Enhancing Educator Engagement with AI: The TeacherServer Experience and Its Impact on Teaching Practices

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Abstract: This study evaluates TeacherServer, a generative AI platform for educators, focusing on its effectiveness and usability. Using the Teachers' Acceptance of AI in Education (TAAI) framework, it assesses teachers' perceptions before and after workshops with 148 K-12 teachers from Florida. Results show a notable improvement in teachers' acceptance of AI tools, including increased perceived usefulness, ease of use, self-efficacy, and reduced anxiety. The System Usability Scale also indicates high usability for TeacherServer. The findings highlight the role of professional development in promoting AI acceptance and suggest future research into its long-term impact on teaching practices and technology integration.

Introduction

Artificial Intelligence (AI) is increasingly recognized as a transformative force in education, offering the potential to significantly enhance teaching, learning, and assessment practices. AI technologies, such as chatbots, automated scoring systems, and intelligent tutoring systems, are being integrated into educational settings, promising to reshape the educational landscape (Chiu et al., 2022). These technologies can offer personalized learning experiences, improve teaching efficiencies, and support student learning in innovative ways (Harvard Graduate School of Education, 2023).

The integration of AI in education, often referred to as AIEd, presents numerous opportunities and challenges. On one hand, AI can facilitate personalized learning by adapting to individual student needs, providing immediate feedback, and supporting diverse learning styles (Chiu et al., 2022). On the other hand, the successful implementation of AI in classrooms is contingent upon teachers' acceptance and willingness to use these technologies. Teachers' perceptions, attitudes, and readiness to embrace AI are critical factors that influence the adoption and effective use of AI tools in educational settings (Wang et al., 2023).

Despite the potential benefits, teachers' acceptance of AI tools remains a significant challenge. Concerns about AI's impact on teachers' roles, the complexity of AI applications, and the additional efforts required to integrate these tools into teaching practices can hinder acceptance (Chiu et al., 2022). Moreover, issues related to data privacy, ethical

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considerations, and the transparency of AI decision-making processes contribute to teachers' apprehensions (Wang et al., 2023).

To address these challenges, it is essential to understand the factors influencing teachers' acceptance of AI in education. The Teachers' Acceptance of AI in Education (TAAI) framework provides a comprehensive model for assessing teachers' acceptance through dimensions such as perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety (Wang et al., 2023). By employing this framework, educators and policymakers can gain insights into the barriers and facilitators of AI adoption, guiding the development of strategies to enhance teacher readiness and support the integration of AI tools in educational contexts.

Literature Review

Generative AI can enhance learning experiences by personalizing education through individualized learning paths and automating routine tasks. This allows educators to focus more on addressing the specific needs of each student, thereby enhancing the overall learning experience (Holmes et al., 2022). Additionally, AI tools can assist teachers by generating lesson resources, providing lesson structures, and designing educational materials like infographics and slideshows. This automation can save time and allow teachers to concentrate on more complex educational tasks (Luckin et al., 2016). In software development education, AI tools like ChatGPT and Copilot have proven effective in expediting coding tasks and automating text generation. These tools enhance usability, efficiency, and effectiveness in real-world scenarios, making them valuable in technical education (Zawacki-Richter et al., 2019). Furthermore, AI-powered tutoring systems can create adaptive learning environments that adjust to the learning pace and style of individual students, potentially leading to improved educational outcomes (Holmes et al., 2022).

However, the use of generative AI in education also presents challenges and concerns. Ethical issues arise, such as the provision of incorrect or biased information and the potential misuse of AI tools by students. Teachers need to guide students in using these tools ethically and safely (Holmes et al., 2022). Customization and accuracy are significant challenges when using AI tools. Educators express concerns about the transparency of AI-generated content and the potential for misinformation (Luckin et al., 2016). The introduction of AI tools in education challenges traditional assessment methods and raises questions about the role of educators in an AI-enhanced learning environment (Zawacki-Richter et al., 2019). Moreover, there is a need for professional development to equip teachers with AI literacy, enabling them to effectively integrate AI tools into their teaching practices. This includes understanding AI's capabilities, limitations, and ethical considerations (Holmes et al., 2022).

Ethical and policy considerations are crucial when integrating AI into education. Institutions are encouraged to develop ethical guidelines and policy frameworks to govern the use of AI in education. This includes addressing data protection, bias, and the ethical use of AI-generated content (Luckin et al., 2016). Professional development programs should include hands-on activities that engage teachers and students in using AI tools, fostering a deeper understanding of their potential and limitations (Holmes et al., 2022). Universities and educational institutions are adopting diverse approaches to AI integration, from outright bans to exploring how AI can enhance learning. This diversity highlights the need for

institutions to carefully consider their position on AI use in education (Zawacki-Richter et al., 2019).

