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The Mediating Role of Practical Relevance between Instructional Practices of Teachers and Sustainable Engagement among Accounting Students in Saudi Arabia: The Moderating Role of Artificial Intelligence Usage

Asst-Prof. Warda Hodaed Alsheikh
College of Business and Economics | Umm Al-Qura University | KSA

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* Corresponding author: whshiakh@uqu.edu.sa

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Abstract: This research aimed to examine the direct influence of the instructional practices of teachers (IPT) on the sustainable engagement (SE) of accounting students studying in Saudi Arabian private and public universities. The study also aimed to investigate the mediating role of practical relevance (PR) in the above relationship. Furthermore, the study investigated whether artificial intelligence usage (AIU) by students has any moderating role in the above relationships. This study adopted a quantitative approach. Using the simple random sampling method, the study collected 374 responses for the analysis through the PLS-SEM. The results indicate that IPT does not necessarily influence sustainable engagement directly unless there is an indirect role of practical relevance. Surprisingly, the study didn't find a moderating role for AIU in the above relationships. The results have practical implications for practitioners, managers, policymakers in to ignite sustainable engagement among the accounting students in Saudi Arabia and beyond.

Keywords: Instructional Practices of Teachers, Sustainable Engagement, Practical Relevance, Artificial Intelligence Usage, Accounting students, Saudi Arabia.

الدور الوسيط للعلاقة العملية بين الممارسات التعليمية للمدرسيين والمشاركة المستدامة بين طلاب المحاسبة في المملكة العربية السعودية: الدور المعدل لاستخدام الذكاء الاصطناعي

الأستاذ المساعد / ورده حضيض الشيخ
كلية الادارة والاقتصاد | جامعة أم القرى | المملكة العربية السعودية

المستخلص: هدف هذه البحث إلى دراسة التأثير المباشر للممارسات التعليمية للمعلمين (IPT) على المشاركة المستدامة (SE) لطلاب المحاسبة الذين يدرسون في الجامعات السعودية الخاصة والحكومية .كما هدفت الدراسة إلى التحقيق في الدور الوسيط للأهمية العملية (PR) في العلاقة المذكورة أعلاه .علاوة على ذلك، بحثت الدراسة فيما إذا كان لاستخدام الذكاء الاصطناعي (AIU) من قبل الطلاب أي دور معتدل في العلاقات المذكورة أعلاه. اعتمدت هذه الدراسة منهجًا كميًا وباستخدام أسلوب العينة العشوائية البسيطة، جمعت الدراسة 374 استجابة للتحليل من خلال PLS-SEM. تشير النتائج إلى أن الممارسات التعليمية للمعلمين لا تؤثر بالضرورة على المشاركة المستدامة بشكل مباشر ما لم يكن هناك دور غير مباشر للأهمية العملية والمثير للدهشة أن الدراسة لم تجد دورًا معتدلًا لاستخدام الذكاء الاصطناعي في العلاقات المذكورة أعلاه. لهده النتائج آثار عملية على الممارسين والمديرين وصانعي السياسات في إشعال المشاركة المستدامة بين طلاب المحاسبة في المملكة العربية السعودية وخارجها.

الكلمات المفتاحية: الممارسات التعليمية للمعلمين، المشاركة المستدامة، الأهمية العملية، استخدام الذكاء الاصطناعي، طلاب المحاسبة، المملكة العربية السعودية.

1. Introduction

Sustainable engagement (SE) is defined as the full commitment of students in their learning aligning with the sustainable development goals (SDG) values (Cottafava, Cavaglià, & Corazza, 2019; Guerra, Jiang and Du, 2024). Such commitment includes not just mental and emotional involvement but also making sustainability values a part of their academic and professional growth (Filho, Trevisan and Dinis, 2024; Brandli et al., 2025). SE goes beyond regular academic engagement by connecting student motivation and conduct to bigger aims for society, such as the United Nations' Sustainable Development Goals (SDGs). In the higher educational spectrum, SE includes consciousness and responsibility for the issues, including climate change, social justice, ethical governance, and economic transparency, that are crucial for future professionals around the world (Uzorka, Akiyode & Isa, 2024; Filho et al., 2025). It is also similar in the case of accounting students, as accounting is no longer just a technical subject of number-crunching; it is now a career that is more and more connected to sustainability reporting, integrated thinking, ethical compliance, and corporate social responsibility (Kurki and Järvenpää, 2024). Hence, this evolvement in the worldwide accounting education systems encompasses both technical and critical thinking skills and environmental awareness (Uzorka, Akiyode & Isa, 2024; Filho et al., 2025; UNESCO, 2025). Despite the growth of the literature, many scholars, especially in non-western countries are treating student engagement as a behavioural construct with limited alignment of sustainability values (Makarenko & Plastun, 2017; Nakpodia et al., 2024). Our research addresses this crucial gap by conceptually investigating sustainable engagement from the educational perspective. Hence, findings of this study would contribute to the literature examining a framework that examines how instructional practices can nurture students in higher educational institutions to be future accounting professionals, who would be both engaged learners and employees in the future and eventually sustainable-aware global citizens.

