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# AI Tool Awareness and Student Adoption in Higher Education: Development of a Learning Support Web Application

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**Abstract:** ***This study examined undergraduate students' awareness, attitudes, and adoption behaviors regarding artificial intelligence (AI) learning tools and developed a web-based AI Tool Awareness Application to support responsible adoption. Guided by the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB), the study used a quantitative pretest-posttest intervention design involving 200 undergraduate students enrolled in information technology programs at the University of Perpetual Help System Laguna. A structured questionnaire measured awareness, perceived usefulness, perceived ease of use, trust, self-efficacy, subjective norms, behavioral intention, and actual usage. Regression analysis showed that awareness significantly predicted perceived usefulness (β = 0.419), trust (β = 0.554), and behavioral intention (β = 0.401), while behavioral intention significantly predicted actual usage (β = 0.325). Findings indicate that awareness and trust are critical drivers of responsible AI adoption. The developed web application provides a scalable framework for promoting AI literacy and informed educational technology use among students.***

**Keywords:** artificial intelligence in education; AI literacy; technology acceptance model; theory of planned behavior; higher education; educational technology adoption; web-based intervention

## 1. Introduction

Artificial intelligence (AI) tools, including generative AI systems, adaptive feedback platforms, and intelligent tutoring applications, are increasingly accessible to students in higher education (Baidoo-Anu & Ansah, 2023). These technologies offer considerable potential for personalizing instruction, improving writing and revision, supporting research, and providing on-demand academic assistance. However, despite growing availability, meaningful adoption by students remains inconsistent and unstructured.

Studies indicate that while students exhibit generally positive attitudes toward AI tools, concerns around trust, privacy, academic integrity, and ethical use continue to moderate adoption (Aldossary et al., 2024). Institutional factors such as the absence of formal guidance, unequal technological access, and limited training further hinder confident and responsible use (Lu et al., 2024). Critically, there is limited empirical research on whether structured, web-based awareness interventions can significantly shift students' attitudes and adoption behaviors.

This study addresses these gaps by: (1) assessing baseline levels of student awareness, perceived usefulness, ease of use, trust, and self-efficacy; (2) identifying key barriers and facilitators to adoption; (3) developing and deploying an AI Tool Awareness Web Application; and (4) evaluating the intervention's effect on attitudes, behavioral intention, and actual usage. The study is grounded in the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB), extended with awareness and trust as precursor constructs.

## 2. Theoretical Framework

The study integrates two established models of technology adoption. TAM's core constructs, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), explain how utility and usability perceptions shape behavioral intention and actual usage in educational contexts (Davis, 1989). Extensions of TAM, including the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2022), further validate these constructs across diverse educational technology settings. TPB extends this by incorporating subjective norms, perceived behavioral control, and attitudes toward behavior, accounting for social and contextual influences on adoption decisions.

The conceptual model proposes that prior awareness serves as a precursor variable, positively influencing PU, PEOU, trust, and self-efficacy. These constructs, together with subjective norms, shape behavioral intention, which ultimately drives actual AI tool usage. Contextual moderators such as institutional support, internet accessibility, and ethical concerns further condition these relationships. This extended framework is consistent with findings from recent studies integrating TAM and TPB to explain AI adoption among students and educators (Alamri et al., 2024; Simon et al., 2024).

## 3. Methodology

### 3.1 Research Design

A quantitative pretest-posttest intervention design was employed. Pre-intervention surveys measured baseline awareness, attitudes, behavioral intention, and self-reported usage. Participants then interacted with the AI Tool Awareness Web Application over one academic semester, with standardized access provided through scheduled

laboratory sessions to ensure uniform exposure. Post-intervention surveys reassessed the same variables. Descriptive statistics and regression analysis were used to examine variable levels and predictive relationships among constructs.

### 3.2 Participants and Sampling

Data were collected from 200 undergraduate students enrolled in Bachelor of Science in Information Technology programs at the University of Perpetual Help System Laguna, located in Laguna, Philippines, during the academic year 2025 to 2026. Purposive sampling was used to select participants who had access to a device and internet connection and were currently enrolled in technology-related courses.

### 3.3 Instrumentation

A structured 5-point Likert scale questionnaire (1 = Strongly Disagree to 5 = Strongly Agree) measured eight constructs: Awareness (5 items), Perceived Usefulness (4 items), Perceived Ease of Use (5 items), Trust (5 items), Self-Efficacy (4 items), Subjective Norms (4 items), Behavioral Intention (4 items), and Actual Usage (2 items). Items were adapted from validated TAM and TPB instruments in prior AI adoption literature. Internal consistency was confirmed through Cronbach's alpha, with all constructs exceeding the acceptable threshold of 0.70. Construct validity was established through confirmatory factor analysis prior to the main data collection.

### 3.4 System Development

The AI Tool Awareness Web Application was developed using the ADDIE instructional design model integrated with the Waterfall Software Development Life Cycle (SDLC). Key application features included an AI tool directory, guided tutorials, use case demonstrations, ethics and privacy modules, a prescriptive recommendation engine, and interactive self-assessment activities. The system was built using HTML, CSS, and JavaScript and deployed for student use during the intervention phase.