Project Background

In an earlier study (Unal & Unal, 2024), researchers surveyed classroom teachers in Florida and Georgia to understand their experiences with Artificial Intelligence (AI) tools. The feedback was clear: while teachers were open to using generative AI for personal tasks, they were hesitant to integrate it into their classrooms. They had concerns about (1) data privacy and security, (2) a lack of specific AI tools designed for teachers, (3) high subscription costs for different AI models, and (4) inadequate training. Teachers were particularly worried about data privacy and security. They didn't want the AI platforms to save their inputs, especially those involving student information. They also didn't want AI models to use their data for training purposes, fearing potential misuse of their data.

Regarding the lack of specific tools designed for teachers, they acknowledged AI's potential to save time and create content efficiently. However, they felt that using chat-based AI required them to write very detailed prompts or have long conversations to get useful results. For instance, to get a lesson plan customized to their grade level, they had to include all specifics in the prompt, such as standards, objectives, grade level, lesson requirements, ESOL, and ESE modifications. Repeating this process for each new lesson plan was time-consuming and led to creating and managing a prompt library. Teachers wished for tools with built-in prompts that required minimal input for optimal outcomes.

High subscription costs were another major concern. Teachers noted that some AI platforms excelled at specific tasks like text generation, image creation, or sound processing. While free options were available, they were often very limited. Subscribing to one or more platforms could become costly, adding financial pressure to teachers' lives. They wished for more robust free options.

Lastly, teachers emphasized the need for proper training to use these tools effectively. They requested demonstrations of AI tools both in and out of the classroom, highlighting the need for professional development to help them integrate AI into their teaching practices confidently and competently.

In response to these concerns, researchers examined existing AI platforms for teachers to address the four key needs but found no single platform that met all the requirements. Therefore, the researchers developed a generative text AI platform called TeacherServer to tackle these issues. To ensure privacy, they installed an open-source AI model on a local server, keeping all data confidential and secure. The data transmission is highly encrypted, and both inputs and responses are not saved or used for training the AI model.

Collaborating with classroom teachers and education faculty, they identified the most essential tools and configured each according to national and state curriculum standards. The beta version of TeacherServer included 47 tools and was provided free to teachers registered with school emails. Additionally, researchers conducted several face-to-face professional development workshops to introduce the platform and gather feedback for improvements and new tool development. Currently, TeacherServer includes over 800 tools specifically designed for educational purposes, with more than 100,000 registered users.

Since its launch, TeacherServer has grown to support K-12 teachers, college faculty, and researchers, providing tools for research design and data analysis.

One practical example is the "Lesson Based on Article" tool, which simplifies lesson preparation. Imagine a teacher finds an interesting article on a Sunday night and needs to prepare a science lesson for the next day. Traditionally, this would take hours. With TeacherServer, the teacher can upload the article and choose from various outcomes—lesson plans, summaries, translations, PowerPoint outlines, quizzes, discussion questions, and vocabulary lists. TeacherServer also provides a range of tools to support differentiation for all learning styles and needs, including accommodations and modifications for students with IEP/504 plans and ESL/ESOL students. The tool generates a comprehensive set of materials in seconds, allowing the teacher to focus more on engaging with students and refining their teaching strategies.

Problem Statements

Effectiveness Testing and Validation of TeacherServer

TeacherServer, a generative AI platform designed to address the specific needs of educators, has shown initial promise in enhancing teaching practices. However, its effectiveness in real-world educational settings remains largely untested. To ensure TeacherServer continues to meet the evolving needs of educators, a rigorous evaluation of its acceptance and use among teachers is essential. This involves conducting comprehensive research to gather practical evidence of its effectiveness. Without further testing and validation, TeacherServer cannot be widely endorsed as a reliable tool for educators.

Teachers' Acceptance of Generative Text Based AI Tools Using the TAAI Framework

The successful integration of AI tools in education heavily relies on teachers' acceptance and willingness to adopt these technologies. Utilizing the Teachers' Acceptance of AI (TAAI) framework, this study aims to assess teachers' perceptions across five dimensions: perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety. By posing targeted questions before and after professional development workshops, the study seeks to determine whether significant changes occur in teachers' acceptance levels post-training. This approach will help identify key factors influencing teachers' readiness to integrate AI tools into their teaching practices and inform strategies to enhance their acceptance and effective use of AI technologies in education.