However, some studies in the past have examined to explore the predictors of sustainable engagement of students; for example, Emblen-Perry (2018) reported games as a significant predictor of sustainable engagement. Moreover, teaching presence was found to be a significant predictor of sustainable engagement of students (Lasekan et al., 2024). Moreover, Kumar et al. (2022) identified several barriers to students' sustainable engagement, including behavioural and technological obstacles. However, none of the studies have examined the influence of the instructional practices of teachers (IPT) on the sustainable engagement of students. This lack of examination is particularly evident among accounting students in the Middle Eastern region. In line with previous studies (i.e., Ajambo, Sannerud, & Nabaggala, 2024; Zakariya & Adegoke, 2024) on IPT, we postulate that it can be a crucial factor in developing sustainable engagement among students. In educational psychology and pedagogy, IPT covers a wide range of tactics and behaviours. These include using active learning, integrating real-world cases, dialogic teaching, giving individualised feedback, and presenting course content in an ethical way (Kurki and Järvenpää, 2024; Altun, Kuduz & Akkan, 2025). Hence, it is very important to examine how IPT influences sustainable engagement among accounting students in Saudi Arabia. This approach is also appealing because the Saudi Arabian education system is intended to connect its teaching methods with both global sustainability goals and the needs of the local workforce in line with the Vision 2030 framework (Allmnakrah & Evers, 2020). Hence, this study's goal is to cover a major gap in the literature by uncovering IPT as the main predictor of sustainability. As such, the results of the study would provide evidence-based information that can help with changes in how accounting programmes are taught in the region.

In addition to the above contribution, this study also seeks to examine how or through what process IPT can be effective in translating sustainable engagement (SE). In this regard, the researchers use practical relevance as the mediator in the relationship between IPT and SE. It is because students are more likely to be meaningfully engaged when they think that what they are learning may be used to solve real-world problems, including ethical issues in financial audits, sustainability reporting, or digital responsibility (Wahab et al., 2025). In Saudi Arabia, where many accounting programmes still focus on theory and don't do much with real-world situations, making the programmes more relevant to the actual world could help students meet the expectations of employers (Srdar, 2017; Alsughayer, 2022; Alsughayer & Alsultan, 2023). As a mediator, practical relevance is promising to make the connection between teaching practices and sustainability-orientated participation by showing how the quality of instruction affects student results.

To strengthen the contribution of the study, we also incorporated artificial intelligence usage (AIU) as a moderating variable in the model. AI technology, like AI-based accounting platforms, automated feedback tools, and predictive analytics, are quickly becoming important parts of both business and education (Abdullah & Almaqtari, 2024). AI tools may make learning more personal, mimic real-world accounting activities, and get people more interested in sustainability data and ESG criteria (Adelakun et al., 2024). AI could also make deep learning less effective if students rely too much on automation for important activities (Zhai, Wibowo & Li, 2024). Also, AIU might not always make students more interested in accounting classes, where grasping concepts and doing calculations by hand are important (Shi, 2020; Mansor et al., 2022). Thus, it is not clear how students' artificial intelligence usage influences the relationship between IPT and SE. It's also evident how AIU's practical relevance would impact the indirect relationship between IPT and SE. The study aims to examine whether AIU among students would have any buffering role in the direct and indirect relationship between IPT and SE.

Apart from the above theoretical significance, the study is also crucial practice, especially for various stakeholders, including accounting students, teachers, policymakers, and practitioners in the accounting sector in Saudi Arabia. This study is anchored on both self-determination theory (SDT) (Deci and Ryan, 1985) and transformative learning theory (TLT). SDT outlines that students are more engaged when they feel independent, capable, and connected (Hsu, Wang & Levesque-Bristol, 2019; Chiu, 2022). Thoughtful teaching methods and a curriculum that is relevant and connected to the actual professional world can help students perceive themselves as independent and capable. On the other hand, TLT describes how students change their worldviews via critical reflection and transformative experiences (Mezirow, 1991; Mezirow, 1997; Wolff, 2023), which makes TLT relevant for lecturers in igniting sustainable engagement among students majoring in accounting. Together, these theories support the moderated mediation model of this study, which aims to understand how pedagogical and technological constructs interact to foster sustainable engagement among accounting students.

2. Literature Review

2.1 Underpinning Theories

This study is based on Self-Determination Theory (SDT) and Transformative Learning Theory (TLT), both of which are great ways to look at how to create long-term interest in accounting education. Deci & Ryan (1985) introduced SDT, which outlines that people are more likely to be intrinsically motivated and keep learning when three essential psychological requirements are met: autonomy, competence, and relatedness. When these requirements are met, students become intrinsically motivated, and thus they participate in learning for its inherent worth rather than for some outside benefit. Regarding instructional practices, teachers that encourage autonomy by letting students choose their assignments, give controlled feedback to develop competency, and create inclusive settings that enable relatedness are more likely to raise ongoing student motivation (Hsu et al., 2019; Chiu, 2022). These are very crucial for accounting students, who mostly view their studies as inflexible or rule-bound (Mahboub, 2022). While accounting education emphasises case-based learning, ethical discussions and sustainability scenarios might reinterpret learning as meaningful and impactful, while another that stresses compliance and memorisation may stifle the natural drive to ignite sustainable engagement among students (Cottafava et al., 2019; Tran & Herzig, 2023; Adelakun et al., 2024). SDT closely aligns with the objectives of sustainable engagement that includes long-term commitment not only to academic performance but also to the societal consequences of one's professional job (Deci et al., 2017; Ryan & Deci, 2020; Yang, Chen, & Zhuang, 2025). When students perceive that their curriculum and learning are interrelated with the realistic corporate and sustainability challenges, they become more interested to be engaged in learning (Hsu et al., 2019; Chiu, 2022).

