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ASSESSING THE IMPACT OF PROFESSIONAL DEVELOPMENT ON TEACHERS' CONFIDENCE IN USING GENERATIVE AI: A PRE- AND POST-TRAINING EVALUATION

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ABSTRACT

The paper examines how a specific professional development intervention will affect the confidence of middle school English teachers in Pakistan to adopt Generative Artificial Intelligence (GAI) in their teaching. This study is based on the Technology Acceptance Model (TAM), with a sequential explanatory mixed-method design, which takes the form of quantitative survey and qualitative focus group interviews. The study of previous data of 200 teachers displayed low confidence rates with 10 percent having high confidence in the use of GAI. After the two-day intervention 50 least confident teachers, confidence tests were conducted after training and also proved positive by the use of paired sample t-test ($p < 0.001$). Qualitative analysis was used to bring out major themes that included fear on the first day, perceived usefulness, classroom transferability, and extended support. The research is a timely addition to the existing disproportionately small body of literature on GAI in education in Global South based settings and a practical contribution to teaching designing effective professional development. It finds that hands-on training, put into a context, can help overcome the confidence gap, but that this needs to continue on institutional levels to be able to integrate with pedagogy over the long-term.

Keywords: *Generative Artificial Intelligence, Technology Acceptance Model, teacher confidence, professional development, Pakistan..*

INTRODUCTION

1.1 Research Background

Over the last few years, the development of Artificial Intelligence (AI) has led to the implementation of highly drastic changes in various fields, and education is not an exception. In this context, a certain kind of AI technology, the so-called Generative Artificial Intelligence (GAI), has become especially powerful (Ooi et al., 2023). The GAI tools such as ChatGPT, Bard, and DALL·E are capable of producing text that sounds human, visual images, and even teaching tools. This generative ability leads them to be extremely useful in the educational field where personalization, adaptive learning material can increase the engagement and performance of the students (Collie et al., 2024).

GAI tools have provided uncharted possibilities in English language teaching in terms of modeling writing skills, developing vocabulary, grammatical practice, and general creativity. Nonetheless, the effective implementation of these aids in the classroom significantly relies on readiness and capability of teachers to embrace it. Although the students, who are frequently considered digital natives, are inclined to accept AI-mentored education, most practitioners appear to be reluctant because of the unknown factor, insufficient education, or even the fear of invading the established instructional patterns (Crouse, 2024). The mismatch between the expectations of the students and the preparedness of the teacher therefore becomes a critical issue, more so, in technologically poor areas.

The situation in the countries such as Pakistan is rather urgent as AI integration in schools requires further emphasis. Despite the theories and plans in countries promoting the digital transformation strategy, there is a lack of teacher education and infrastructural failure that hinders this implementation, particularly in middle schools (Mustafa et al., 2024). Some of the challenges include lack of confidence of teachers when using generative technologies as one of the obstacles.

This current research is an answer to this new challenge as it aims to investigate the effects of professional development programs on teacher confidence in adopting GAI into teaching English language.

1.2 Problem Statement

Although the usage of the GAI tools in the education systems, all over the world, is booming, its application is scant in Pakistani classrooms, mostly owing to the low teacher confidence and inadequate practical exposure. The challenges English language teachers, especially, may have with implementing the GAI technologies in their work are related to training insufficiencies, misunderstanding, and fear of the complexity and suitability of the technologies adopted by artificial intelligence (Tavakol & Dennick, 2011).

Even though students are willing to acquire knowledge through AI-based technologies, most teachers think of these technologies as hard to operate or as the ones that are likely to interfere with their fixed teaching procedures. States such as Finland and China have initiated extensive AI training programs available to teachers whereas in countries like Pakistan, there exists no evidence-based programs aimed at preparing middle school educators with regard to technological preparedness, particularly with respect to language teaching (Ooi et al., 2023).

Up to now, there is no empirical research in the Pakistani background, which has been done to suggest that systematic professional development can measurably enhance the confidence of English language teachers in the use of GAI. This paper brings solutions to that knowledge gap by investigating the correlation between professional preparation and teacher confidence towards the AI-enhanced pedagogy.