Research Questions

How do professional development workshops impact teachers' acceptance of generative AI tools, as measured by changes in perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety, according to the Teachers' Acceptance of AI (TAAI) framework? How effective is TeacherServer in enhancing teaching practices and meeting the specific needs of educators, and what are the key factors influencing its acceptance and use among teachers in real-world educational settings?

Methodology

Participants and Procedures

At the beginning of the 2024-25 academic year, teachers from three counties in Florida—Pinellas, Pasco, and Hillsborough—conducted professional development workshops on various topics, including classroom management, STEM education, time management, leadership, and mentorship. The researchers requested a time slot in these conferences to conduct a session titled "Integrating AI In and Out of the Classroom with the Use of TeacherServer." The proposed three-hour professional development sessions were accepted by all three counties, and the researchers were invited to present at the sessions in each county. A total of 148 K-12 teachers participated in the researchers' professional development sessions and subsequently took part in the study.

During the professional development sessions, participants were introduced to TeacherServer and its various functionalities. The sessions began with an overview of the platform, highlighting its key features and benefits. This introduction was followed by interactive, hands-on activities where participants created lesson plans, quizzes, discussions, and classroom management plans using TeacherServer. These activities were designed to provide teachers with practical experience and a deeper understanding of how to effectively integrate the tools into their teaching practices.

After the individual activities, teachers collaborated in groups to further explore and utilize the tools, fostering a shared learning environment and encouraging peer-to-peer learning. Throughout the sessions, participants were actively encouraged to provide feedback, share their experiences, and suggest improvements or new tool ideas. This collaborative approach not only enhanced the learning experience but also contributed to the continuous development and refinement of TeacherServer, ensuring it meets the evolving needs of educators.

Data Collection and Analysis

Teachers' Acceptance of AI in Education (TAAI) Pre-Post Survey

At the start and conclusion of each professional development session, teachers were invited to voluntarily complete a survey designed to gauge their acceptance of generative AI technology. This survey utilized the 27-item Teachers' Acceptance of AI in Education (TAAI) instrument, aiming to assess the impact of the sessions on teachers' openness to integrating AI tools into their educational practices. The TAAI instrument is a validated tool designed to measure teachers' acceptance of AI technologies in educational settings. It was developed to address previous limitations in measuring AI acceptance, providing robust evidence of high psychometric quality, including reliability and validity (Guo, Shi & Zhai, 2024). The instrument assesses five key dimensions: perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety. Each dimension is evaluated through a series of carefully crafted items. The TAAI survey demonstrates a high overall reliability coefficient of 0.92. The reliability coefficients for the sub-dimensions are as follows: perceived usefulness (0.88), perceived ease of use (0.91), behavioral intention (0.91), self-efficacy (0.91), and anxiety (0.77). The instrument has been validated through construct validity,

convergent validity, and discriminant validity (Guo, Shi & Zhai, 2024). Quantitative data from the pre- and post-TAAI surveys were analyzed using paired t-tests to assess changes in teachers' acceptance of AI tools. The analysis focused on the five dimensions of the TAAI instrument: perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety.

System Usability Scale Survey

In order to evaluate perceived usability, the researchers employed the System Usability Scale (Brooke, 1996). The cale, an industry benchmark, is a 10-item questionnaire designed to gauge the user's perception of a technology's usability. Participants rate each item using a 5-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). To compute the SUS score, the sum of these responses is multiplied by 2.5, resulting in a range between 0 and 100. Higher scores denote better perceived usability. A score above 68 is considered to be above average. The reliability and validity of the SUS have been confirmed in studies, making it a trusted tool for evaluating the usability of mobile apps among both experts and end-users (Kortum & Bangor, 2013). To ensure the survey's validity, both content and construct validity methods were employed. Construct validity assesses whether the survey accurately measures the concept it is intended to measure, while content validity ensures that the survey fully represents the domain it aims to cover.

Results

Part 1: Impact of Professional Development Workshops on Teachers' Acceptance of Generative AI Tools

The study first aimed to determine how professional development workshops influence teachers' acceptance of generative AI tools, focusing on changes in perceived usefulness, perceived ease of use, behavioral intention, self-efficacy, and anxiety, based on the (TAAI framework. Researchers analyzed pre- and post-workshop scores from TAAI Survey to explore these effects.

