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AI-ENHANCED TEACHING STYLES: LEVERAGING INTELLIGENT TOOLS FOR RESOURCE ACCESSIBILITY

Premilah A/P Ganapathy¹, Nor Hanani Ahamad Rapani^{2*}

¹ Faculty of Management and Economics, Universiti Pendidikan Sultan Idris, Malaysia
Email: D20221103795@siswa.upsi.edu.my

² Department of Accounting and Finance, Universiti Pendidikan Sultan Idris, Malaysia
Email: norhanani@fpe.upsi.edu.my

* Corresponding Author

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Abstract:

This study investigates the influence of teaching styles and the availability of learning resources on accounting students' conceptual understanding, with an emphasis on how AI-enhanced teaching styles that use intelligent tools can improve resource accessibility. Based on the Constructivist Learning Theory as proposed by Jean Piaget and Lev Vygotsky, the research emphasizes the role of active knowledge construction through interaction with teaching methods and learning materials. Data were collected from 102 accounting students using a stratified convenience sampling technique. The research employed statistical tests of regression analyses. The instrument demonstrated high internal consistency, with a Cronbach's Alpha value of 0.86. Mean score analysis indicated that modern interactive teaching styles (mean 3.57) and digital learning resources (mean 3.39), particularly when enhanced with AI-driven personalization and real-time feedback, were the predominant approaches used in accounting education. The availability of these accessible and up-to-date intelligent digital resources played a significant role in enhancing accounting students' conceptual understanding. Regression analysis revealed that availability of learning resources (p-value 0.004) and the combined factors of teaching styles and availability of learning resources (p-value 0.013), both had a positive and significant influence on accounting students' conceptual understanding. However, teaching styles alone, without AI-supported interactivity, showed insignificant influence on accounting students' conceptual understanding. These insights highlight the need for AI-driven, interactive, and resource-supported teaching environments in higher education. The study recommends that institutions invest in modern intelligent resources powered by AI and encourage instructors to adopt blended and adaptive teaching methods to promote deeper learning. This research contributes meaningfully to the ongoing enhancement of accounting education in Malaysian universities.

Keywords:

Teaching Styles, Availability of Learning Resources, Conceptual Understanding

Introduction

This study investigates the influence of teaching styles and the availability of learning resources on accounting students' conceptual understanding, with an emphasis on how AI-enhanced teaching styles using intelligent tools that can improve resource accessibility. In accounting education, students are expected not only to memorize formulas and procedures but also to develop a deep understanding of accounting principles and their application in real-life situations. However, many students face difficulties grasping accounting concepts due to several factors, particularly the teaching styles used by lecturers and the resources available to support learning.

Teaching style refers to the methods and strategies employed by lecturers to deliver content, manage classrooms and engage students in the learning process. Traditional lecture-based teaching methods, such as one-way communication, note-taking and chalk-and-talk, are still widely used. While these methods are effective for delivering structured knowledge, they often lead to surface learning rather than deep conceptual understanding. In contrast, modern interactive teaching emphasizes student-centered learning through activities such as group discussions, case studies and problem-based learning, which encourage critical thinking and enhance engagement (Lim & Tan, 2023).

Apart from teaching styles, the availability of learning resources also plays a crucial role in shaping students' academic success. Learning resources include textbooks, lecture notes, online tutorials, accounting software, and e-learning platforms that provide flexible and updated content. Increasingly, AI tools like intelligent tutoring systems, adaptive learning platforms, and AI-powered accounting software improve these resources. It personalizes content delivery, provide instant feedback, and suggest targeted materials based on each person's learning needs. As Mohd Salleh et al. (2020) highlighted, digital resources support independent learning by allowing students to revisit difficult topics and learn at their own pace. When these resources are insufficient, outdated, or inaccessible—particularly without AI-driven adaptability—students may experience difficulties understanding accounting concepts.

Given the increasing importance of digital education and blended learning environments, particularly after the COVID-19 pandemic, this study explores how teaching styles and learning resources influence conceptual understanding among accounting students. By identifying the most effective strategies and resources, the findings aim to improve accounting education and better prepare students for their professional careers.

Literature Review

Accounting education equips students with the knowledge and skills needed to interpret, analyze and apply financial information effectively. According to Lim and Rajan (2021), quality accounting education fosters transparency, accountability and informed decision-making, making it essential for producing competent graduates. However, various factors

influence students' conceptual understanding, notably teaching styles and the availability of learning resources.

Constructivist Learning Theory

Constructivist Learning Theory which is based on the foundational work of Jean Piaget (1954) and Lev Vygotsky (1978), was adopted as the theoretical underpinning in this study. Constructivism posits that knowledge is not simply transmitted from teacher to student but actively constructed by learners through meaningful engagement with their environment, tasks and social interactions. This learner-centered theory emphasizes the role of prior knowledge, cognitive engagement and contextual learning in the knowledge construction process.

