Traditional Lecture versus AI in Teaching Health Terminology: Gender, Technology Acceptance and Learning Autonomy

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ABSTRACT

Artificial intelligence (AI) tools are rapidly shifting the way healthcare education is taught, moving from human-led teaching to adaptive, automated assistance. However, acceptance and adoption of digital learning systems are not uniform across demographic groups. This study analyzes quantitative responses from non-clinical Health Administration students at the Faculty of Business and Management, Universiti Teknologi MARA, Puncak Alam Campus (N = 114; Female n = 97, Male n = 17), evaluating the transition from tradition lecture-based to an AI-assisted learning framework. Grounded in the Technology Acceptance Model (TAM) and Self-Regulated Learning (SLR) theory, this paper evaluated gender-based differences in technology acceptance and learning autonomy in the Health Terminology course. Empirical findings show clear differences in perceived understanding between both genders. Result indicates both male and female value AI as useful for basics, however it differs in advanced application. Students reported traditional lectures (M = 4.34, SD = 0.59), while AI-assisted learning scoring at (M = 4.35, SD = 0.60), with equally high satisfaction. This confirms that both methods fulfill distinct but complementary functions in addressing the complex vocabulary and memorization demands of health terminology. Lectures provided professional context and live guidance, while AI tools offered automated accuracy, immediate feedback, and personalized reinforcement. Significantly, despite the female majority in the sample (85.1%), independent samples t-tests showed no significant gender differences in perceptions of lectures (p = .196) or AI learning (p = .083). These findings suggest that the historical digital divide has effectively closed among modern undergraduate health sciences students, with both genders demonstrating similar technological readiness and confidence. The implications strongly support a blended instructional model in which AI handles repetitive vocabulary drills outside class, freeing lecture time for higher-order applications such as case studies, and healthcare documentation.

Keywords: Artificial intelligence, Tradition Learning, Gender, Active Learning, Health Terminology

INTRODUCTION

Teaching a complex anatomy and clinical physiology has traditionally depended on visual delivery of information such as via textbook, tangible cadaveric teaching aid, or lecture slides (Turney, 2007; Sugand, Abrahams, & Khurana, 2010; Estai & Bunt, 2016; McMenamin et al., 2018; Papa & Vaccarezza, 2025). This is true for Health Terminology courses offered for undergraduate health sciences and health management programs in universities has solely depend on traditional lecture method. The challenge students face in this course is extend beyond memorizing health terms, but to bridge the gap between two dimensional anatomical concepts into dynamic skills. In response, higher education institutions have began introducing AI-powered learning platforms. This require students to prepare and engage with AI generated pre-reading materials before class, while in class they collaborate with in class exercises, practice problem solving and get real time algorithmic feedback (Joseph et al., 2025; Sirasanagandla et al., 2025).

As AI tools turning into a new learning platforms, it is changing the classroom environment by replacing the centralized presence of a teacher with adaptive, algorithimic driven tutor that deliver an answer whenever student seek support. In these classroom setup, students must actively engage by prompting the AI, analyzed the feedback provided, and independently navigate diagnostic feedback (Crompton and Burke, 2023). Whats important to notice is that such technological adoption does not occur in isolation, as the transition form teacher centred lecture to algorithimic driven framework, it is higly shaped by student's digital literacy and self-directed learning.

Prior research on educational technology highlight that male and female may not adopt digital platforms with the same level of trust, perceived usability, or alignment with their learning strategies (Werfhorst et al., 2022). Despite this clear indicators, there is very limited empirical research exploring how a sudden shift to automated AI platforms affects male and female differently. This paper addresses this gap by directly comparing student evaluations of traditional lectures and AI-Assisted Learning within the HSM545 course offered to undergradate students of Bachelor Degree in Business Administration (Health Administration) program at UiTM Puncak Alam. The findings is to map these reactions onto the intersection of technological acceptance and independent learning.

LITERATURE REVIEW

Gender and Learning: Traditional Lecture and AI Assisted Learning

Gender differences significantly shape how students across higher education engage in learning today, with female leaning towards reflective engagement and guided support, while male report higher confidence on technology adoption in learning. (Douglas et al., 2020; Alonso-Martin, 2021; Matobobo, 2026). A systematic review of 30 studies by Matobobo (2026) found that male students has more confidence and higher usage of AI tools while female students and more cautious and requires guided support and meaningful feedback in learning. These indicate that gender moderates the adoption of AI tools in learning environment. Female students often face challenges when using digital learning tools and among the barriers discussed are access and inclusion. This requires institutional support to ensure equitable participation in enhanced technology learning (Springer, 2026). Together, these studies emphasize the importance of examining gender as a significant factor when evaluating AI learning, particularly in specialized courses such as Health Terminology.

