the data (Braun & Clarke, 2006). Participants were provided with transcripts for an initial member check, as stated by Merriam, Tisdell, and E (2016). The transcripts were coded by the authors individually, resulting in initial codes that were then collectively revised using Google Docs.

Themes and sub-themes were determined by reaching a general agreement. An approach of code-recode was employed to ensure consistency and reliability (Anney, 2014). An additional member validation process was carried out to further verify the reliability of the study. The participants were given an overview of the findings, encompassing identified themes and representative quotes (Merriam et al., 2016). The language instructors did not propose any revisions throughout the two member checks, which confirms the reliability of the findings.

4. Results

The results have been categorized according to the four primary themes that were identified during the investigation. Themes 1 and 2 offer valuable perspectives on Research Question 1, whereas Themes 3 and 4 specifically tackle Research Question 2. This section presents the interview responses of the language instructors exactly as they were given.

4.1 Theme No 1: Implicit Awareness of AI and its Influence on Attitudes

Overall, the participants exhibited a good understanding of AI tools and their diverse functionalities during the interviews. They regularly engaged with AI products, such as Alexa, Siri, Google Assistant and Fitbit. Participants explained that they utilized these technologies to optimize work and personalize their exposures. One respondent exemplified their use of AI tools to effectively manage their daily calendar by receiving timely reminders for significant business and personal obligations. Additionally, certain individuals indicated that they utilised Google Maps and Apple Siri to access real-time updates on traffic conditions and weather forecasts.

Nevertheless, the language instructors had integrated these technologies so deeply into their everyday routines that they did not necessarily connect them with artificial intelligence.

Amelia expressed that she utilises her Fitbit on a regular basis and does not perceive it as artificial intelligence, but rather as another form of technology. Only recently, upon the introduction of ChatGPT, did I begin to contemplate this AI.

While AI had already been integrated into the participants' everyday routines through interactive tools, the emergence of ChatGPT and comparable software heightened their understanding of AI and its consequences. For example, Mukhtar observed that following the introduction of ChatGPT, there was a dramatic surge in discussions about artificial intelligence. Similarly, Naeem became aware that he had been "employing diverse forms of AI technology for a considerable period of time." Will pondered, "Prior to the surge in AI enthusiasm, I hadn't even considered its significance, but now I comprehend that I have been utilising it for several years."

Hence, despite the participants' prior familiarity and daily usage of AI-driven technologies like virtual assistants and fitness programs, their recognition of AI's presence only occurred upon the introduction of ChatGPT. Obtaining a deeper understanding of the experiences of language tutors with AI can assist in developing training programs for professional development that effectively leverage their existing skills and awareness to encourage the integration of generative AI in their lectures.

4.2 Theme No 2: The significance of Awareness and Confidence to Integrate Generative AI into Teaching Methodologies

The second repeating topic emphasized the participants' requirement to familiarize themselves with generative AI tools prior to contemplating their incorporation into instructional methodologies. Sehrish expressed, "In order to assess its suitability for my students, I must initially endeavor to comprehend its functionality." Zeshan stated, "As an educator, my primary responsibility is to impart knowledge on academic essay writing to my students. Therefore, I am interested in understanding how ChatGPT-4 can serve as a complementary tool to enhance my teaching methods, rather than serving as a substitute." When prompted for clarification, he admitted to being unsure about creating educational exercises that promote both critical thinking and writing abilities, rather than simply copying and pasting. Two participants, Roheen, brainstormed potential applications of ChatGPT-4 for student use. Roheen suggested that instead of instructing students to begin with a Google search for background material, using ChatGPT-4 in the upcoming semester could be a more effective method for idea generation. Nevertheless, they both concurred that they must acquire additional assurance using ChatGPT-4 prior to integrating it into their instructional practices.

A number of other participants expressed comparable pedagogical concerns. Tayyaba stated that both students and educators are new to everything, and it is necessary for us to understand how to successfully utilize AI in order to achieve the required learning outcomes. The majority of participants agreed that they lack sufficient preparation to effectively utilize generative AI techniques for improving teaching and learning. Zeshan, who saw himself as technologically

adept, characterized generative AI as an entirely novel realm that necessitates a fresh set of skills and is challenging to stay abreast of.