1.3 Research Objectives

The main objective of this research is to explore how professional development can be used to develop the confidence of the English language teachers to use GAI tools in teaching the middle school students. Certain criterions are:

1.To understand the original levels of confidence of English teachers in middle schools in the use of the Generative AI tools.

2.To determine the perceptions, concerns, and challenges of teachers with the respect to GAI integration in pedagogy.

3.To roll out a specific two-day teacher upgrade program on the use of GAI in English teaching.

1.4 Research Questions

In order to meet such objectives, the study has the following research questions:

Quantitative Questions:

1.How confident are teachers with the idea of applying Generative AI in the instruction of the English language in middle school?

2.What effects do the training intervention have on the confidence of the teachers regarding the use of GAI to teach language?

Qualitative Questions:

3.What do middle school English teachers feel are the most important visualizations and issues concerning GAI integration?

4.How does the training module influence the attitude of teachers and their readiness to apply GAI tools after the intervention?

2. LITERATURE REVIEW

2.1 Understanding Generative Artificial Intelligence (GAI) in Education

Generative Artificial Intelligence (GAI) is a sub branch of AI that is centered on the autonomous production of new content, including natural language text and visuals, code and music through learning big data. The technologies such as ChatGPT, DALL-E, or Bard, and QuillBot are examples of such new technology, offering instant creation of humanlike intelligence in terms of content produced (Ooi et al., 2023; Crouse & M., 2024). They are differentiated by large language models (LLMs) and deep learning algorithms, which analyze, and generate content, and distinguish them with rule-based or predictive AI systems.

Within the educational context, GAI is being acknowledged more and more as an effective tool in improving lesson planning, individualization of learning process, and scaffolding of instruction (Faustino & Kaur, 2022). Within the English language teaching (ELT) field, GAI has the potential to support with writing prompts, vocabulary, grammar correction, and automatic feedback, meaning that teachers can concentrate more on the quality of their instruction and communication with the students. The GAI options are more than mere automation: they enable independence of the learner, formative evaluation, and task interactivity.

Even though this is the case, there is limited GAI use in classrooms; this is particularly true in developing countries. Limited use of the technology is further influenced by the novelty, complexity which the technology is speculated to have as well as teacher training. Educators usually show concern about the use of AI because they are afraid that it will destabilize professional skills, be abused by learners, or be inappropriate in confined pedagogical environments (Zulkarnain & Yunus, 2023; Mustafa et al., 2024).

2.2 GAI and Language Acquisition

The acquisition of a language has already been mediated in the classical way by means of teacher-guided learning and the specially developed textbooks. But these models are being interfered with by the GAI platforms, which facilitate flexible, student-directed learning courses. Such applications are able to mimic human speech, analyze the written the text, give syntactic suggestions and provide feedback in real time (Akbarani, 2024). Duolingo, Google Translate, and ABLE (Assessment-Based Learning Environment) are the tools that are being more and more relevant to ELT to facilitate listening, speaking, reading, and writing.

It also has been proposed that, due to AI-guided learning circumstances, the students themselves will exhibit greater self-efficacy and motivation (Zulkarnain and Yunus, 2023). GAI-based applications create language interactivities and enhance immoral language learning which makes it more pertinent to students in both multilingual and multicultural classrooms. Nevertheless, even though students may stand to gain the most, the role of a teacher will gradually become more complicated, as it will require technical proficiency, subject matter knowledge, and online instruction. A significant number of teachers resort to traditional practices because they have not undergone proper GAI training.

In addition to it, ethical issues, like privacy of data, discrimination, and students' over-dependency, make adoption more complicated. Educators should pay attention to the pedagogical possibilities of GAI on the one hand and mindfulness toward its shortcomings on the other (Kohnke et al., 2023). It requires a set of professional development programs that do not simply provide answers to the question of how to use AI in ELT but also explain why and when it should be used in the English language teaching setting.