Transformative learning theory (TLT) (Mezirow, 1991) complements SDT by emphasising how profound and long-lasting change in students' viewpoints happens. Transformative learning results from critical thought, disorienting challenges, and discourse that forces students to change their presumptions, mental patterns, and perspective (Illeris, 2018; Young et al., 2022). This means that in accounting education, it is essential to go beyond technical knowledge and include moral reasoning, environmental accounting, and social issues (Alsughayer & Alsultan, 2023; Ancelin-Bourguignon, 2025). For instance, when students investigate subjects like corporate environmental disclosure or unethical audit methods, they are encouraged to challenge the social function of financial information (Boiral, Heras-Saizarbitoria & Brotherton, 2019; Deliu, 2020; Shelley & Kostova, 2024). These moments of introspection result in a change of viewpoint that is a trademark of sustainable student engagement. Additionally, TLT encourages teams creating the curriculum to add challenging or ethically complex topics, which helps students link their professional skills with goals for sustainable development. Particularly because Saudi Arabia intends to match its educational goals with Vision 2030 and global sustainability frameworks, incorporating TLT propositions can promote more environmental, ethical, and intellectual engagement in the Saudi educational setting, where conventional didactic approaches often rule. The theory also promotes experiential projects and active learning approaches, which raise the emotional-cognitive depth of student learning as well as the apparent relevance of accounting resources (Kolb, 2020; Sommier et al., 2022).

SDT and TLT together provide a dual foundation: one based on the psychological motivation of teachers and the other on the cognitive transformation of students. Both are important for understanding how teaching practices, practical relevance of studies, and AI-enhanced settings affect sustainable engagement.

2.2 Instructional Practices of Teachers and Sustainable Engagement

Teachers' effective instructional practices are very important for getting students to stay engaged over time, especially in subjects that are hard and often changing, like accounting (Munna & Kalam, 2021; Öncü & Bıchelmeyer, 2021). IPTs include a lot of different behaviours, such as teaching that focuses on the student, learning via problems, ethical framing, interactive lectures, and giving feedback on time (Bellibaş, Polatcan & Kılınç, 2022). These strategies are very important for making a classroom that encourages students to stay involved in learning activities that are in line with sustainability thinking. According to Self-Determination Theory, teachers that use autonomy-supportive methods, such as encouraging students to think for themselves, giving them choices in their tasks, and listening to what they have to say, create an environment that encourages internal motivation (Brandisauskiene et al., 2023; Cherry, 2024). Students are more engaged when they feel capable and connected to their teachers (Deci & Ryan, 2000). In accounting classes, where the material is frequently seen as strict or procedural, these kinds of activities can make students curious, make them think about ethics, and make them more aware of the world around them (Alsughayer, 2022; Kurki and Järvenpää, 2024; Adelakun et al., 2024).

Transformative Learning Theory also supports the idea that teaching methods that encourage critical thinking, real-world problem solving, and debates about sustainability can lead to more participation (O'Grady, 2023; Singer-Brodowski, 2023). For instance, employing ESG (Environmental, Social, and Governance) case studies or sustainability reports in the classroom can help students think critically about what their job as future accountants will be in helping the world become more sustainable (Filho et al., 2024; Sheehan et al., 2024; Filho et al., 2025). Even though it is important, there hasn't been enough research on IPTs as a predictor of long-term involvement in non-Western settings. This disparity is most clear in Saudi Arabia, where Vision 2030 is still working on educational changes, but there isn't much evidence that these reforms are working. Hence, we posit the following hypothesis:

Hypothesis 1: There is a relationship between Instructional Practices of Teachers and Sustainable Engagement.

2.3 Mediating Role of Practical Relevance

The practical relevance of the accounting curriculum is a key relationship between teaching methods and long-term student involvement (Bullen, Kordecki & Capener, 2018; Rajeevan, 2020). Practical relevance is when students think that what they are learning can be used to solve problems in the real world, especially ones that go beyond financial measures to include moral, environmental, and social issues (Hsu, Wang & Levesque-Bristol, 2019; Chiu, 2022). In Saudi Arabian institutions, accounting courses frequently focus on theoretical knowledge and compliance-based learning, with little exposure to real-world situations or content related to sustainability (Srdar, 2017; Allmnakrah & Evers, 2020; Alsughayer & Alsultan, 2023).