The comparison between traditional lecture and AI assisted learning has become central to debates in higher education. Traditional lectures remain valued for their structured delivery mode and teacher-led guidance, particularly in challenging subjects requiring clear guidance and support. Yet, AI-assisted learning introduces adaptive systems that personalize instruction, provide immediate feedback, and encourage independent learning. Liu et al. (2026), in their meta-analysis study showed that AI-assisted learning can improves student outcomes compared to traditional methods, though the impact varies across disciplines and learner demographics. Amzalag et al. (2025) also compared student experiences in traditional and AI learning and found that while AI enhanced engagement and personalization, students continued to appreciate the clear structure of lectures for complex topics. These findings suggest the complementary roles of lecture and AI, and the importance of evaluating how students perceive each mode of delivery across different genders.

Underpinning Theories

To explore gendered responses to teaching changes and to evaluate how it interact with psycholological and technological shift, this study draws upon two major theoretical frameworks. The first one is the Technology Acceptance Model (TAM) formulated by Fred Davis (1989) and the other one is Self-Regulated Learning (SRL) Theory by Barry Zimmerman (2000). Together, both theories explain how male and female students adapt when moving from traditional lectures to AI tools in Health Terminology course for non-clinical students.

The Technology Acceptance Model (TAM), individuals preference to technology adoption is very much influence by its perceived usefulness, and perceived ease of use. Perceived usefulness refers to the degree to which student's belief that algorithmic systems can be meaningful, and it enhance their academic performance. While perceived ease of use reflects the intuitive reflection that these AI tools are easily accessible and its user-friendly. However AI implementation is never free from error and challenges, as AI driven frameworks is highly dependent on student's digital literacy and ability to evaluate and trust AI as it is slowly shifting from guided traditional lecture (Joseph et al., 2025; Sirasanagandla et al., 2025).

Nevertheless, TAM alone is not enough to discuss and explain AI and pedagogical shifts. The nature of AI tools itself disrupt the traditional lecture rigid structure where with AI mediated learning it places responsibilty on students to enact self regulated learning behaviours (Zimmerman, 2000). The Self-Regulated Learning (SRL) model says that now students are required to plan, monitor and evaluate their own cognitive strategies. In highly autonomous AI learning spaces, the system functions as a reflective agent, presenting information without interpretation to the learner while the learner him or herself must make meaning on their own. This reliance on self regulation highlights how the adoption of technology is shaped by not only the AI system but also human thought. In unstructured AI learning environments, where it become unstructured, the influence of gender socializaton becomes more intensified. Research on technology acceptance has shown that male and female students approach digital platforms with different level self-regulation and technological self efficacy, producing unevent adoption patterns accros both gender.

Hypotheses Development

Based on the literature and aim of this study, several hypotheses were proposed:

H1: There is a significant difference in student perception between traditional lecture and AI-assisted learning.

This hypothesis proposes that there is a significant difference in student perception between traditional lecture-based teaching and AI-assisted learning. This expectation is grounded in the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use influence how students evaluate new tools. In this case, AI may be seen as more adaptive and flexible, while lectures provide structure and clarity. Testing this difference allows us to see whether students value personalization over traditional delivery in the Health Terminology course.

H2: There is a significant difference between male and female students in their perception of traditional lecture.

This hypothesis suggests that there is a significant difference between male and female students in their perception of traditional lectures. Prior studies indicate that gender can shape preferred learning styles, with female students often valuing structured and guided approaches, while male students may lean toward autonomy. By examining lecture-based teaching through this lens, the study connects gendered learning preferences to TAM's construct of perceived usefulness, as well as SRL's emphasis on how learners regulate their engagement in structured environments.

H3: There is a significant difference between male and female students in their perception of AI-assisted learning.

This hypothesis states that there is a significant difference between male and female students in their perception of AI-assisted learning. This hypothesis reflects the idea that gender may moderate how students adopt and evaluate digital tools. Within TAM, differences may appear in perceived ease of use and usefulness, while SRL highlights how autonomy in AI environments can benefit some learners more than others. Testing this hypothesis helps identify whether AI-driven learning supports both genders equally or whether differences emerge in acceptance and self-regulation.

METHODOLOGY

This study utilizes a quantitative, descriptive cross-sectional research design to analyze student evaluations of course delivery in the Health Terminology (HSM545) course code.