2.3 Assessing Confidence of Teachers in Using Educational Technology

Confidence is also a significant intervening variable on the employability of teachers with the new technologies. The confidence of teachers is often synonymous with the term of self-efficacy and affects their ability to experiment, persist, and innovate in the classroom (Nazaretsky et al., 2022). This is even more vital in the integration of AI, where the rate at which technological change is experienced may be daunting to even seasoned educators. The research has shown that confidence in the use of technology among teachers is influenced by perceptions of usefulness as well as ease of use and support of institution (Collie et al., 2024). As Mustafa (2024) stated, teachers might not be so bad in attitude towards AI but they instead tend to have a lack of trust in it due to the fact that they forgot how to, or feared making a mistake. On the other hand, increased confidence and the likelihood of long-term adoption levels are reached due to exposure to relevant training in a hands-on way (Nazaretsky et al., 2022; Lawrence et al., 2024).

Confidence cannot be regarded an individual quality only; it is an effect produced by organization culture, network, and leadership support. Educators working in schools which appreciate innovativeness and the continued provision of support are the ones who report a greater confidence level in using educational technology. On the other hand, individuals who are in strict, exam-based atmospheres will be resistant to change even when the technologies exist (UNESCO, 2019

2.5 Technology Acceptance Model (TAM) and the Conceptual Framework

In a bid to determine the preparedness of teachers in adopting Generative Artificial Intelligence in teaching the English language, the Technology Acceptance Model (TAM) has been borrowed in this research study first described by Davis (1989). TAM has been identified as a very sound model in describing how people adopt and utilize new technologies in any field, and education is not an exception. It is also strong in its capacity to describe the way users behave on the basis of few basic perceptions.

Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the two main constructs of TAM with respect to this paper. Useful Trustfulness is the perception of a person on how the usage of a particular technology will help them perform their workplace better. In this regard, it indicates the level to which the teachers appear to express confidence in using GAI tools to enhance effectiveness, engagement and efficiency of their teaching of the English language. Perceived Ease of Use, conversely, simply refers to the perceived amount to which one may think that use of the technology will be not at all daunting. To teachers, this is an expression of their faith in the nature of the GAI tools in terms of their ability to seem intuitive, accessible and manageable relative to their established pedagogical workflows.

Based on this model, the research hypothesis is that professional development (PD) can be conceived as an independent variable correlating with other factors. It is theorized that PD can affect either PU or PEOU by increasing the level of teachers' knowledge of GAI tools, responding to misunderstanding, and generating practical competence. The changes in perceptions are supposed to have a direct and positive impact on teacher confidence in the use of GAI which is a key mediating concept that links the TAM constructs and practices in the classrooms.

