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AI adoption, technological readiness, and AI usability in sustainability accounting education: The moderating role of academic integrity

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Abstract

This study investigates the influence of AI adoption tools, user readiness, and ease of use on sustainability accounting education in Jordanian public universities, moderated by academic integrity. As AI becomes increasingly integrated into university instruction, its influence on learning outcomes and ethics is paramount. Survey data from 384 instructors at 10 Jordanian public universities were analyzed with Smart PLS. The results show that AI implementation improves education in sustainability accounting by improving accessibility, effectiveness, and personalization. Usability greatly facilitates the adoption of AI, with increased student engagement by providing higher levels of involvement. Yet, as education in academic integrity encourages responsible and ethical AI use, it also creates challenges for adoption whenever regulations are perceived as overly limiting. These results highlight the importance of a balance between innovation and ethics and stress how institutions need to invest in adaptive policy infrastructures and digital literacy. The study contributes to theoretical understanding and practical guidance for policymakers and educators in AI-supported education.

Keywords: Sustainability accounting education, AI adoption tools, User readiness, Ease of use, Smart PLS

1. Introduction

Education and scientific research are basic pillars of global economic and social development, whose progress is made by all the nations and which are forming the future of societies. The need for sustainability accounting education has never been more evident to the world that faces new challenges and leverages opportunities [1, 2]. Sustainability accounting education is an education that continually changes and adjusts with the condition of society, with equity for access, quality, and efficiency in education delivery [3]. Nations must surmount several linked barriers to educational sustainability if they are to secure long-term prosperity. They comprise the integration of frontier technologies, better educational results, increased institutional effectiveness, and

robust systems that match changing educational needs. Given the fact that the digital transformation [4, 5], also known as the digitization of education, is currently becoming a popular solution to these challenges.

Digital transformation in the context of digital technology embedded to the extent of significantly altering how educational contents are created, distributed, and consumed [6]. Not merely limited to the implementation of digital tools, this transition from the traditional educational model to a technology-integrated model is aimed at enhancing the pedagogies, access to education, and ensuring better learning experiences for both students and educators [7, 8]. Digital transformation is essentially the act of improving aspects of education, like the quality of education, improving institutional effectiveness, and extending access to education opportunities in underserved communities. In addition, given that digital technologies will support the education of the workforce and the acquisition of skills for improved productivity, this transformation therefore provides a great economic opportunity to spur long-term economic growth by developing a highly skilled, creative, and competitive workforce [9].

This realization is due to the benefits of digital transformation in education, especially where the use of artificial intelligence (AI) is concerned [10]. AI technology adoption in the educational setting has observed growing interest for it enables individualized learning, improves administrative efficiency, and supports the consideration of data as one of the factors in making important decisions [11]. When designed properly, AI can be used to improve learning outcomes by addressing individual needs of students, freeing up time for teachers to perform more value-adding tasks, and developing more adaptive learning environments. AI and other digital tools allow us to leverage them in the educational ecosystem in a more efficient, inclusive, and responsive manner to the needs of learners and educational institutions [12].

For the case of Jordan, digital transformation in education is more relevant. Under its REACH2025 initiative, the Jordanian government is ambitious about digitizing all sectors and particularly education. Its REACH2025 vision aims to promote the country's digital economy, promote innovation, its digital capacity, and the digital skills of its population, with a particular focus on educational sectors [13]. Within this vision, Jordan seeks to provide students, educators, and administrators with digital tools and skills to help them face the challenges of the modern educational landscape. Based on this, it is apparent that the country is trying to become a digital innovation and ready its citizens to succeed in a rapidly transforming digital economy.

Although this is necessary, it is also worth noting that the digital transformation of education institutions in Jordan will not take off unless educators and students are ready and willing to adopt the newly introduced technologies [14, 15]. Furthermore, it is noted that user readiness (U.R.), which is related to the determination of how ready users are in adopting and using digital technologies in their daily life successfully, is very important in defining the success or failure of the digital transformation process [16]. The transition from analogue is smoother, and the benefits of the transformation are reaped more effectively when users are adequately prepared to start using digital [17]. As such, it is crucial to understand the role of user readiness in the proper adoption of digital technologies in education and, consequently, the attainment of long-term educational sustainability [18].