The majority of participants saw that their existing degree of digital proficiency directly impacts their capacity to properly utilize artificial intelligence. For instance, Noeen stated that his lack of familiarity with AI technologies will pose a difficulty in determining the most effective methods to include them into his teaching approach in the forthcoming semester. Although the process of utilizing ChatGPT for lesson preparation and quiz creation is uncomplicated, the user is of the opinion that his students would derive additional advantages from employing it to fulfil assignments.

The participants stated a wish to get more familiarity with employing chatbots as a pedagogical resource in an AI setting to support their students in practicing writing. The individuals specifically requested information on the most effective prompts to utilize in order to facilitate the development of students' writing skills. Other participants proposed that AI could assist their pupils in actively participating in their assignments and acquiring knowledge more efficiently, or it could offer automated feedback.

Sehrish stressed the need of pupils "cultivating their communicative abilities" and "acquiring knowledge autonomously beyond the confines of the classroom." Nevertheless, they recognized that this could pose a difficulty if pupils excessively depend on AI tools. In general, the interviewees displayed a positive outlook regarding the potential of generative AI tools in education, but they also indicated skepticism regarding how these tools may be effectively applied. Therefore, it is recommended that providers of professional development include tactics for integrating these tools in order to foster more profound learning and improve students' abilities to think critically.

4.3 Theme No 3: Tailored Support for Enhancing AI Teaching Competencies of Instructors

The third element centered on the assistance required by participants to cultivate proficiency in teaching with AI. Most interviewees expressed consensus that their university has not provided adequate support recently to keep pace with the rapid progress of generative AI technologies. The university has primarily depended on sending unclear instructions by email and has not even provided opportunities for interactive discussion. Language professors advised participants to participate in practical workshops, where they may actively explore and apply artificial intelligence approaches in a supportive environment, since this would result in better advantages. Mia commented that there is an excessive amount of discourse around the favourable and unfavourable attributes of ChatGPT-4 in both the corridors and university emails.

However, we do not receive instruction on the efficient utilization of it at workshops or seminars. Multiple participants supported Mia's viewpoint, underscoring the necessity for casual workshops where they can engage in experimentation with various prompts and deliberate on how these tools can enhance their current materials and evaluations. Will suggested that the university implement self-paced learning opportunities, where instructors can engage in different scenarios

to enhance their comprehension. In addition, they proposed enhancing the website's accessibility by providing easy access to publications, journals, and reviews. Additionally, it was proposed to organize informal sharing sessions as a means to facilitate an open forum for discussing concerns.

The participants reached a consensus that they require additional information in order to fully comprehend the advantages and constraints of artificial intelligence in the educational setting. Sophia stressed the importance of acquiring further knowledge on how it might augment our teaching methods without substituting them. Another proposal was to have language centers and universities offer individualized coaching and mentoring sessions led by skilled language instructors in the field of AI tools. Zeshan recollected, "Amidst the COVID-19 pandemic, we collaborated with our colleagues to seek guidance on the utilization of technology." I believe it would be beneficial for them to commence promoting this initiative immediately, as it would assist certain individuals in catching up.

When prompted for details, Roheen suggested the implementation of small, exclusive online courses that concentrate on various facets of artificial intelligence. One course could address ethical considerations regarding the utilization of AI-generative tools, while another could concentrate on their application in teaching and evaluating speaking and writing skills. In my opinion, this approach would be a highly effective way for us to get familiarity with and explore the issue in greater depth at our own convenience, regardless of location. This subject emphasizes the importance of offering a range of professional development formats and methods that meet the specific needs and learning preferences of language instructors. This will allow them to acquire the necessary knowledge and skills to successfully incorporate generative AI.