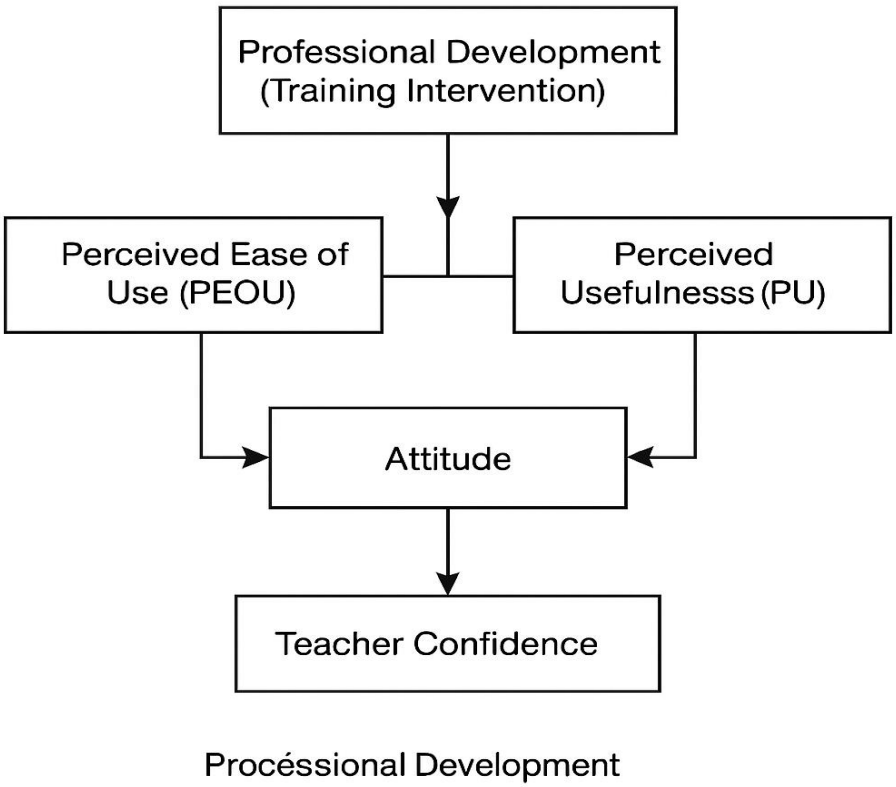

Figure 1. Conceptual Framework: Pathways from Professional Development to Teacher Confidence in Using Generative AI

Note: This framework illustrates how a professional development intervention influences middle school English teachers' confidence in using Generative AI (GAI). Grounded in the Technology Acceptance Model (TAM), it positions *Perceived Ease of Use* and *Perceived Usefulness* as mediating variables shaping teachers' *Attitudes* and

Behavioral Intentions, ultimately leading to enhanced *Confidence*.

It is important to articulate that this framework provides with a theoretically substantiated perspective in terms of which the impact of training interventions can be analyzed. It also allows the research to identify the connections between changes in the perception and behavior of teachers to a more general literature on technology adoption in educational establishments.

2.8 Literature Gap

To start with, the majority of research that has already been conducted has attempted to answer the question of technological affordance and education influence of GAI tools used in higher education or technical fields. Most studies on GAI usage at the university level are accessed in the work by Ooi et al. (2023), Faustino and Kaur (2022), and Crouse (2024) with references to academic writing, computer science, or creative industries. Consequently, the particular application of GAI in teaching the English language (ELT) at middle school level, particularly in the developing world has not been adequately exploited.

Second, despite the fact that most authors admit the significance of teacher confidence in the adoption of educational technologies (Nazaretsky et al., 2022; Collie et al., 2024), not many researchers have empirically studied how specific professional development interventions may result in increasing their confidence regarding GAI in particular. Third, even though the Technology Acceptance Model (TAM) has crossed its wide application in educational technology studies, domestic research studies establishing a concurrence between TAM and professional development are scanty.

This research study aims to fill in these gaps, which are interrelated as it involves a mixed-methods analysis of teacher self-efficacy during and after a training intervention with a specific focus on GAI.

3. METHODOLOGY

This research attempted to employ a '**sequential explanatory mixed-method' design**, mainly by integrating quantitative and qualitative approaches in two phases. The aim was to assess the impact of professional development on middle school English teachers' confidence in using Generative Artificial Intelligence (GAI) in Karachi, Pakistan. The **quantitative phase** preceded the **qualitative phase**, enabling numerical analysis of confidence shifts followed by in-depth exploration of teacher perceptions.

A total of **26 English teachers** from private middle schools participated in pre- and post-training surveys, selected via purposive sampling based on their interest in GAI and teaching roles at Grades 6–8. From this group, **10 teachers** participated in **focus group discussions (FGDs)** to provide qualitative insights.

Data collection tools included:

- **Structured questionnaires**: Administered pre- and post-training to assess teacher confidence, using Likert-scale items adapted from validated technology integration and self-efficacy tools.

- **Focus group discussions**: Conducted post-training to explore perceptions, experiences, and barriers regarding GAI integration.

The intervention consisted of a **two-day training program**, covering:

- Introduction to GAI tools (e.g., ChatGPT, QuillBot)
- Classroom use demonstrations
- Activity design
- Ethical issues and engagement strategies
- Hands-on practice with peer feedback

The training aimed to boost both **perceived usefulness** and **ease of use**—constructs that underpin increased confidence.

Quantitative data were analyzed using descriptive statistics and paired sample t-tests to evaluate confidence shifts, whereas **qualitative data** from FGDs were thematically coded, combining **deductive (TAM-based)** and **inductive** approaches. This triangulation ensured both statistical validity and narrative depth.