The goal of this research is to study how user readiness affects the relationship between academic integrity, the ease of use of the digital tools, and the adoption of AI technologies within sustainability education. More specifically, undergraduate students hypothesize that user readiness, ease of use, and AI adoption tools directly impact sustainability accounting education and that academic integrity moderates these relationships. This study aims to provide valuable insights into the dynamics of digital transformation in education by analyzing these dynamics and the mechanisms that drive the processes of digital transformation in education as a means for developing the broader societal and economic goals, particularly in Jordan.

Through this investigation, the study will give a better concept of how different variables affect each other to form the future of education in an age of digital education, while recommending practicable options for policymakers, educational leaders, and institutions in an attempt to facilitate a successful digital transformation.

In addition, the research attempts to provide strategies that can be adopted to improve the readiness of educational stakeholders and to use digital technologies to promote maximal utilization in creating a sustainable and inclusive education system. Overall, this research will contribute to the current discourse on digital transformation in education and its likely role in bringing about significant changes to the outcomes of education and economic development.

The following provides a concise list of the contributions of this study. This study adds to the scholarly literature by analyzing the interaction between user readiness and digital transformation towards sustainability accounting education in Jordan. The study further clarifies the impact of user readiness, usability, and the usage of artificial intelligence tools on sustainability accounting education, with academic integrity as an intervening variable to the aforementioned relationships. With the increasing rate of online education systems across the globe, this study forms a firm basis for conducting further studies on the issue at hand, focusing on the various factors related to the concept of digital transformation in the education sector.

Second, the study has practical applications for policymakers and leaders in the education sector, notably in Jordan, where the digitization forms a core element of the strategic plan, REACH2025. As a result, the paper provides a model explaining the interplay between the use of ICT tools and the issue of academic integrity in educational institutions, thus enabling the effective application of ICT technology. One of the arguments advanced includes the postulation that both the teacher and the learner are to be fully ready to support their uptake of the tools to foster sustainable education outcomes.

Third, the results of this study can be used by university administrators and educational institutions to derive strategies specific to assist students in becoming digitally ready. It is about creating professional development programs, reworking academic management policies, and having their staff ready with the required skill sets to adopt digital tools. The insights can furthermore seed human resource departments of universities with data to support employee policies to mitigate resistance towards digitalization, and to boost the overall adoption of technology in the university as a whole. In addition, this paper can hold or assist the educational leaders in designing more inclusive digital transformation strategies that accommodate the needs and preferences of the stakeholders in the Jordanian education system. Considering the readiness of users allows institutions to steer the process to make the digital transition smoother, lessen potentially challenging situations, and enhance the effectiveness of digital tools. This can, in turn, help achieve broader goals of sustainability, economic growth, and improved educational outcomes in Jordan as well as other such contexts.

1.1. Theoretical framework and hypotheses development

A better education outcome is possible due to integration with AI tools changing entirely the teaching environment, on the other hand, which has increased ethical concerns. The educational effectiveness of AI tools depends on usability, technological readiness, and adoption of frameworks and mechanisms to integrate AI technologies in organizational processes. Nevertheless, preserving academic integrity is nonetheless a grave problem. Moving on, the study develops a theoretical basis building on the technology acceptance model (TAM), technology readiness index (TRI), and the institutional theory to explore such interaction within the educational facet. TAM (technology acceptance model) [19] is a core model for explaining how individuals perceive and adopt technology. According to TAM, two primary factors are essential for technology adoption: perceived ease of use (PEU) explains how easy the respective users felt to use AI tools; perceived usefulness (PU) explains the extent to which AI improves the learning effectiveness. The availability of AI tools and ease of use have played a major role in the AI tools in sustainability accounting education. The intuitive hurdle is manageable, but it can only bestow adoption on students and educators if significant advantages exist for their substantial academic experience. The technology readiness index (TRI) [20] explains individual levels of readiness to adopt AI-enabled education besides usability. It is made up of four core dimensions: (1) optimism, a positive belief about AI's potential role in moving education forward; (2) innovativeness, the willingness to use AI-enabled learning resources; (3) discomfort, anxiety regarding and/or refusal to use AI; and (4) insecurity, concerns about AI reliability and ethics.