Using Transformative learning theory as a guide, when students work on real-world problems in their classes, like case studies on green finance, sustainable auditing, or CSR accounting, they face a "disorienting dilemma" that makes them question their assumptions and think critically (Tran & Herzig, 2023; Kurki and Järvenpää, 2024; Altun, Kuduz & Akkan, 2025). Using these kinds of study materials in the classroom makes the subject more relevant, which makes it more likely that students will be deeply engaged (Castilla-Polo et al., 2022). At the same time, self-determination theory implies that feeling like the curriculum is relevant makes people feel more competent and independent, which are crucial for sustainable engagement (Anggini et al., 2024; Núñez, Siddiqui & Abbas, 2024). When students realise that the things they are learning can be used in their future jobs, especially in disciplines relating to corporate responsibility and sustainability, they are more likely to get involved (Haile & Mekonnen, 2024). Studies, i.e., Barnes & West (2018); Yusof et al. (2022), have demonstrated that tactics that make things more relevant, such as experiential learning and applying what you've learnt to real life, make business students more interested in school and more mindful of ethics (Young et al., 2008; Trevino & Nelson, 2021). Hence, practical relevance is a way to turn good teaching into meaningful, future-focused involvement of students, i.e., sustainable engagement. Hence, the following hypotheses are proposed:

Hypothesis 2: Instructional Practices of Teachers have a relationship with Practical Relevance.

Hypothesis 3: Practical Relevance has a relationship with Sustainable Engagement.

Hypothesis 4: Practical Relevance mediates the relationship between Instructional Practices of Teachers and Sustainable Engagement.

2.4 Moderating Role of Artificial Intelligence Usage

The artificial intelligence usage (AIU) in education is changing the way students learn (Lytvynova, Rashevska & Proskura, 2024 ; Alam & Hasan, 2024). AI tools in accounting education, like smart tutoring systems, automated tests, and financial simulations that use machine learning, could make the effects of teaching methods and curriculum design stronger or weaker (Lajnef, 2025; Zhang et al., 2025). As a moderator, AIU may change the intensity or direction of the linkages between instructional practices, practical relevance, and long-term engagement. This is in line with the SDT's propositions that AIU could help people be more independent and competent when it is used to tailor learning, give feedback that changes based on what the student needs, or mimic making decisions in the real world (Admane et al., 2024). For instance, when students use AI platforms to look at ESG reports or do automated audits, they are learning in a relevant way that is in line with their sustainable goals (Bharathi et al., 2024). But AIU might also make people less interested if it makes them less likely to think critically or morally, especially in a subject like accounting that still needs basic manual abilities (Çela, Fonkam, & Potluri, 2024; Ballantine, Boyce & Stoner, 2024).

In the same way, TLT posits that transformative learning needs reflection and conversation, which AI technologies may make easier or harder depending on how they are made and used (Gruetzemacher & Whittlestone, 2022; Zhang, et al., 2025). If AI technologies make it easier to ask introspective questions or create ethical scenarios, they could help people become more involved in transformative ways (Saurabh et al., 2022). However, how AIU buffers the relationships between ITP and SE directly and indirectly through the practical relevance is not clear. Hence, it is important to fill this gap in the current literature where the role of AI is inconsistent; for example, Rabbani et al. (2023) reported AI has no moderating role in the relationship between a bank's innovative financial process and the bank's market share. However, Alblooshi, Mohamed & Yusr (2023) reported that AI moderates the relationship between leadership skills and business continuity. Furthermore, the moderating role of AI was found in the relationship between green HRM practices and environmentally sustainable practices (Abid et al., 2024). Consequently, we propose the following hypotheses:

Hypothesis 5: AIU moderates the relationship between Instructional Practices of Teachers and Sustainable Engagement.

Hypothesis 6: AIU moderates the relationship between Instructional Practices of Teachers and Practical Relevance.

Hypothesis 7: AIU moderates the relationship between Practical Relevance and Sustainable Engagement.

Hypothesis 8: AIU moderates the indirect relationship between Instructional Practices of Teachers and Sustainable Engagement through Practical Relevance.