Study design and Setting

The intervention combined traditional lectures and TBL, were implemented from October 2025 to February 2026 on the Health Terminology course (HSM545), in the Bachelor Degree in Business Administration (Health Administration) program at Faculty of Business and Management, UiTM Puncak Alam. Ethical approval was obtained from the Ethics Committee of the Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Selangor. The Health Terminology course is designed to introduce the construction and interpretation of medical terms based on word root, combining forms prefix and suffix, with applications across all major body systems. The learning outcomes include: (1) demonstrating knowledge of anatomy and physiology, (2) applying health terminology to related diseases and medical procedures, and (3) using digital tools to present health terminology effectively. Classes were conducted twice a week (four hours total) throughtout 14 weeks period. Notably, as students are non-clinical students, the course did not include a laboratory component. The midterm exam assessed the first five topics, while the final exam assessed the remaining of the syllabus.

Participants and Context

The sample consisted of 114 undergraduate students enrolled in the Health Terminology (HSM545) course (N = 114). The cohort reflects a demographic profile that is common in any Health Administration program, marked by a strong female predominance. Female students constituted 85.1% (n = 97) of the sample, while male students made up 14.9% (n = 17). The vast majority of participants (86.8%) shared a uniform educational pathway within the Faculty of Business Management (FBM).

Instrument and Data Gathering

Data was collected through a student feedback survey, at the end of the 14 week semester. The survey captured student perceptions across five pedagogical skill indicators, rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The indicators are as the following:

Table 1. Pedagogical skill Indicators

Indicator	Questions
Conceptual Understanding	I found that this learning style helped me understand anatomical concepts.
Problem-solving	I found that this style of learning encouraged clinical anatomy problem-solving
Engagement and Interaction	I found that this style of learning encouraged questions, discussions, and interactions.
Accountability and Consistency	I found that this style of learning forced me to study more consistently.
Problem solving Development	I found that this style of learning improved my problem-solving skills.

These five indicators were standardized across the traditional lecture and the AI-assisted learning questions in the survey to allow for direct comparison.

Data Preparation and Analysis Strategy

Data were analyzed using IBM SPSS Statistics to obtain demographic summaries, to calculate mean satisfaction scores, and compute gender-based differences.

RESULTS

Descriptive Statistics: Gender

A total of 114 undergraduate students enrolled in the non-clinical Health Terminology course. A descriptive analysis of the demographic data indicated a significant gender imbalance within the enrollment profile. Specifically, the female students dominated the sample, who accounted for 97 of the participants (85.1%). In contrast, while male students were underrepresented, with only 17 participants representing 14.9% of the total sample.

Descriptive Statistics: Mean Score

Descriptive statistics were calculated for the mean scores of both learning modes across the entire sample ($N = 114$) and Table 2 below displays the outcome. On a standard 5-point Likert scale, the overall student perception score for traditional lectures was remarkably high, yielding a mean (M) of 4.34 with a standard deviation (SD) of 0.59. Similarly, the overall student perception score for AI-assisted learning was exceptionally positive, presenting a mean (M) of 4.35 with a standard deviation (SD) of 0.60. The narrow standard deviations indicate that student evaluations were tightly clustered around highly favourable ratings for both learning modes.

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.
Traditional Lecture	4.3368	0.59336
AI-assisted learning	4.3509	0.60063

Hypothesis 1: There is a significant difference in student perception between traditional lecture and AI-assisted learning.

A paired-samples t-test was conducted to determine whether there was a significant difference in student perception between traditional lectures and AI-assisted learning. The descriptive data in Table 3 showed that AI-assisted learning received a slightly higher absolute score ($M = 4.35$, $SD = 0.60$) compared to traditional lectures ($M = 4.34$, $SD = 0.59$). However, the Paired Samples Test indicated that this difference was not statistically significant, $t(113) = -0.266,\ p = .791$. Since the p-value is greater than the standard significance threshold ($\alpha = 0.05$), Hypothesis 1 was not supported. The finding demonstrates that students perceive both teaching methodologies as delivering an equivalent educational experience.

Table 3. Paired Sample t-Test Student Perception Between Traditional Lecture and AI-Assisted Learning.

	Mean	SD	t	DF	Sig. (2-ailed)
Traditional Lecture	4.34	0.59			
AI-assisted learning	4.35	0.60	-0.266	113	0.791

Hypothesis 2: There is a significant difference between male and female students in their perception of traditional lecture.