4.4 Theme No 4: Integrating AI into the Subject or Discipline

The fourth theme focused on the requisite expertise that English language instructors need to possess to efficiently use AI tools into their instruction. This is because certain technologies may have subject-specific applications or difficulties. Will revealed his intention to employ generative AI techniques for the purpose of delivering personalized feedback to enhance individual learning. This would involve providing targeted assistance to weaker students in areas like erroneous verb tense usage and vocabulary development. He explained, stating that acquiring additional knowledge regarding chatbots and intelligent teaching systems would be advantageous for such endeavors. James proposed that AI technologies could aid students in enhancing their pronunciation and communication abilities, allowing them to engage in "authentic language" practice for speaking skills. Nevertheless, the language instructors observed that the little resources they are acquainted with for teaching English, such as Loora.ai and SmallTalk2.me, are excessively costly.

Therefore, it is necessary for professional development programs to provide content that is particular to the topic areas of language instructors. The participants also recognized some challenges that could arise from employing AI in language classes. The participants engaged in a

conversation regarding the significance of tackling plagiarism and the consequences of utilizing AI-generated material for academic tasks.

Roheen expressed apprehension regarding the potential lack of autonomous work among students, while Sophia remarked, "It is exceedingly effortless for students to attempt to engage in academic dishonesty." Will proposed that language professors may aid students in acquiring the skills to "assess online information and employ it responsibly" as a solution to the worry that students may depend on ChatGPT-4 to accomplish their written assignments. They reached a consensus that their responsibility entails instructing linguistic abilities and promoting digital citizenship among their students.

During the interviews, participants displayed a keen interest in the practical use of AI. The consensus was that implementing a ban on ChatGPT-4 would be unfeasible. Nevertheless, Tayyaba expressed apprehension regarding the increased workload and time needed to determine the optimal approach for incorporating it into students' language study. Amelia also mentioned the necessity of adapting her teaching methodology to "incorporate AI tools in her classroom." These arguments emphasize the significance of creating professional development programs that tackle these difficulties and provide guidance to language instructors in dealing with them within their specific subject or discipline.

4.6 Conclusion & Discussion

The findings offer insights into the essential digital competencies and pedagogical knowledge required by language instructors to effectively integrate AI tools into their teaching. Moreover, they offer valuable understanding into the difficulties that instructors encounter and the support they require. According to the literature review, teachers' views on integrating AI in the classroom are significantly influenced by their level of proficiency with the technology. This study verifies that language instructors commonly possess tacit understanding of artificial intelligence due to its integration into numerous widely utilized digital technologies. The advent of ChatGPT and the subsequent media coverage appears to have heightened language instructors' awareness of AI and inspired them to partake in more discerning and productive contemplation on it.

Nevertheless, despite the heightened level of consciousness, the individuals involved in the research appear to be deficient in the requisite abilities to proficiently utilize artificial intelligence systems for educational purposes. Their lack of confidence in integrating these tools and educating pupils how to utilize them effectively and ethically was openly acknowledged. The findings indicate that language instructors need to have both knowledge and self-assurance in utilizing generative AI technologies in order to use them effectively, as supported by other studies (e.g., Christudas et al., 2018; Liu et al., 2017).

Furthermore, it is imperative for individuals to develop expertise in digital skills and gain a thorough understanding of the educational aspects associated with these tools. To rectify the deficiencies highlighted by (Chiu et al. 2023) and (Ng et al. 2023), one can address these

requirements. The findings also emphasize the challenges and concerns that language instructors face when integrating AI technology, such as the fear of being replaced and ethical considerations (Du & Gao, 2023). (Hockly, 2023) underscores the significance of integrating ethical considerations and devising remedies to tackle the potential drawbacks of AI in professional development courses. Language instructors might be encouraged to view AI as a valuable addition to their instruction rather than something to be feared or seen as a threat by addressing their concerns (e.g., Ratten, 2020).