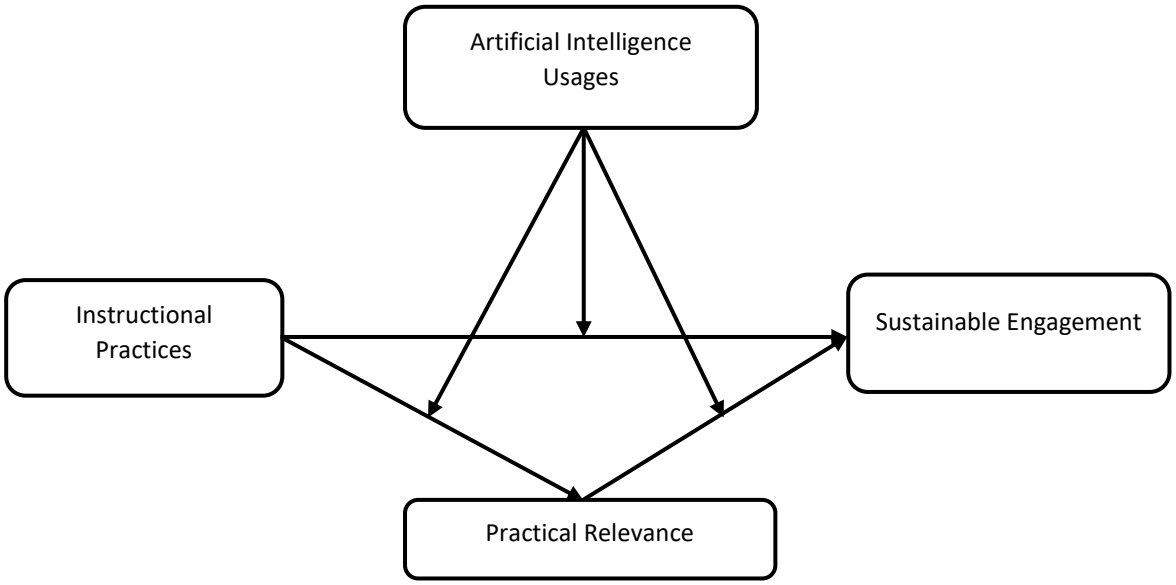

Figure 1: Research Framework

3. Methodology

This study adopted a quantitative approach. This research used simple random sampling to include students studying in both private and public universities in Saudi Arabia. We distributed 489 questionnaires among students of both undergraduate and

postgraduate courses randomly in a 3-month period. We explained the objectives of the study along with no-risk information. Moreover, we have also shared that the questionnaire may take 15-20 minutes to respond to. We have also disclosed that there is no payment associated with taking the anonymous survey. However, we received 411 questionnaires returned. In this regard, only 374 responses were useful for the data analysis using the SmartPLS 4.0 software. The demographic information of the respondents is outlined in Table 1 and explained in the results section.

We adopted the study's measures from previous research papers. Five items to measure IPT were adopted from Francisco & Celon (2020); four items to measure practical relevance were adopted from Roberts & Forman (2015); five items to measure sustainable engagement were adopted from Briggs and Towler (2005); and four items to measure artificial intelligence usage were adopted from Handelsman et al. (2005). We adopted the insturments to make sure that the content of the instrument was valid by using measuring items from well-known studies (Handelsman et al., 2005; Briggs and Towler, 2005; Francisco & Celon, 2020; Roberts & Forman, 2015). Furthermore, before collecting data, two academic professionals read the items to make sure they were clear and relevant to the current paper. Also, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 to both reliability and validity of the research instrument. We firstly examined for internal consistency reliability with Cronbach's alpha and composite reliability (CR), and both were higher than the suggested level of 0.70 for all constructs (Hair et al., 2019). We used Average Variance Extracted (AVE) to evalaute the convergent validity, and all the values were over the 0.50 level. Table 2 shows more information on these analyses. The Fornell-Larcker criterion (Table 3) and cross-loadings (Table 2) also showed that the constructs are different from each other, which validated discriminant validity.

The analytical strategy used in this study was PLS-SEM in line with the recommendation of Hair et al. (2020). We employed PLS-SEM over CB-SEM because this is an exploratory study rather than a confirmatory study. In the exploratory study, a researcher tries to develop a prediction of the relationships between the variables, while in the confirmatory studies, researchers endeavour to confirm or compare theory (Hair et al., 2020). Moreover, this study is more suitable to use PLS-SEM rather than CB-SEM, as the data is non-normal. Normal data is suitable for CB-SEM analysis. Furthermore, the sample size of this study is more than 300, i.e., 374 responses; that is a relatively large sample size (Hair et al., 2020; Usakli & Rasoolimanesh, 2023). Furthermore, the PLS-SEM has been employed in the accounting-related research (Abdullah & Almaqtari, 2024; Mondal, Akter & Ibrahim, 2024). Therefore, researchers found PLS-SEM is more suitable for analysis of the data than CB-SEM; thus, PLS-SEM was used in this study.

4. Results

The results were analysed using SmartPLS 4.0 software. The graphs are derived from this software to specify outer and inner models.

4.1 Demographic information

Results presented in Table 1 show that 77.5% of respondents in this study were male and the rest were female students. In this regard, 69.3% were undergraduate students, and the rest were graduate students studying at public (34.2%) and private (65.8%) universities.

Table 1: Demographic information

Variables	Values	Percentage (%)
Gender	Male	77.5%
	Female	22.5%
Education	Undergraduate	69.3%
	Graduate	30.7%
University Type	Public	65.8%
	Private	34.2%

4.2 Common method bias (CMB)

CMB is an issue that is taken seriously in this study to make sure our study is not affected by this. CMB mainly occurs when constructs are related to a shared measurement method rather than a true relationship. To evaluate CMB, we tested the variance inflation

factor (VIF), which is important because it quantifies the degree of multicollinearity among the independent variables that may indicate the presence of CMB. Higher VIF values are the evidence of strong multicollinearity; however, the results as outlined in Table 2 show that VIF values are lower than 3.300 in this study that meets the recommendation of Kock (2015). Thus, the VIF values found in this study confirm that this study has no CMB issue.