The study adhered to strict **ethical guidelines**, including informed consent, anonymity, voluntary participation, and institutional ethics approval, ensuring compliance with educational research standards.

4. FINDINGS

In this section, quantitative outputs (survey data) and qualitative outputs (focus group discussions) of the study have been given. Teachers were exposed to how a two-day professional development program can affect their confidence to use Generative Artificial Intelligence (GAI) in teaching the English language.

4.1 Quantitative Findings

The quantitative part of the research entailed a pre and post training assessment of the middle school English school teachers on their confidence to incorporate Generative Artificial Intelligence (GAI) in their own pedagogy. The data (collected before the intervention) of 200 participants were obtained by means of a structured questionnaire, adapted based on Nazaratsky et al. (2022). Out of this group the 50 teachers who scored the lowest confidence numbers were chosen to attend a targeted training program and then the level of confidence was rechecked in these 50 teachers.

First findings showed a big range in the level of confidence in the teachers even before any kind of intervention. Only 60 percent of the participants (n = 120) participated indicated low confidence and indicated a mean value of 2.4 (SD = 0.8) as seen in Table 1. These people were very unfamiliar with the tools of GAI and reluctant to use them in the classroom. Third, 30% (60) were in the moderate confidence, which had a mean of 3.0 (SD 0.5), and only 10 percent (20) had high confidence with a mean of 4.2 (SD 0.6).

4.1.1 Pre-Training Confidence Levels (n = 200)

Table 1. Pre-Training Confidence Levels of Teachers (n = 200)

Confidence Level	N	Mean	SD
Low	120	2.4	0.8
Moderate	60	3.0	0.5
High	20	4.2	0.6

This distribution emphasized the need for a focused intervention, particularly for those with low self-efficacy regarding GAI.

4.1.2 Selection of Participants for Intervention (n = 50)

Based on the pre-training data, the training module was purposively sampled in such a way that 50 teachers who have the lowest confidence scores were included in the training module. They scored an average of 2.1 (SD = 0.7), which is another affirming factor that a specific professional development program should be designed to accommodate them.

Table 2. Pre-Training Confidence Levels of Selected Teachers (n = 50)

Confidence Level	n	Mean	SD
Low	50	2.1	0.7

4.1.3 Post-Training Confidence Levels (n = 50)

The participants showed significant increase in their self-reported confidence carried out after completion of the training. Through Table 3 provided, 5 teachers (10%) were still in the low confidence level and the mean revised to 3.4 (SD = 0.6). In the meantime, twenty teachers (40 percent) expressed moderate confidence (M = 4.1, SD = 0.5), and 25 participants (50 percent) joined the group of high confidence with the mean score of 4.7 (SD = 0.3).

Table 3. Post-Training Confidence Levels of Selected Teachers (n = 50)

Confidence Level	n	Mean	SD
Low	5	3.4	0.6
Moderate	20	4.1	0.5
High	25	4.7	0.3

The striking effect of the training program is demonstrated by the number of high-confidence responses increasing by a solid 40 percentage points (to the level of 50 percent). Such a change is also visible in Figure 1 (a bar graph depicting the pre and post confidence), and Figure 2 (a line graph demonstrating the progression of mean scores over time).

4.1.4 Paired Sample t-Test Analysis

To statistically validate the impact of the intervention, a **paired sample t-test** was conducted comparing pre- and post-training mean scores of the selected teachers.

Table 4. Paired Sample t-Test Results (n = 50)

Measure	Mean (Pre)	Mean (Post)	Mean Diff.	t	p
Confidence Level	2.1	4.1	+2.0	10.67	<0.001

The results indicated that the confidence level had improved significantly with a large and reliable increase in the results after the training ($t = 10.67$, $p < 0.001$). A practical meaningful and educationally significant gain is 2.0 point mean on 5-point scale.

4.1.5 Hypothesis Testing

In this research, the following two null hypotheses were tested:

- H1 0: Before training, there is no definite confidence in teachers concerning the usage of GAI to teach English.
- H 2 0: Training on confidence will not produce any significant change in the confidence of the teachers.
- H1 0 was in favor of pre training data based on the low average confidence levels ($M = 2.1$).