The overall evaluation of the study indicates a significant positive impact of the professional development sessions on teachers' perceptions and intentions regarding the use of generative AI applications in education. Across all measured dimensions—Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, Self-Efficacy, and Anxiety—there were substantial improvements in posttest scores compared to pretest scores, with all differences being statistically significant. This suggests that the training effectively addressed initial skepticism, unfamiliarity, and anxiety, while simultaneously enhancing teachers' confidence and willingness to integrate AI tools into their teaching practices. The consistent and significant improvements across all dimensions highlight the success of the intervention in transforming teachers' attitudes and capabilities, thereby paving the way for more widespread and effective adoption of AI technologies in educational settings (see **Table 1**).

Table 1. *Impact of PD on Teachers' Acceptance and Use of Generative AI Applications.*

Statements	Pretest M	Pretest SD	Posttest M	Posttest SD	Difference t	Difference p
Section 1. Perceived Usefulness						
Generative AI applications are beneficial for my teaching tasks.	1.1	.41	3.8	.67	-9	.00*
Using generative AI applications improves my teaching effectiveness.	0.7	.42	3.6	.81	-11	.00*
Generative AI applications help me achieve important teaching objectives.	0.8	.59	3.7	.78	-12	.00*
The use of generative AI applications enhances my productivity as a teacher.	1.5	.67	3.9	.36	-14	.00*
Generative AI applications make my teaching tasks easier.	1.3	.59	3.9	.42	-18	.00*
Generative AI applications are useful in my teaching practice.	1.4	.66	3.8	.44	-15	.00*
Generative AI can offer convenience and save time in my teaching activities.	1.3	.65	3.9	.39	-21	.00*
Section 2. Perceived Ease of Use						
Learning how to use generative AI applications is straightforward for me.	1.7	.51	3.6	.55	-22	.00*
It is easy for me to become proficient in using generative AI applications.	1.2	.49	3.7	.56	-14	.00*
Generative AI applications are user-friendly.	1.4	.57	3.9	.71	-11	.00*
My interaction with generative AI applications is clear and comprehensible.	1.3	.48	3.8	.69	-11	.00*
I find it easy to leverage generative AI applications in my teaching.	1.3	.62	3.6	.88	-9	.00*
Section 3. Behavioral Intention						
I intend to use generative AI applications in my teaching practice.	0.6	.59	3.7	.81	-19	.00*
I plan to incorporate generative AI applications into my teaching activities.	0.7	.67	3.9	.58	-17	.00*
I am likely to recommend generative AI applications to other educators.	0.6	.61	3.8	.61	-15	.00*
I am interested in exploring more uses of generative AI applications in education.	3.1	.67	3.8	.54	-11	.00*
I foresee myself using generative AI applications regularly in my teaching.	0.3	.41	3.7	.48	-16	.00*
Section 4. Self-Efficacy						
I am confident in my ability to use generative AI applications effectively.	0.8	.61	3.6	.81	-14	.00*
I can troubleshoot issues that arise when using generative AI applications.	0.2	.59	3.4	.77	-21	.00*
I feel capable of integrating generative AI applications into my teaching.	0.6	.63	3.5	.68	-10	.00*
I am skilled at using generative AI applications for educational purposes.	0.8	.68	3.6	.82	-9	.00*
I can teach others how to use generative AI applications in education.	0.5	.67	3.6	.71	-14	.00*
Section 5. Anxiety						
I do not feel anxious about using generative AI applications in my teaching.	0.7	.61	3.8	.59	-17	.00*
The thought of using generative AI applications does not make me uneasy.	0.8	.67	3.7	.89	-13	.00*
I do not worry about making mistakes when using generative AI applications.	0.8	.65	3.8	.71	-18	.00*
I do not feel apprehensive about relying on generative AI applications for teaching tasks.	1.1	.45	3.8	.83	-16	.00*
I am not concerned about the potential negative impacts of generative AI applications on my teaching.	0.9	.54	3.8	.86	-19	.00*

Responses were scored on a 5-point Likert scale ranging from 0=strongly disagree to 4=strongly agree
*.00 refers to significant difference

Part 2: Evaluating the Effectiveness of TeacherServer in Enhancing Teaching Practices and Its Adoption Factors

The second purpose of the study was to evaluate how effective TeacherServer is in improving teaching practices and addressing the specific needs of educators. To answer this question, researchers analyzed the results from the Usability and Effectiveness Survey data (see **Table 2**).