Constructivist Learning Theory provides a comprehensive and well-aligned framework for this study by emphasizing active learning, meaningful engagement, scaffolding, social interaction and resource-rich environments. It supports the examination of how teaching styles and learning resources interact with students' personal efforts to construct a deep and transferable understanding of accounting principles. In essence, the combined influence of teaching style and availability of learning resources creates a synergistic learning environment, aligning with constructivist principles. This combination provides both the guidance and tools necessary for students to internalize complex accounting concepts effectively.

Teaching Styles

Teaching styles significantly affect how students absorb and apply accounting knowledge. Traditional lecture-based teaching has long been the dominant method in accounting education. Lee and Low (2020) found that 72% of accounting students preferred lectures for their structured delivery of core concepts like the accounting equation and double-entry bookkeeping. However, Wong and Ismail (2020) reported that this method often leads to passive learning and reduced critical thinking skills. Students may memorize formulas without truly understanding their applications in diverse contexts.

Conversely, modern interactive teaching focuses on active participation and deeper engagement. Rahman and Hassan (2021) demonstrated that students exposed to problem-based learning scored 18% higher in conceptual assessments compared to those taught via lectures. Similarly, Ali and Kamaruddin (2024) highlighted that integrating gamified platforms like Kahoot and Quizizz improved students' motivation, confidence and mastery of difficult accounting topics. Building on these approaches, AI-powered interactive tools such as adaptive learning platforms, intelligent tutoring systems, and AI-driven gamification can further personalize learning routes, provide real-time analytics, and ensure more fair students engagement. Yet, challenges exist. Lee et al. (2021) observed that group-based learning can result in uneven participation, while Iskandar and Mahmud (2022) noted that poorly facilitated activities can lead to confusion.

Availability of Learning Resources

Learning resources also play a critical role in enhancing conceptual understanding. Traditional resources, such as textbooks and lecture notes, provide structured, reliable knowledge, especially in environments with limited internet access (Lee & Hassan, 2021). However, digital resources, including video tutorials, e-books and accounting software, have transformed how students learn. Studies by Tan and Amin (2020) and Lim and Rajan (2021) revealed that students using digital resources achieved up to 25% higher scores in conceptual assessments

due to flexible, interactive learning features. Nonetheless, Rahman and Chuah (2022) warned that distractions and low digital literacy could hinder learning outcomes.

Overall, prior studies suggest that combining interactive teaching methods with accessible, up-to-date learning resources fosters better conceptual understanding in accounting education. Recent advancements indicate that AI-enhanced teaching styles and intelligent learning tools can further strengthen this combination by personalizing instruction, improving resource accessibility, and providing real-time feedback to students. However, gaps remain in understanding how these factors interact in Malaysian universities, particularly in UPSI, which this study aims to address. Table 1 presents the summary of past findings on teaching styles and availability of learning resources.

Table 1: Summary of Past Findings on Teaching Styles and Availability of Learning Resources

Factor	Author	Findings
Teaching Styles – traditional lecture based	Lee & Low, 2020; Wong & Ismail, 2020; Noor & Rahim, 2022; Kumar et al., 2023)	Traditional lecture-based teaching is valued for its structured content delivery, clarity and suitability for large classes, particularly for beginners
Teaching Styles – modern interactive	Tan & Chong, 2020; Iskandar & Mahmud, 2022; Zhang et al., 2022; Ali & Kamaruddin, 2024).	Modern interactive teaching style have shown to improve engagement, analytical thinking, collaboration and confidence among students
Availability of learning resources – traditional resources	Lee & Hassan, 2021; Lim & Tan, 2023; Rani et al., 2022; Sulaiman & Nor, 2023).	Availability of traditional learning resources significantly influences accounting students' conceptual understanding. Traditional resources are appreciated for their structured content, accessibility and long-term value especially in supporting exam preparation and active reading strategies
Availability of learning resources – digital resources and technological facilities	Hassan & Goh, 2021; Lee & Hassan, 2021; Lim & Rajan, 2021; Ahmad & Lim, 2024).	Availability of digital resources and technological facilities significantly influences accounting students' conceptual understanding. Digital resources technological facilities enhance flexibility, engagement, collaboration and real-world application of concepts

Methodology

This study adopted a quantitative research design to examine the influence of teaching styles and the availability of learning resources on UPSI accounting students' conceptual understanding. A quantitative approach was selected because it enables systematic collection and analysis of numerical data, allowing the researcher to identify relationships between variables and measure the strength of their influence. By using this approach, the study aimed to provide objective and reliable findings on how teaching practices and learning resources contribute to students' ability to comprehend and apply accounting concepts effectively.