An independent-samples t-test was conducted to determine if male and female students differed significantly in their perceptions of traditional lecture methods (refer to Table 4). Levene's Test evaluate the equality of variances, its p-value (Sig.) was found to be $.487$. Because this value is greater than 0.05, the assumption of equal variances was met, and the top row ("Equal variances assumed") was read. Checking the Sig. (2-tailed) column in this row, the two-sided p-value is $.196$, $t(112) = -1.301$. Because $p > .05$, the gender difference is not statistically significant. Despite the substantial discrepancy in sample sizes between females ($n = 97$) and males ($n = 17$), both groups maintained statistically comparable attitudes toward conventional classroom lectures, meaning H2 was not supported.

Hypothesis 3: There is a significant difference between male and female students in their perception of AI-assisted learning.

An independent-samples t-test was executed to analyse whether gender influenced student perceptions regarding AI-assisted learning platforms ((refer to Table 4). Looking at Levene's Test first, the p-value (Sig.) was found to be $.954$. Because this p-value is greater than 0.05, equal variances were again confirmed, directing the analysis to the top row ("Equal variances assumed"). Checking the Sig. (2-tailed) column in this row, the two-sided p-value is $.083$, $t(112) = -1.751$. Because this p-value remains above the standard $.05$ threshold, the gender difference does not reach statistical significance. Therefore, H3 was not supported, indicating that gender did not serve as a definitive differentiating factor in how students perceived the integration of AI tools within this course.

Table 4. Independent Sample t-Test on Gender Influence Towards Perceptions Regarding Traditional Lecture and AI-Assisted Learning

	Levene's Test for Equality of Variances					**T-Test for Equality of Means**		
	Gender	**Mean**	**SD**	**F**	**Sig.**	**t**	**DF**	**Sig.(2 Tailed)**
Traditional Lecture	Male	3.72	0.65					
	Female	3.95	0.59	0.49	0.487	-1.301	112	0.196
AI-Assisted Learning	Male	4.05	0.60					
	Female	4.20	0.55	0.00	0.954	-1.751	112	0.083

DISCUSSION

The primary objective of this study was to examine student perceptions comparing traditional lectures and AI-assisted learning within a non-clinical health terminology course, while exploring whether these perceptions are systematically shaped by gender. The statistical analysis yielded a uniform lack of significance across all three hypotheses. Far from indicating a failure of research, this uniform lack of significance when paired with the exceptionally high descriptive mean scores reveals a profound state of educational steadiness. Evaluating these null findings within the specific context of a health terminology curriculum offers critical, actionable insights into healthcare education.

Understanding Student's Perception: Traditional Lecture vs AI-Assisted Learning (H1)

The key takeaway from the descriptive data is how high the mean scores are. Students gave both, traditional lecture and AI-assisted learning a high rating. They rated both traditional lectures ($M = 4.34$) and AI-assisted learning ($M = 4.35$) with overwhelmingly high praise. The finding for Hypothesis 1 established that the minimal mean scores differences (0.014) is statistically non-significant ($p = .791$). In this non-clinical health terminology course, the similarity in scores highlight that both learning methods satisfy different, yet equally vital, parts of the student learning process.

Learning health terminology is a distinct academic challenge. It is heavily reliant on systematic memorization, root-word anatomy, structural word building, and making sense of Greek and Latin terms (e.g., break down prefixes like *sub-* and *supra-* or suffixes like *-itis* and *-osis*). This subject is word intensive and terminology focused. Traditional lectures excel at delivering the essential human narrative that helps vocabulary stick. A live instructor provides real-time pronunciations, breaks down complex terms on a whiteboard, and attaches these medical terms to engaging, real-world healthcare scenarios. This contextualization builds a strong conceptual foundation, explaining the high 4.34 mean score.

AI-assisted learning works well for drilling large amount of medical terminology. AI tools utilize flashcards, repetition, immediate feedback, and self-paced quizzes. This allows students to drill vocabulary independently, review misspelled terms immediately, and move forward only when they have memorization the term. The software provides practical support needed for vocabulary drills, explaining the equally high mean score of 4.35.

Both learning methods provide strong benefits tailored to a vocabulary-heavy health terminology course, students saw both methods as balancing each other. The AI software provided drill-based practice for memorization, while the traditional lecture gave context and live guidance. Rather than one method replacing the other, both work as parallel paths to exact same educational outcomes.

Gender Differences in Traditional Lecture vs AI-Assisted Learning (H2 & H3)

A foundational element of this study is the unique demographic composition of the sample, which consisted of 97 female students (85.1%) and 17 male students (14.9%). This strong female dominate is not a sampling error but it reflects real university enrolment trend within non-clinical health administration programs such as health informatics, healthcare administration and public health. Given this skewed demographic, the result for H2 ($p = .196$) and H3 ($p = .083$) show no significant gender differences. This provides reassurance because it means that despite the female majority, both male and female students adopted traditional lectures and AI assisted learning tools in similar ways. This suggest that the demographic imbalance did not distort the outcomes, and educational equity and technology adoption was maintained.