4.3 Measurement model

In this study, we applied a two-step approach using a measurement model (convergent reliability and discriminant validity) (Anderson & Gerbing, 1988). Since results show that factor loadings (FL) are higher than 0.5, composite reliability (CR) is higher than 0.7 and average variance extracted (AVE) is higher than 0.5, the convergent validity is secured as recommended by Henseler et al., (2012). The results are outlined in Table 2 and Figure 2.

Table 2: Measurement model

Variables	Items	Factor Loadings	VIF	CA	CR	AVE
Artificial Intelligence Usage				0.863	0.907	0.708
	AIU_1	0.85	2.095			
	AIU_2	0.848	2.164			
	AIU_3	0.828	1.939			
	AIU_4	0.84	2.017			
Instructional Practices of Teachers				0.885	0.916	0.686
	IPT_1	0.819	2.231			
	IPT_2	0.858	2.578			
	IPT_3	0.866	2.642			
	IPT_4	0.831	2.345			
	IPT_5	0.765	1.607			
Practical Relevance				0.903	0.932	0.775
	PR_1	0.879	2.633			
	PR_2	0.88	2.607			
	PR_3	0.882	2.664			
	PR_4	0.88	2.566			
Sustainable Engagement				0.88	0.913	0.677
	SE_1	0.838	2.103			
	SE_2	0.849	2.348			
	SE_3	0.845	2.302			
	SE_4	0.795	1.873			
	SE_5	0.785	1.862			

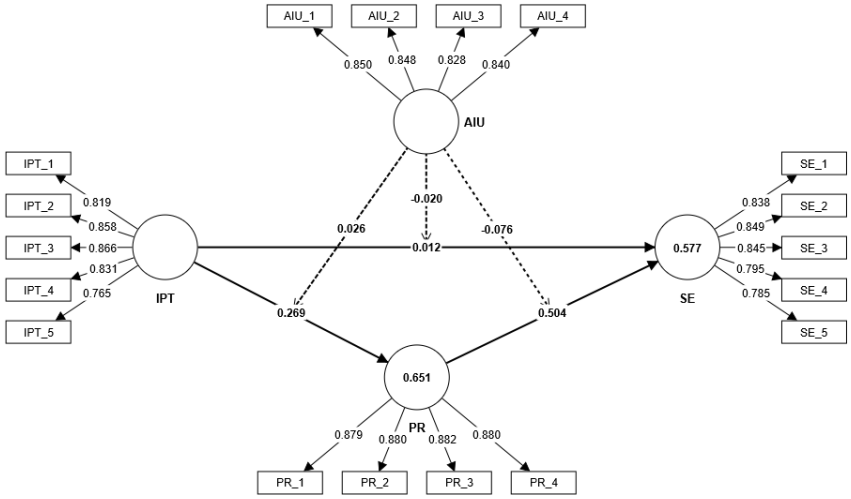

Figure 2: Measurement model

Moreover, we assessed discriminant validity, which outlines the extent to which a specific latent variable is unique from other variables. We checked discriminant validity by looking at the square root of the Average Variance Extracted (AVE) and used both the Heterotrait-Monotrait ratio and the Fornell and Larcker criteria (Fornell & Lacker, 1981; Henseler et al., 2012). Results securing discriminant validity indicate that two variables are unrelated and their values differ. Table 3 (Fornell and Larcker) outlines that the correlation of each variable is surpassed by the square root of AVE. Thus, the variables show satisfactory discriminant validity (Hair et al., 2017). We also used the Heterotrait-Monotrait ratio to assess discriminant validity. In this regard, the results outlined in Table 4 show that the most restraining threshold of 0.85 as recommended by Henseler et al. (2012).

Table 3: Fornell Larcker

Variables	AIU	IPT	PR	SE
AIU	**0.842**			
IPT	**0.514**	**0.829**		
PR	**0.776**	**0.584**	**0.88**	
SE	**0.664**	**0.464**	**0.73**	**0.823**

Table 4: Heterotrait-Monotrait (HTMT)

Variables	AIU	IPT	PR	SE
AIU				
IPT	**0.586**			
PR	**0.878**	**0.65**		
SE	**0.757**	**0.519**	**0.816**	

4.4 Structural model assessment

Table 5 and Figure 3 present the results of the proposed hypotheses. However, the first hypothesis, i.e., the relationship between instructional practices of teachers (IPT) and sustainable engagement (SE), was rejected as the beta value (b = 0.012) and p value (p = 0.838). However, the second hypothesis, i.e., the relationship between IPT and practical relevance (PE), was accepted as the beta value (b = 0.269) and p value (p = 0.000). Furthermore, the third hypothesis, i.e., the relationship between practical relevance and SE was also accepted as the beta value (b = 0.504) and p value (p = 0.000).

Additionally, the results indicate that the fourth hypothesis, which looks at how practical relevance (PR) affects the connection between IPT and SE, was accepted with a beta value (b = 0.504) and a p value (p = 0.014). This study concludes that PR fully mediates the relationship. However, surprisingly, the results show that artificial intelligence usage (AIU) has no moderation in the above relationships. Therefore, we reject hypotheses 5, 6, 7, and 8. The next section outlines a critical analysis of these findings.