The target population consisted of undergraduate accounting students enrolled at the Faculty of Management and Economics, UPSI. From this population, a total of 102 respondents were selected using a stratified convenience sampling technique. Stratification ensured proportional representation from different semesters, thus capturing diverse student experiences and perspectives. The sample size was considered sufficient to generate valid results for descriptive and inferential statistical analyses.

Research Instrument

Data were collected using a structured questionnaire developed based on established instruments from previous studies. The questionnaire consisted of four sections. Section A gathered demographic information, including gender, race, semester of study and cumulative grade point average (CGPA). Section B focused on students' perceptions of teaching styles, which included both traditional lecture-based teaching methods, such as chalk-and-talk and one-way communication and modern interactive strategies, such as problem-based learning, case studies and group discussions. Section C assessed the availability of learning resources, covering traditional materials like textbooks and printed notes as well as digital resources covering the intelligent tools, such as e-books, video tutorials, online platforms, accounting software and technological facilities like computer labs and financial simulation tools. Finally, Section D evaluated students' conceptual understanding of accounting by measuring their ability to comprehend, apply and analyze accounting principles in real-world financial scenarios.

All items in the questionnaire were measured using a four-point Likert scale, ranging from 1 = Strongly Disagree to 4 = Strongly Agree. This scale was chosen to accurately capture respondents' levels of agreement regarding teaching styles, learning resources and conceptual understanding. The questionnaires were distributed both physically and online to maximize accessibility and response rates. Respondents were informed of the purpose and scope of the study and their participation was entirely voluntary. Table 2 present the questionnaires development.

Table 2: Questionnaires Development

Section	Statement	Number of Items	Source
A	Respondent's demographic information	5	Self-Created
B	Teaching Styles	6	Adapted from Alessa & Hussein (2023)
C	Availability of Learning Resources	7	Adapted from Yusof et al. (2020)
D	Conceptual Understanding	10	Self-Created
	Total	28	

Data Analysis

Descriptive statistics were used to summarize demographic information and calculate mean scores to identify predominant factors influencing conceptual understanding. Inferential analyses included Pearson correlation to determine the strength and direction of relationships between variables and multiple regression analysis to evaluate the predictive influence of teaching styles and learning resources on students' conceptual understanding.

To ensure the reliability of the instrument, a pilot study was conducted prior to the main data collection. The results produced a Cronbach's Alpha value of 0.86, indicating high internal consistency of the questionnaire items. Content validity was also established by adapting measures from previous peer-reviewed studies. Ethical considerations were strictly adhered to throughout the research process. Respondents provided informed consent and their participation was voluntary, with full assurance of anonymity and confidentiality.

Findings and Discussion

Findings of the study will be presented in descriptive (Table 3) and regression analysis (Table 4). Major findings will be shown using Regression Analysis that examine the influence of teaching styles and availability of learning resources on the conceptual understanding of accounting students.

Descriptive Statistics

The descriptive analysis was conducted to identify the predominant factors influencing accounting students' conceptual understanding. Mean scores indicate the general trend of responses while standard deviation shows the response variation among students.

Table 3: Descriptive Analysis

Factors	Mean	Std Dev.
Teaching styles:		
Traditional Lecture-Based Teaching	3.31	0.81
Modern Interactive Teaching	3.57	0.60
Availability of Learning Resources:		
Traditional Learning Resources	3.25	0.81
Digital Learning Resources	3.39	0.67
N	102	

Based on the findings, the mean score analysis revealed that modern interactive with AI-enhanced teaching styles recorded the highest mean value of 3.57, indicating that lecturers increasingly incorporate interactive, student-centered approaches in their classes. These include group discussions, case studies, problem-based learning activities and the integration of technology to encourage active participation and deeper engagement. Students reported that these approaches made it easier for them to understand complex accounting concepts, relate theory to practice and retain knowledge effectively.

In comparison, digital learning resources obtained a mean score of 3.39, making them the second most significant factor influencing learning. Students widely accessed online tutorials, e-books, accounting software and learning platforms to supplement their studies. These digital and intelligent tools enabled flexible, self-paced learning and provided updated content aligned with current accounting practices.

Traditional teaching styles and printed resources, while still used, recorded lower mean scores, showing that UPSI is gradually moving toward blended learning environments that combine interactive and AI-enhanced teaching with digital and intelligent tools for resources accessibility. These findings suggest that although teaching styles play an essential role, learning resources particularly digital tools are equally critical for supporting conceptual understanding.

Inferential Statistics

The regression analysis was conducted to examine the influence of teaching styles and availability of learning resources on the conceptual understanding of accounting students.