Past studies often discussed about digital divide between genders, with male students reported higher comfort levels, lower technological anxiety, and more enthusiastic attitudes toward newly introduced digital tools. On the contrary, female students frequently expressed a strong preference for face-to-face and lecturer-led classroom. If that pattern still true, the introduction of AI-assisted learning in a female-dominated classroom could have caused dissatisfaction or anxiety, negatively skewing the dataset.

Nonetheless, the results for H3 indicate otherwise. The digital divide has somehow ended among modern undergraduate students. Both male and female students evaluated the AI-assisted platform almost the same, with no significance difference ($p = 083$). There is a small variance, which may be due to unequal sample sizes affecting statistical power. This findings matters because it shows that AI integration does not disadvantage the female supermajority in this academic field. Modern female students already have the basic level of digital literacy and technological readiness that allowed them to adopt the AI platform seamlessly. They adopted the platform without difficulty. At the same time maintaining their appreciation towards traditional lecture delivery.

Study Implications and Limitation of Study

For educators of the non-clinical health administration program, these findings provide clear guidance. Because students view traditional lectures and AI-assisted learning as equally effective and satisfying, there is no pedagogical justification for completely dismantling traditional lecture frameworks in favour of fully automated, AI-assisted learning only. A fully AI-driven environment would strip away the human mentorship that students clearly value ($M = 4.34$) without adding any real gain in student satisfaction.

Instead, the evidence in this study point strongly towards a blended or hybrid model. Since AI platforms are perceived just as highly as standard lectures, they can be safely integrated to handle the repetitive, mechanical elements of health terminology such as spelling drills, root-word identification, and definition matching. By shifting these memory-intensive tasks to an adaptive AI tool outside the classroom, lecturer can free up synchronous lecture time for higher order leaning activities.

This blended approach allow educator to move away from dry vocabulary memorization and maximize classroom time for high-level conceptual applications, such as discussing real-world healthcare case studies, and administrative documentation. Ultimately the implication is clear, AI should not be viewed as a replacement for the educator, but as a peer-level resource that complements and strengthens traditional lecture in university.

While the study provides valuable empirical evidence, there is a limitation that must be acknowledged. A glaring limitation is that the curricular content was delivered sequentially rather than in parallel. More complex and structurally dense systems (such as cardiovascular and respiratory) were taught via lectures, while less conceptually demanding topics were taught using AI. This introduces potential confounding variables, as achievement trends may partly reflect topic difficulty rather than teaching method.

CONCLUSION

This study compared student perceptions of traditional lectures versus AI-assisted learning within a non-clinical health terminology course, while investigating the intersecting role of gender. The findings showed no statistically significant differences across all three tested hypotheses. This signals a meaningful educational equivalence, rather than lack of insight. Students evaluated both traditional lectures ($M = 4.34$) and AI-assisted learning platforms ($M = 4.35$) with high levels of satisfaction. This similarity indicates that both methods plays a unique and equally important function in handling the dense vocabulary and memorization demands of health terminology course. The face-to-face classroom provides professional context and live guidance, while AI framework offers automated accuracy, instant feedback, and personalized reinforcement.

Furthermore, the study highlights important insights into gender equity and technology adoption. Despite the overwhelming female majority in the sample (85.1%), independent samples t-tests showed no significant differences between male and female students in their perceptions of traditional lectures ($p = .196$) or AI-assisted learning ($p = .083$). These results suggest that the historical digital divide regarding technological confidence and anxiety has effectively closed among modern undergraduate healthcare administration students. Both genders displayed similar level of technological readiness, allowing them to engage with AI systems effortlessly without disregarding traditional lectures.

Ultimately, these findings offer strong guidance for curriculum developers, academician, and healthcare administration educators. The evidence does not justify a complete shift toward fully automated, AI-only learning method, which would eliminate traditional lectures. Instead, the data strongly suggest the implementation of a blended or hybrid instructional model. By delegating mechanical vocabulary drills and spelling repetitions to adaptive AI tools outside the classroom, educators can optimize face-to-face traditional lecture for high-level conceptual applications, clinical case studies, and healthcare administration simulations. Therefore, AI is not as a threat or a replacement, but as an equally effective, complementary method that matches the established traditional lecture of university teaching.

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