Nonetheless, H2 0 was not supported by the post-training data, and descriptively, the scores went up significantly ($M = 4.1$), $t(49) = 23.53$, $p < 0.001$. Therefore, the training worked out very well in boosting confidence.

4.1.6 Instrument Reliability

To ensure the internal consistency of the questionnaire, **Cronbach's Alpha** was calculated and yielded a value of **0.85** across 100 items.

Table 5. Reliability Analysis

Scale	Cronbach's Alpha	No. of Items
Teachers' Confidence	0.85	100

A score above 0.80 confirms that the scale was **highly reliable** in measuring teacher confidence constructs.

4.2 Qualitative Findings

To shed more light on the lived experiences of the teachers who were acquired in working with GAI, two focus group discussions (FGDs) were established after the professional development intervention. There were 10 participants (randomly chosen among the number of 50 teachers that received training) who explain their ideas, challenges and the changed levels of confidence via GAI tools in the realm of English language teaching.

The raw data were put through a thematic analysis technique, which led to the surfacing of four main themes:

1. First Insecurity and Doubt.
2. Changing Attitudes to the Usefulness of GAI.
3. We must know how to practically integrate and make relevant in the classroom.
4. Enduring Optimism and Requirement to be Continued.

4.2.1 Initial Apprehension and Uncertainty

Most of the participants lacked clarity and were also uncomfortable about what GAI was and how they could meaningfully integrate GAI in their lessons prior to the training. Some had not even heard of tools such as ChatGPT before, others assumed them too sophisticated or useless in the school aspect of teaching.

"The use of AI just did not seem to be safe... it was too much and too distant to my classroom reality".

This theme was congruent with the poor pre-training scores of perceived ease of use (PEOU) during quantitative phase. There was also the psychological hurdle, as the unfamiliarity led to avoidance. Teachers cited their fears of being substituted with AI-based technologies, fears of misinformation being produced by AI, and the fact that they did not have any institution guidance on the use of such technologies.

4.2.2 Evolving Perceptions of GAI Usefulness

Because they were involved in practical exercises during the two days of training, participants started to change their views. Bringing people to real classroom experiences with the help of GAI proved that these instruments would help but not supplant their functions. Perceived usefulness (PU) of GAI escalated tremendously.

"After I noticed how ChatGPT can easily come up with creative reading activities, I noticed that it is not a threat, but a support tool".

"To think about sentence structures that I can teach to my students, QuillBot was helpful".

Teachers indicated comprehending how GAI would be beneficial when planning lessons and scaffolding languages and providing personalized feedback- all of which fitted their teaching aims perfectly.

4.2.3 Sustained Confidence and Need for Continued Support

Although the increased enthusiasm was definitely observed after training, a large number of participants said that further exposure, practice and support within institutions would be required to maintain their confidence.

"This cannot be a one time. Today, unless we have access to them, we have guidance, and time to search into them, we are not going to continue using them."

"It would be beneficial to have shared space where you can post what was working with teachers, as it were, a GAI teaching community."

This theme relates to greater issues within professional development literature in the area of long-range change. The level of confidence went up but to ensure that it would be sustained long-term in the classrooms that teachers needed access to resources, administrative support, and collaboration.

Besides, some of them raised moral issues verging on excessive use of AI-generated content and the possibility of misuse on the part of students. Such concerns indicate that future PD activity should promote responsible use training.

4.3 Summary of Findings

It can be inferred from the above findings that the positive change in the self-confidence of the teachers following the professional development program. It includes quantitative results that demonstrate the statistically significant growth of familiarity, perceived usefulness, and ease of use, and qualitative results that deliver information about the emotional and pedagogical experience that teachers underwent. The findings are consistent in demonstrating that hands-on practice through workplace-embedded short-term training can produce significant effects on teacher attitudes towards GAI in particular contexts where closely integrated with classroom practice and sufficed with the supporting mechanism. Educators stated that they felt more ready to investigate AI tools, adapt them to lesson plans, and use the new tools to conduct creative tasks with learners. The training demystified AI as instructions provided some practical applications in the classroom which alleviated some initial fears.