Table 2. *Means and standard deviations for the System Usability Scale across participants.*

Statement	Mean	SD
I think I would like to use the website frequently	3.8	0.6
I found the website to be unnecessarily complex	0	0
I thought the website was easy to use	3.9	0.5
I think that I would need support of a technical person to be able to use the website	0	0
I found the various functions on the website were well integrated	3.7	0.6
I thought there was too much inconsistency on the website	0	0.6
I would imagine that most people would learn to use the website very quickly	3.9	0.5
I found the website very cumbersome to use	0	0
I felt very confident using the website	3.8	0.6
I needed to learn a lot of things before I could get going with the website	0	0
System Usability Scale total score	97.75	

Responses were scored on a 5-point Likert scale ranging from 0=strongly disagree to 4=strongly agree

Based on the data provided from user feedback, participants generally expressed highly favorable sentiments towards the usability of the website. Participants indicated a strong inclination towards frequent use of the website, with a mean score of 3.8. They found the website easy to navigate, as evidenced by a high mean score of 3.9, highlighting its ease of use. Additionally, participants felt confident in their ability to use the website without the need for technical support, as reflected by the low mean scores of 0 for both unnecessary complexity and the need for technical assistance. The integration of functions on the website was well-received, with a mean score of 3.7, and participants felt confident using the website, evidenced by a mean score of 3.8. Concerns regarding inconsistencies, cumbersome use, or the need to learn a lot before getting started were minimal, as these items also received low scores of 0. In conclusion, the System Usability Scale total score of 73.75 indicates an excellent level of usability, suggesting that users predominantly had positive experiences with the website.

Discussion

The study revealed a significant positive shift in teachers' attitudes towards AI tools after their engagement with TeacherServer. Initially, there was considerable skepticism, with almost all of the teachers expressing doubts about AI integration in classrooms. However, post-intervention, most if not all participants reported a more favorable view. This change underscores the transformative potential of hands-on experience with AI tools. The user-friendly interface and practical applications of TeacherServer helped alleviate initial concerns, fostering a more positive outlook on AI's role in education. This finding aligns with

existing literature suggesting that direct exposure to technology can enhance acceptance and reduce apprehension among educators.

The high usability ratings and positive feedback on the effectiveness of TeacherServer highlight its value as an educational tool. With most participants finding the platform "very easy" to use and noting improved lesson planning efficiency, TeacherServer demonstrates its potential to enhance teaching practices. The platform's diverse educational resources and streamlined lesson planning capabilities were well-received, suggesting that such tools can significantly improve teaching efficiency and effectiveness. These results are consistent with previous studies emphasizing the importance of usability in technology adoption within educational settings.

The willingness of most of teachers to integrate TeacherServer tools into their regular teaching practices reflects the platform's practical benefits. The collaborative group work during professional development sessions likely contributed to this positive outcome by allowing teachers to share insights and strategies, thereby enhancing their confidence in using the tools. This finding supports the notion that collaborative learning environments can facilitate technology adoption in educational contexts.

User feedback on TeacherServer has provided several suggestions for enhancements. Teachers expressed a strong desire for a mobile app to complement the web platform, allowing for on-the-go access to resources and increased flexibility in dynamic teaching environments. Users also requested more customization features, such as saving conversations, exporting materials, and personalizing the interface, to tailor the platform to their specific needs. Integration with Learning Management Systems (LMS) like Canvas or Moodle was highlighted as a priority to streamline course reviews and feedback, reducing administrative tasks.

Additionally, there is demand for AI tools that students can use, such as interactive learning aids and personalized study plans, to create a more engaging learning environment. Finally, offering online professional development modules would provide flexible learning opportunities for teachers unable to attend in-person sessions, ensuring access to essential training. By addressing these suggestions, TeacherServer can enhance its functionality and accessibility to better serve educators and students.

Conclusion

The study highlights TeacherServer as a highly effective tool for educators, improving attitudes towards AI and enhancing lesson planning efficiency. It underscores the importance of professional development in fostering AI acceptance, positioning TeacherServer as a valuable educational resource. The platform can modernize educational practices by streamlining lesson planning and providing diverse resources, enhancing teaching efficiency and allowing more time for student engagement. However, challenges like data privacy and the need for continuous training must be addressed. The study's limitations include a small sample size and potential biases from self-selecting participants. Future research should focus on TeacherServer's long-term impacts on teaching and student outcomes, its effectiveness across diverse contexts, and integration with other educational technologies. By addressing these areas, TeacherServer can continue evolving to meet educators' needs and enhance educational practices through technology.

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