### 3.5 Data Analysis

Descriptive statistics (mean, standard deviation) characterized distributions across study variables. Simple and multiple regression analyses examined predictive relationships among awareness, attitudes, behavioral intention, and actual usage. Statistical significance was set at $p < 0.05$. IBM SPSS Statistics was used for all analyses.

## 4. Results and Discussion

### 4.1 Descriptive Statistics

Table 1 presents descriptive statistics for major study variables. Students demonstrated moderate awareness ($M = 2.96$, $SD = 0.73$), suggesting familiarity with AI tools but incomplete understanding of their functions and ethical implications. In contrast, perceived usefulness ($M = 3.54$), self-efficacy ($M = 3.77$), subjective norms ($M = 3.57$), and behavioral intention ($M = 3.54$) were all high, indicating generally positive orientations toward AI tool adoption. Trust remained moderate ($M = 3.58$), reflecting persistent concerns about reliability, privacy, and ethical use.

**Table 1:** Descriptive Statistics for Major Study Variables

| Variable | Mean | SD |
|---|---|---|
| Awareness | 2.96 | 0.73 |
| Perceived Usefulness | 3.54 | 0.68 |
| Perceived Ease of Use | 3.29 | 0.71 |
| Trust | 3.58 | 0.66 |
| Self-Efficacy | 3.77 | 0.61 |
| Subjective Norms | 3.57 | 0.69 |
| Behavioral Intention | 3.54 | 0.72 |
| Actual Usage | 3.81 | 0.74 |

### 4.2 Regression Results

Table 2 presents regression findings for major study relationships. Awareness significantly predicted perceived usefulness ($\beta = 0.419$, $p < 0.0001$, $R^2 = 0.172$), indicating that students with greater AI tool familiarity perceive these tools as more useful for academic tasks. Awareness was also a strong predictor of trust ($\beta = 0.554$, $p < 0.0001$, $R^2 = 0.277$), suggesting that exposure and understanding substantially alleviate concerns about AI reliability and privacy.

Among TAM and TPB constructs, trust emerged as the strongest predictor of behavioral intention ($\beta = 0.483$, $p < 0.0001$), followed by PEOU ($\beta = 0.398$, $p < 0.0001$) and PU ($\beta = 0.254$, $p < 0.0001$). These results confirm that students are more willing to adopt AI tools when they perceive them as trustworthy, easy to use, and academically valuable. Finally, behavioral intention significantly predicted actual usage ($\beta = 0.325$, $p < 0.0001$), establishing intention as the key pathway from attitudes to behavior.

**Table 2:** Regression Results for Major Study Relationships

| Relationship | β | $R^2$ | p-value |
|---|---|---|---|
| Awareness → PU | 0.419 | 0.172 | < 0.0001 |
| Awareness → Trust | 0.554 | 0.277 | < 0.0001 |
| Awareness → BI | 0.401 | 0.153 | < 0.0001 |
| PU → BI | 0.254 | 0.062 | < 0.0001 |
| PEOU → BI | 0.398 | 0.113 | < 0.0001 |
| Trust → BI | 0.483 | 0.245 | < 0.0001 |
| BI → Actual Usage | 0.325 | 0.079 | < 0.0001 |

Note: PU = Perceived Usefulness; PEOU = Perceived Ease of Use; BI = Behavioral Intention

### 4.3 Discussion

The finding that awareness is the most potent precursor of trust ($\beta = 0.554$) has important implications for AI adoption interventions. Students who understand how AI tools work, including their data practices, limitations, and ethical boundaries, are substantially more willing to trust and use them. This supports calls in the literature for structured AI literacy programs that go beyond basic tool introductions to address responsible use, bias, and privacy (Annapureddy et al., 2025; Southworth et al., 2023).

The stronger effect of trust on behavioral intention ($\beta = 0.483$) compared to perceived usefulness ($\beta = 0.254$) suggests that

adoption in educational contexts is as much an ethical and social phenomenon as a utilitarian one. Students must feel confident that AI tools are reliable and safe before they will commit to using them, consistent with findings from Almahasees (2023) and Alamri et al. (2024). These results reinforce the design logic of the awareness web application, which embedded ethical modules and transparency features alongside practical AI tool demonstrations.

## 5. Conclusions

This study confirms that awareness plays a foundational role in students' adoption of AI learning tools, primarily through its influence on trust, perceived usefulness, and behavioral intention. Moderate baseline awareness (M = 2.96) despite high perceived usefulness and behavioral intention highlights a gap between positive attitudes and structured knowledge, a gap the AI Tool Awareness Web Application was designed to close.

The findings suggest that promoting AI literacy through structured educational interventions can support more informed and responsible technology adoption in higher education. The developed web application demonstrates practical potential as a scalable awareness intervention. Future research should assess long-term behavioral outcomes, broader student populations, and objective usage measures to strengthen generalizability.

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