The research has stressed on the relevance of the non-informational professional development of a person that is not only focused on the information but is also contextually based and emotionally supported. The complexity of the approach plays a crucial role in the development of the realistic belief in the ability of educators to survive in an environment of digital transformation of the teaching process.

5. DISCUSSION

This study aimed to evaluate the impact of a targeted professional development program on middle school English teachers' confidence in using Generative Artificial Intelligence (GAI) tools in Pakistan. Drawing on the Technology Acceptance Model (TAM) and a constructivist learning framework, the findings demonstrate that structured, hands-on training significantly enhances both perceived ease of use (PEOU) and perceived usefulness (PU), ultimately strengthening teachers' confidence and behavioral intention to adopt GAI in classroom instruction.

The statistically significant improvement in teacher confidence, as evidenced by the increase in mean scores from 2.1 to 4.1, confirms TAM's central premise: that PU and PEOU directly shape attitudes and intentions toward technology use (Davis, 1989). Before the intervention, participants scored low on confidence and demonstrated minimal understanding of GAI tools—suggesting limited exposure and low self-efficacy. Post-training data revealed not only a sharp increase in high-confidence participants (from 10% to 50%), but also a deeper appreciation for GAI's potential to support and enrich teaching practices.

This shift reflects the activation of both TAM determinants:

- Perceived Usefulness (PU) increased as teachers observed how GAI could assist with grammar correction, idea generation, differentiated instruction, and classroom engagement.
- Perceived Ease of Use (PEOU) improved through scaffolded, hands-on exposure, allowing teachers to develop the procedural knowledge necessary to navigate and experiment with tools like ChatGPT and QuillBot.

The study's success in enhancing confidence also aligns with best practices in effective teacher professional development (PD), which emphasize contextual relevance, collaborative learning, and practical application (Desimone, 2009). Unlike abstract or theoretical PD sessions, this intervention was grounded in real classroom scenarios, and offered teachers the opportunity to test and adapt GAI tools for their actual instructional needs.

These findings echo research by Ertmer & Ottenbreit-Leftwich (2010), who note that belief change in teachers, particularly regarding technology, relies heavily on experiences that make them feel competent and in control. In this case, even teachers with the lowest pre-training confidence levels reported significant growth, suggesting that well-designed PD can bridge deep gaps in readiness, especially in under-resourced or digitally skeptical environments.

Importantly, the research contributes to a relatively underexplored area: teacher preparedness for AI integration in Global South contexts, particularly Pakistan. Most literature on GAI in education is centered in Global North environments with higher digital literacy, institutional funding, and infrastructure. This study demonstrates that Pakistani teachers, when provided access and training, are not only capable of integrating emerging technologies, but eager to do so when confidence barriers are addressed. However, the findings also underscore systemic gaps—such as lack of ongoing institutional support, limited access to digital tools in some schools, and concerns over AI misuse—that must be resolved to ensure long-term adoption. Teachers voiced a desire for continued mentorship, peer sharing, and centralized resources, highlighting the need for education systems to not only train, but also support and sustain innovation in practice.

More importantly, the research contributes to a relatively underexplored area: teacher preparedness for AI integration in Global South contexts, particularly Pakistan. Most literature on GAI in education is centered in Global North environments with higher digital literacy, institutional funding, and infrastructure. This study demonstrates that Pakistani teachers, when provided access and training, are not only capable of integrating emerging technologies, but eager to do so when confidence barriers are addressed. However, the findings also underscore systemic gaps, such as lack of ongoing institutional support, limited access to digital tools in some schools, and concerns over AI misuse that must be resolved to ensure long-term adoption. Teachers voiced a desire for continued mentorship, peer sharing, and centralized resources, highlighting the need for education systems to not only train, but also support and sustain innovation in practice.