This study argues that available technology readiness supports or prevents the usage of AI in sustainability accounting learning. Based on this finding, it seems that educators and learners who are better positioned in terms of technology readiness will, by and large, find a way to embed AI tools into their work, while those who see themselves as being less prepared for, or familiar with, technology may adopt a more hesitant and resistant posture towards the use of AI tools, based on uncertainty or skepticism regarding their role in education. Moreover, the choice of whether to integrate AI into the education system is not solely a personal preference but rather shaped by external factors, as indicated by institutional theory [21, 22]. This theory postulates that organizations (e.g., universities) adopt innovations responding to coercive pressures (e.g., regulations, accreditation standards) (e.g., AI has to be integrated); normative pressures (e.g., academic or professional communities that begin to push for AI) (e.g., AI is included in the curriculum); and mimetic pressures (e.g., institutions observing what other successful universities do with AI) (e.g., providing best practices). As such, AI adoption in sustainability accounting education is informed by internal factors (such as perceived ease of use and technological readiness), as well as external institutional pressures that ultimately motivate the ethical decision-making process.

While it brings many benefits, AI also poses challenges for academic integrity, such as plagiarism, automated text generation, and ethical issues in the assessment of students. Based on the fraud triangle theory [23, 24], academic dishonesty happens because of three key elements. These are: opportunity, in which AI tools make unauthorized assistance easily accessible; pressure, in which students experience academic burden or performance expectations that drive them toward unethical practices; and rationalization, in which students rationalize their misuse of AI due to unfair academic situations. At a micro (individual) level, academic integrity policies can serve as a moderating factor to combat the negative impacts of AI on education by defining specific, acceptable uses of AI in the academic environment, promoting human-centered learning in the context of ethical AI use, and using AI to uphold integrity by using tools that detect cheating and penalizing dishonesty. In this way, academic integrity promotes ethical standards to be applied to ensure that AI adoption is sustainable for the education system as long as honesty in academia is not sacrificed.

Through the integration of TAM, TRI, and institutional theory, a complementary framework of AI usability, technological readiness, adoption, and sustainability accounting education, along with the moderating role of academic integrity, is consequently drawn in this study. Understanding how these elements interact can yield important information for policymakers, educators, and researchers as they work to mediate the competing forces of AI-enabled ingenuity and ethical duty in higher education. The annual contribution to GDP growth of 12% is a way out. Digital transformation can effectively support the economy. Therefore, 0.59% of GDP is added to Jordan's transitional economy as a result of a 10% increase in digitization in behavioral indication (International Monetary Fund) [25]. By 2025, digital transformation in Jordan could lead to the creation of a digital economy that generates productivity gains (as focused specifically on the manufacturing sector in Jordan) [26]. Several research papers have examined digital transformation in manufacturing [27-30]. However, increasing studies are focusing on the role of digital transformation in the services sector [31].

User readiness represents the readiness position of students together with educators regarding digital learning tools and modern teaching approaches [32, 33]. User readiness in sustainability accounting education settings boosts digital learning platforms by improving student and educator engagement and versatility, which produces better educational results in both the short and long term [34]. Educators, alongside students who have effective digital tool proficiency ability can successfully implement these tools into their educational practice, leading to better knowledge, understanding, and retention rates. Organizations that provide digital literacy training and skill improvement for their learners are able to produce students who are both resilient and prepared for the future, which helps strengthen sustainability in education, according to [35].

H1: User readiness has a direct positive impact on sustainability accounting education.