Table 5: Structural Model (Hypotheses testing)

Hypotheses	Original sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Mediation
IPT -> SE	0.012	0.011	0.061	0.205	0.838	
IPT -> PR	0.269	0.27	0.072	3.748	0.000	
PR -> SE	0.504	0.5	0.121	4.155	0.000	
IPT -> PR -> SE	0.135	0.137	0.055	2.457	0.014	Full mediation
AIU x IPT -> SE	-0.020	-0.019	0.045	0.452	0.651	
AIU x IPT -> PR	0.026	0.026	0.019	1.393	0.164	
AIU x PR -> SE	-0.076	-0.077	0.059	1.291	0.197	
AIU x IPT -> PR -> SE	0.013	0.014	0.011	1.194	0.233	

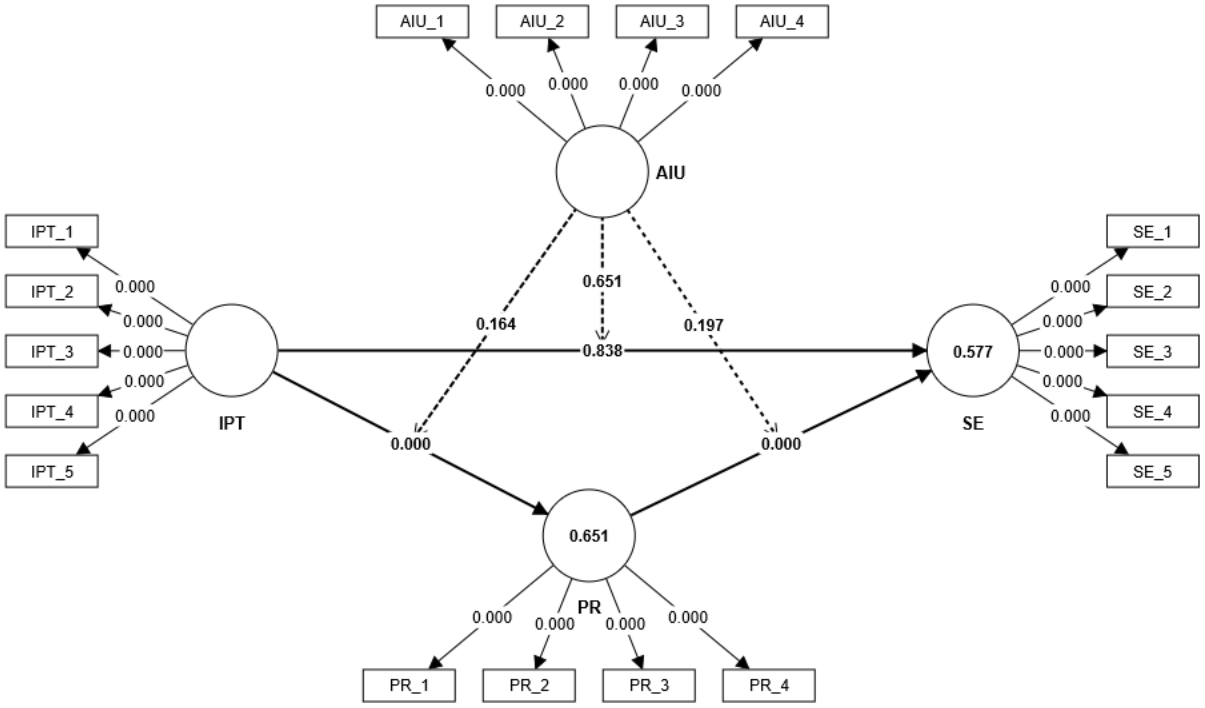

Figure 3: Structural model

5. Discussion

The current study provides important new perspectives on the educational processes of igniting sustainable engagement (SE) among Saudi Arabian accounting students. Despite the hypothesis that teachers' instructional practices (IPT) would directly influence sustainable engagement (SE), the results surprisingly reject this proposition. This result is different from other research based on Self-Determination Theory (SDT), which suggests that teaching methods that support student independence lead to better sustainable engagement. This unexpected result could be due to obsolete teaching practices in teaching accounting subjects, which are criticised for claiming a habitually inflexible design and being rule-bound (Mahboub, 2022; Alsughayer, 2022).

Rather, practical relevance (PR) was found to have a full mediation in the relationship between IPT and SE. This finding establishes that IPT does not necessarily translate to sustainable engagement (SE) among accounting students unless they see any practical relevance of the studies. When students perceive that study materials and teaching practices are pertinent to showcase real-world concerns, they become engaged in the classroom that validates the propositions of transformative learning theory (TLT) (Mezirow, 1991; Young et al., 2022). This finding is similar to the research conducted by Bullen et al. (2018) in the context of the United States of America (USA). Furthermore, our results are also different from Hsu et al.'s (2019), since our results show that accounting students are

more sustainably engaged in the classroom when instructional strategies directly help them grasp ethical, environmental, or social issues relevant to professional practice. Therefore, PR serves as the cognitive link that transforms educational information into sustainable engagement.

