Artificial Intelligence Use in Education: A Technology Acceptance Model Perspective

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Introduction

Artificial Intelligence (AI) has revolutionized the technological landscape helping to simplify and solve complex intellectual tasks. Such revolutionary potential has been documented in a wide range of areas, including education (Adiguzel et al., 2023). Even if limitations such as ethical concerns exist, previous research has indicated AI tools are highly useful tools in education (Baidoo-anu & Ansah, 2023; Dimitriadou & Lanitis, 2023). Understanding the perceptions and behaviors of students regarding AI use and the relationship between these perceptions and behaviors can help educational decision/policy makers to formulate better regulations regarding the use of AI (Saif et al., 2024; Shahzad et al., 2024). However, limited research has explored the perceptions, attitudes, intention, and behavior of students toward AI use, especially among graduate students. To address this gap, we first describe the perceived usefulness, perceived ease of use, attitudes, intention, and behavior of graduate students toward using AI tools, and we then explain the relationship among these variables.

Theoretical Framework

This study was framed using the technology acceptance model (TAM). The model states that perceived ease of using a technology and its perceived usefulness affect people's attitudes toward it, which in turn affects their intention and thus the actual technology use behavior (Davis, 1986, 1989). TAM is a widely used model in education as it serves as the basis for conducting research on the usage of several educational technologies (Granic & Marangunic, 2019). This research deals with the use of AI technologies in education considering its emerging application in an educational setting (Zhai et al., 2021). The applicability of TAM while using AI as an educational technology has also been documented in the previous literature (Shahzad et al., 2024). However, the dynamic nature and context-specific perceptions and behaviors of AI use allow us to conduct similar studies using the TAM. In this research, we utilized the model for framing our research questions, developing survey instruments, and interpreting the findings.

Methods

We used a quantitative design to conduct this research. The researchers collected data online via Qualtrics surveys with the graduate students at The Ohio State University (OSU). A convenience sampling method was used to select the study participants (Golzar et al., 2022). The criteria to select the participants were: current graduate student at OSU at an age more than 18 years. Among the 36 responses obtained in total, four responses were incomplete and hence discarded, making our final sample size to be 32 ($N = 32$). The majority of the participants were from the department of agricultural communication, education, and leadership ($n = 20$, 62.50%), female ($n = 19$, 59.38%), Whites ($n = 17$, 53.13%), grown up in rural community ($n = 14$, 43.75%), and liberal in their political orientation ($n = 13$, 40.63%). The average age of the participants was about 31 years ($M = 30.68$, $SD = 7.03$). Likert scales consisting of multiple items were used to measure each variable under the technology acceptance model. While a panel of experts consisting of 3 university faculty members validated the instrument, the reliability of all the variables was ensured by calculating the Cronbach's alpha (perceived usefulness = .94, perceived ease of use = .94, attitude = .95, intention = .96, and behavior = .93), with all values satisfying the standard reliability requirement (Carmines & Zeller, 1979). Data were analyzed using SPSS Version 29. Descriptive analysis and linear regression techniques were used for analyzing data.

Results

On average, the graduate students perceived AI tools to be moderately useful ($M = 3.46$, $SD = 1.04$) and easy to use ($M = 3.63$, $SD = 1.04$) for academic purposes. With a neutral attitude on average ($M = 3.38$, $SD = 1.03$), the students had moderate intention to use such tools for learning ($M = 3.36$, $SD = 1.15$). Finally, the findings showed that the students were using AI tools to a moderate extent for educational purposes ($M = 2.88$, $SD = 1.26$). With 27.8% of the variance explained by the model ($R^2_{Adj.} = .278$, $F\ (1, 30) = 12.94$, $p = .001$), perceived ease of using AI tools positively and significantly influenced its perceived usefulness ($\beta = .55$, $t = 3.60$, $p = .001$). Perceived usefulness ($R^2_{Adj.} = .750$, $F\ (1, 30) = 93.76$, $p < .001$) and perceived ease of using AI tools ($R^2_{Adj.} = .331$, $F\ (1, 30) = 16.34$, $p < .001$) by graduate students explained 75.0% and 33.1% of variance on the students' attitude toward using AI tools, respectively. Both perceived usefulness ($\beta = .86$, $t = 9.68$, $p < .001$) and perceived ease of use ($\beta = .59$, $t = 4.04$, $p < .001$) were significant positive predictors of the students' AI use attitudes. Again, perceived usefulness ($R^2_{Adj.} = .644$, $F\ (1, 30) = 57.04$, $p < .001$) and attitudes ($R^2_{Adj.} = .812$, $F\ (1, 30) = 135.33$, $p < .001$) independently explained 64.4% and 81.2% of the variance on the graduate students' intention to use AI tools for academic purposes. Both perceived usefulness ($\beta = .89$, $t = 7.55$, $p < .001$) and attitudes ($\beta = 1.00$, $t = 11.63$, $p < .001$) significantly and positively predicted the intention to use AI tools. Finally, with 83.0% of the variance explained by the model ($R^2_{Adj.} = .830$, $F\ (1, 30) = 152.12$, $p < .001$), intention to use AI tools positively and significantly influenced students' actual AI use behavior ($\beta = 1.00$, $t = 12.33$, $p < .001$).

Discussion, Conclusion, Implications, and Recommendation

AI is an emerging technology, and its full potential in education is yet to be unfolded (Dimitriadou & Lanitis, 2023). However, it is obvious that AI can be a very useful tool in education if used properly (Baidoo-anu & Ansah, 2023). Our findings indicate that graduate students have already started using AI tools to a certain extent for educational purposes, considering its benefits. Our findings also supported the relationships theorized by the technology acceptance model (Davis, 1986). The students who perceived AI tools to be useful and easy to use were more likely to form positive attitudes toward using the tools. The more positive the attitude, the higher their intention was to use AI tools, finally leading to higher AI usages. Hence, interventions to increase positive attitudes toward AI tool usages in education results in higher AI adoption. Based on our results, one way to develop and/or reinforce positive attitudes is to ensure that students have higher perceived usefulness and perceived ease of using AI tools for learning. Hence, AI developers should consider creating user-friendly AI interfaces to ensure that users perceive it easy to use and/or learn to use to increase the acceptance of AI tools. Programs communicating what purposes AI tools can serve in education and how, can help students to understand the usefulness of the tools, ultimately enhancing positive attitudes toward the tools. However, because ethical considerations are important while using AI tools (Baidoo-anu & Ansah, 2023), educational institutions should formulate AI use regulations so that the students know exactly how they can use AI tools ethically to help them learn better. The implications of this research are useful in education including agricultural education. This is especially true for this research as most of our research participants were graduate students in the agricultural education. This research is confined by sample size limiting generalizability beyond our sample, but it provides valuable information on status, perceptions, and behaviors of using AI tools by graduate students. Future research should consider replicating the study with higher sample size to meet the scope of generalizability.

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