Research on the impact of generative AI tools on education is now in its nascent stages, and language instructors are consistently investigating and adjusting to it. Hence, it is imperative to establish professional development initiatives that are specifically tailored to foster favourable mindsets and facilitate the adoption of English language teaching methodologies propelled by artificial intelligence. These courses should acknowledge and build upon teachers' prior artificial intelligence (AI) experiences, as detailed in this study. This study highlights the significance of offering tailored support to enhance teachers' AI teaching abilities, which includes hands-on workshops, self-guided learning opportunities, and personalized coaching. This aligns with the recommendations put forth in the scholarly literature by Hrastinski et al. (2019) and underscores the importance of seeking support from governments and commercial entities to secure the required financial support and resources, as emphasized by Ng et al. (2022).

5.1 Practical Implications

This study makes a substantial contribution to the comprehension of the digital skills, instructional expertise, and ongoing training that language educators require in order to successfully incorporate generative AI into the field of education. The results have practical implications for establishing professional development programs that specifically target the issues and concerns faced by teachers, thereby helping them properly utilize these technologies. The subsequent suggestions are intended to assist educators, policymakers, and stakeholders in establishing conducive settings that successfully utilize AI technologies to improve the teaching and learning process.

Emphasize the capacity of AI to enhance conventional teaching approaches through the provision of personalized education, feedback, and evaluation. Possible strategies could involve the invitation of knowledgeable speakers or the coordination of webinars to disseminate knowledge regarding the advantages and practical uses of AI in the field of language instruction. To overcome opposition stemming from perceived complexity or lack of relevance, it is crucial to highlight concrete advantages by presenting actual instances of AI implementation in educational settings.

Organize seminars and hands-on sessions where language instructors engage with AI technologies pertaining to language instruction, under the guidance of AI experts, to receive concise and thorough training. It is essential to customize the training based on the technical competency levels of the instructors, offer support resources, and conduct follow-up sessions in

order to reduce any potential emotions of overwhelm. Create customized online courses and self-study modules specifically designed for language instructors, enabling them to learn at their preferred speed. By incorporating into current professional development initiatives and offering rewards for completion, engagement can be enhanced even in the midst of demanding schedules.

Incorporate artificial intelligence (AI) into teacher education programs by incorporating AI-related abilities and skills into the curricula for pre-service teachers. To overcome the difficulties in obtaining capable instructors, one can handle this issue by engaging in collaboration with curriculum designers, offering training to educators, or forming partnerships with AI professionals. Utilize systematic assessment methods, like as surveys, interviews, and classroom observations, to evaluate the efficacy of professional development programs in improving language instructors' AI-related skills. Integrating qualitative and quantitative methodologies can yield a comprehensive comprehension, leading to improvement. Continuously revise professional development programs to match the advancements in AI technologies and the shifting requirements in language education. Forming a specialized team or task force to remain informed and guarantee the ongoing relevance of program content is advantageous.

Create an atmosphere of collaboration in which language instructors may exchange experiences, draw lessons from both triumphs and obstacles, and provide mutual assistance in the integration of AI. Establishing learning communities or peer-coaching programs can promote the exchange of knowledge, especially when there are limited time limitations. Establish a mentorship program in which seasoned educators or AI experts offer personalized help to language instructors in the implementation of AI technologies. Establishing collaborations with technology businesses or universities can facilitate the recruitment of mentors and offer training opportunities within the teaching community.

5.2 Limitations of the Study

There are many constraints in the study that need to be recognized. Firstly, the limited sample size may hinder the capacity to apply the findings to a broader population. Nevertheless, it is crucial to acknowledge that despite this constraint, the sample size is considered adequate to yield a detailed comprehension of the phenomenon being studied. Within the interpretive paradigm, the focus is on the importance of relevance rather than rigorous adherence to rigor at a level related to values.

Hence, the relevance of the findings to a reader's specific professional or personal circumstances should be assessed on an individual basis. Additionally, while the language instructors included in the study represent a diverse range of educational backgrounds, ages, and genders typically found in higher education institutions in Central Punjab, it's essential to recognize that their perspectives may not fully encapsulate the experiences of all language instructors globally. These recommendations aim to empower language instructors with the necessary skills and support to effectively integrate AI into their teaching practices, ultimately enhancing the quality of education delivery.

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