Notable also is the non-significant moderating influence of artificial intelligence usage (AIU) that is different from the previous studies (Alblooshi et al., 2023; Admane et al., 2024) conducted in the different context i.e., environment, In this regard, AIU did not moderate the relationships in either the direct or mediated paths as reported by Alblooshi et al. (2023) in the context of Malaysia. Furthermore, the resulting moderating influence of AIU is also different from the study conducted by Admane et al. (2024). This result might be a reflection of the constraints of AI tools now used by students, which could emphasize automation more than reflective or transformative learning. It also implies that AI technologies are not yet coupled in a pedagogically significant manner to support or improve the link between IPT and SE.

Together, the results empirically confirm a moderated mediation model based on SDT and TLT, therefore contributing to the scarce literature on sustainable engagement of accounting studies in non-Western higher education. More specifically, the centrality of practical relevance emphasises the need for curriculum congruence with sustainability goals and practical issues. Furthermore, even while artificial intelligence is sometimes seen as a disruptive enabler in education, its pedagogical function calls for careful evaluation to guarantee fit with cognitive and motivating mechanisms necessary for sustainable engagement.

6. Implications of the study

This study has both theoretical and practical implications. The results considerably contributes to both Transformative Learning Theory (TLT) and Self-Determination Theory (SDT) in the framework of sustainable engagement among accounting students. First, the results enhance the SDT theory by showing that the IPT does not directly result in sustainable engagement unless it is linked to real-world importance. The finding implies that especially in conventional fields like accounting (Ryan & Deci, 2020; Chiu, 2022), IPT may not completely influence behavioural results without a strong value alignment or applied benefit.

Second, by offering empirical evidence for the idea that practical relevance is a precursor to transformation, this study advances TLT. Although TLT has long underlined confusing problems and critical thinking (Mezirow, 1991; Illeris, 2018), our results show that this kind of transformation is motivated not just by instructional relevance to real-world sustainability settings but also by disorienting challenges. Therefore, teaching strategies should give experienced activities that place sustainability within accounting models top priority.

This study raises doubt about the pedagogical use of artificial intelligence. Our results show that AIU does not reduce the impact of IPT or PR on SE, despite increasing demand in AI-enhanced education. Especially in schools where digital technologies are not used much or don't fit with learning goals, this finding emphasises the need to improve theoretical models that include artificial intelligence (Zhai et al., 2024; Ballantine et al., 2024).

Moreover, the results of this study have several practical implications. Our results imply to teachers and curriculum designers that good teaching strategies should encourage autonomy and participation and obviously show the practical applicability of course materials. To help students understand the link between academic knowledge and society impact, accounting teachers in Saudi Arabia should include sustainability-orientated case studies, simulations, and ethical quandaries (Kurki & Järvenpää, 2024; Filho et al., 2025). The results show universities the need to match and develop academic courses with Vision 2030 by ensuring practical relevance. The discussion covers not only content change but also faculty development initiatives with an eye towards transforming teaching.

Regarding technology, the report issues a warning against the unquestioning acceptance of artificial intelligence in universities. Although artificial intelligence can provide efficiency and automation, it has to be ingrained in ways that improve reflective learning, critical thinking, and moral reasoning, qualities of sustainable participation most importantly. AI tools meant only for rote learning or computation could not fit this educational picture. Finally, for legislators, ministries and policymakers, the study offers empirical support for combining educational innovation with sustainability relevance as its main assessment criteria. The results present a strong case for changing teaching criteria to reflect not just academic performance but also students' aptitude for ethical and sustainable decision-making in future professional environments.

7. Limitations of the study and directions for future research

This study has some limitations despite its important contributions that should be considered before generalisation of the findings. The cross-sectional design of this paper restricts the ability to draw causal inferences. While the study uses strong statistical techniques, longitudinal studies would provide closer understanding of how teaching strategies affect sustained involvement across time. Moreover, the study collects data through surveys; therefore, combining survey data with interviews or observational techniques could yield richer and more complex results. The study focuses just on Saudi Arabian accounting students. Although the Vision 2030 educational transformation agenda calls for this contextual emphasis, the results might not be applicable to other fields of study or cultural environments. Comparative research across many geographical areas and topics would improve the external validity of the model. Moreover, our study operationalised general constructions for artificial intelligence use. Future research could classify artificial intelligence tools (e.g., intelligent tutoring systems vs. predictive analytics) to better determine which kinds of AI interventions help or hinder transforming learning. Although this study examined moderation, future research could include other individual factors, such as digital literacy, sustainability values, or past experience with experiential learning, to produce a more complete understanding of sustainable engagement drivers.

8. Conclusion

This research firstly examined the relationship between IPT and sustainable engagement among Saudi Arabian accounting students. The study showed that practical relevance has a full mediation in the link between instructional practices of teachers and sustainable engagement by combining Transformative Learning Theory with Self-Determination Theory. Artificial intelligence usage surprisingly did not regulate either direct or indirect approaches, suggesting a need for more deliberate incorporation of digital resources in teaching practices. The results highlight how much student engagement can be ignited by showcasing the practical relevance of their studies. The study calls for future studies in accounting education ensuring practical relevance so that students can be engaged.

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