Table 4: Regression Analysis

Predictor(s)	Adjusted R ²	β	t-stat	p-value
Teaching styles	0.018	0.136	1.368	0.174
Availability of Learning Resources	0.081	0.285***	2.974	0.004
Teaching Styles and Availability of Learning Resources	0.060	0.244**	2.521	0.013
N	102			

The findings revealed that the availability of learning resources had a positive and significant influence on conceptual understanding ($p = 0.004$). This suggests that students who have access to updated and relevant learning materials, such as textbooks, online tutorials, accounting software and technological facilities particularly when enhanced with AI-driven personalization and real-time feedback, are better able to understand, analyze and apply accounting principles. These findings are consistent with studies by Lee and Hassan (2021) and Tan and Amin (2020), which emphasized that high-quality and easily accessible resources contribute substantially to deeper conceptual comprehension.

Secondly, the results showed that teaching styles did not have a statistically significant effect on conceptual understanding ($p > 0.05$). Although many lecturers have begun adopting modern interactive teaching strategies, such as group discussions, case studies and problem-solving activities, these methods appear to be less effective when not supported by sufficient learning resources. This finding implies that even the most innovative teaching approaches require appropriate materials to reinforce students' learning and enhance their grasp of complex accounting concepts.

When teaching styles and learning resources were combined in the regression model, the analysis revealed a significant positive relationship with conceptual understanding ($p = 0.013$). This indicates that the integration of effective teaching practices with adequate and up-to-date learning resources produces the most substantial impact on students' comprehension. In other words, teaching methods and learning resources complement one another and their joint influence is greater than their individual effects.

Overall, the regression analysis highlights that learning resources are the strongest predictor of conceptual understanding, but their effectiveness is amplified when paired with appropriate, student-centered teaching styles. These results underscore the importance of adopting a blended learning approach at UPSI, where interactive teaching is supported by

sufficient traditional and digital learning materials. Such an approach will not only improve students' conceptual understanding but also better prepare them for future professional roles in accounting. Summary of the main findings presented in Table 5.

Table 5: Summary for Main Findings

Objective	Hypotheses	Findings
To identify the predominant teaching styles used in accounting courses	N/A	Modern Interactive Teaching as Predominant Teaching Style
To identify the predominant learning resources and their accessibility	N/A	Digital Learning Resources as Predominant Learning Resources
To examine the influence of teaching style on accounting students' conceptual understanding	There is a positive and significant influence of teaching styles on UPSI accounting students' conceptual understanding	Not supported
To examine the influence of the availability of learning resources on accounting students' conceptual understanding	There is a positive and significant influence of availability of learning resources on accounting students' conceptual understanding	Supported
To examine the influence of teaching style and availability of learning resources on accounting students' conceptual understanding	There is a positive and significant influence of teaching styles and availability of learning resources on accounting students' conceptual understanding	Supported

Conclusion

The objectives of this study were partially achieved (i.e. availability of learning resources.) This study examined the influence of teaching styles and the availability of learning resources on accounting students' conceptual understanding. The findings revealed that while modern interactive teaching styles are increasingly adopted, their effectiveness is enhanced when combined with adequate learning resources. AI-enhanced, digital platforms and updated online materials were found to be crucial in supporting independent learning and strengthening comprehension of complex accounting topics.

Regression analysis confirmed that the availability of learning resources significantly contributes to conceptual understanding, whereas teaching styles alone are less impactful. This highlights the importance of a blended approach, where innovative teaching is supported by accessible and relevant resources. By integrating interactive pedagogy with intelligent tools such as e-books, accounting software and learning platforms, educators can foster

deeper learning and better prepare students for professional careers in accounting.

The study underscores the need for higher education to invest in resource development and provide continuous training for lecturers to adopt effective teaching strategies with AI-integration. It also recommends enhancing technological infrastructure to ensure equitable access to updated learning materials. Ultimately, this research contributes to improving accounting education by emphasizing that effective teaching, supported by accessible resources, is key to developing strong conceptual understanding among students. Future studies could explore other influencing factors, such as motivation, learning styles and prior knowledge, to provide a more comprehensive perspective on improving accounting education outcomes.

The study has several limitations. The scope of the study was confined to UPSI accounting students, limiting generalizability to other institutions or programs. Teaching styles, curriculum, and resource availability may differ elsewhere, affecting outcomes. Besides, reliance on self-reported data risks response bias, as students may misjudge teaching styles or resource accessibility. Moreover, disparities in learning resources across departments and faculties were not examined in detail, potentially skewing results. Additionally, institutional factors such as infrastructure, lecturer-student ratio, digital adoption, and budgets were excluded. Lastly, the study focused solely on conceptual understanding, omitting broader cognitive, emotional, and social learning dimensions.

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