The confidence gains also suggest an alignment with constructivist pedagogical principles, which advocate for learning environments that are exploratory, adaptive, and student-centered. GAI tools, when integrated thoughtfully, can facilitate

scaffolded learning, authentic assessment, and personalized instruction, key pillars of constructivist classrooms (Vygotsky, 1978).

6. CONCLUSION AND RECOMMENDATIONS

The present study informs on the role of the Generative Artificial Intelligence (GAI) integration in English language teaching through the lens of how a specific kind of professional development plan can lead to the increase in the confidence of teachers. The research setting was in the underrepresented sphere of middle school English teachers in Pakistan, meaning that the results support the notion that even short, practical training results in a substantive change of the attitude towards the technological resourcefulness and simplicity of use. As the structured intervention did more than just enhance the confidence of the teachers, it also enabled them to better appreciate the application of GAI to classroom teaching, a fact that motivated the conclusion that such initiatives can be carried out even in resource limited environments.

One of the contributions of the research is the fact that it empirically develops the Technology Acceptance Model (TAM) to cover GAI adoption in a Global South educational setting, where not much empirical research has been done. Flexibility of the model to a new setting is very well brought out in skills of the application of TAM constructs-Perceived Usefulness and Perceived Ease of Use as mediators of teachers' confidence. Moreover, this research fills a very important gap in the existing literature that intends to provide practical and contextual evidence on the effectiveness of professional development in relation to emerging technologies in developing states.

The analysis provided by the mixed-methods approach made the study analytically deep. The quantitative gains in confidence were triangulated with qualitative data provided in the focus group discussion, which provided a comprehensive picture of how all the emotional feelings, cognition, and transformation of participating teachers occurred professionally. The findings of the study can be projected in the view of a number of limitations however. To begin with, measurement only involved short term post-training satisfaction of confidence and did not follow it up on a long-term basis in terms of continued use or incorporation into classroom. Second, the sample was taken to a particular area and subject of study hence generalizability may be limited. Third, the data recording is self-reported and may have the risks of bias. Lastly, the standardized two-day training program though effective with the majority of the people might not suit every learning style or the level of expertise.

6.1 Recommendations for Future Research and Practice

1. Longitudinal Follow-Up: In the future, researchers need to test the long-term retention of confidence, and how GAI is actually carried over into classroom practice preferably one where both teacher behavior and performance can be measured over a period of time.

2. Broadening the research: The research that involved only a limited number of teachers of different subjects, working in different regions and various educational systems should be extended to improve the applicability of the results and finding out the local training needs.

3. Blended and Differentiated Training Models: Modular or blended training or differentiated training and learning should be a concept explored in the future interventions to meet various technological skills and preferences of learning.

4. External Validation Measures: Classroom observations or third-party assessments might be used as a measure of determining the area of pedagogical change due to the rise in confidence.

5. Support Mechanisms: Institutional One-time training will not be sufficient in order to integrate GAI into practice, it needs to be sustained on an institutional level, have access to updated tools, and to have communities of practice that will allow further experimentation and reflection.

Research Contribution

The research has several contributions to the emerging debate on educational technology regarding how the use of Generative Artificial Intelligence (GAI) can be used in teaching English language in a developing country context. It augments the utilization (applicability) of the Technology Acceptance Model (TAM) by confirming that it is applicable to measure teacher preparedness and confidence in a Global South

educational context through empirical evidence. The study demonstrates the pragmatic data concerning the efficacy of small-scale quick-hit professional intervention by showing that it can be used to increase technological confidence in teachers.

Research Limitations

In spite of profound insights generated by this study, it still has a number of limitations that need to be addressed. First, it only gets the short-term effects of a two-day training intervention and it lacks an evaluation of the long-term memory, the actual application in the classroom, and the consequences in the students. The sample group was restricted to English teachers in the area of Karachi middle schools, and this could affect the generalization of the findings to different subjects, levels of education or regions. The actual intervention was also standardized in the format, and it was also possible that it did not respond to the individual preferences among learners or technological skills. To enhance the scope, applicability, and long-term effects of such a professional development project, longitudinal designs, the representation of various populations, and some type of blending or differentiated model of training should be considered in future research.

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