According to [37], ease of use of educational technology implies its use, intuitiveness, and user friendliness on learning platforms. Educational tools that are easy to navigate increase student motivation, reduce cognitive

overload, and result in better learning outcomes [38]. Studies have shown that digital learning platforms that are easy to use also boost active participation and increase engagement and consequently, better retention of knowledge [39-42]. In addition, an open and engaging learning environment allows students from varying experiences to gain access to education, making education more sustainable in the long run [43].

H2: Ease of use has a direct positive impact on sustainability accounting education.

In the educational sector, artificial intelligence has automated administrative tasks, making it more personalized and improving the efficiency of the education process [44, 45]. Another propelling factor in AI use in education is the development of AI-powered tools like virtual tutors, adaptive learning platforms, automated grading systems, etc., which enhance student engagement and ease the learning process for students, contributing to sustainability accounting education [46]. Studies have found that AI can help fill the gaps in education with real-time feedback, personalized recommendations, and intelligent tutoring systems, which are designed according to the individual learning needs [47, 48]. Despite this, the adoption of AI involves institutional support, ethical aspects, and users' acceptance of AI-driven learning [49]. Through responsible integration of AI, institutions can improve the production of quality and sustainability accounting education by making resources accessible to more people than previously possible and by making educational experience as efficient as possible.

H3: AI adoption tools have a direct positive impact on sustainability accounting education.

Academic integrity has to do with the ethical practices in learning and or research so as to build trust and accountability in education [50]. This helps play a major role in the education system by revising ethics, ingenuity, and critical thinking for students and teachers [51-53]. Academic integrity is a set of values that promotes ethical responsibility, which in turn, leads to increased impact of digital learning tools and other technological advancements in education [54]. Academic integrity serves as a moderating factor that strengthens the relationship between sustainability education, user readiness, ease of use, AI adoption, and guarantees responsible involvement of technology and digital resources. The extent of impact of user readiness on effective learning can be maximized by the combination of user readiness with commitment to academic integrity [55]. Most students and teachers hold ethical standards when they use digital tools in and to a more positive learning effect [34] indicates that the role of user readiness in sustainability accounting education is enhanced by academic integrity that foments responsible and ethical learning behavior.

H4: Academic integrity moderates the relationship between user readiness and sustainability accounting education.

While ease of use constitutes an enabling factor in the uptake of online learning platforms, academic integrity further reinforces the process by encouraging responsible technology usage [42]. Both the students and the lecturers who have firm beliefs in academic integrity are willing to work with online platforms for the creation of authentic learning results, as opposed to misusing them for cheating strategies [35, 36]. A greater awareness regarding the ethics of using technology in education is the prerequisite for the development of an effective and sustainable learning culture consonant with the values of sustainability, especially in the context of educational accounting. Thus, user-friendly technology, in conjunction with a firm basis of academic integrity, results in a responsible, transparent, and sustainable learning process.

H5: Academic integrity moderates the relationship between ease of use and sustainability accounting education.

AI adoption in education offers opportunities for sustainability learning, that is, how ethically and responsibly it is adopted determines its effectiveness [49]. To continue with this type of work, academic integrity is key to ensure that AI tools enhance education and are not used to enable misconduct [47]. In the case where students and educators follow ethical standards, AI-powered learning systems will be used in the spirit of knowledge retention and long-term sustainability in education [46]. Institutional effort to integrate AI literacy and ethical

guidelines in education makes way for the responsible and effective use of AI tools to achieve positive outcomes:

H6: Academic integrity moderates the relationship between AI adoption tools and sustainability accounting education.

This research extends the existing research by analyzing the role of user readiness, ease of use, and AI adoption tools on sustainability education. It also discusses how academic integrity builds on such relationships to maintain ethical conduct in the use of digitality in learning. This process of understanding these interactions is necessary to recognize, then to be able to create responsible, technology-integrated learning environments for long-term academic sustainability. The following model, Figure 1, shows the relationship between the variables.

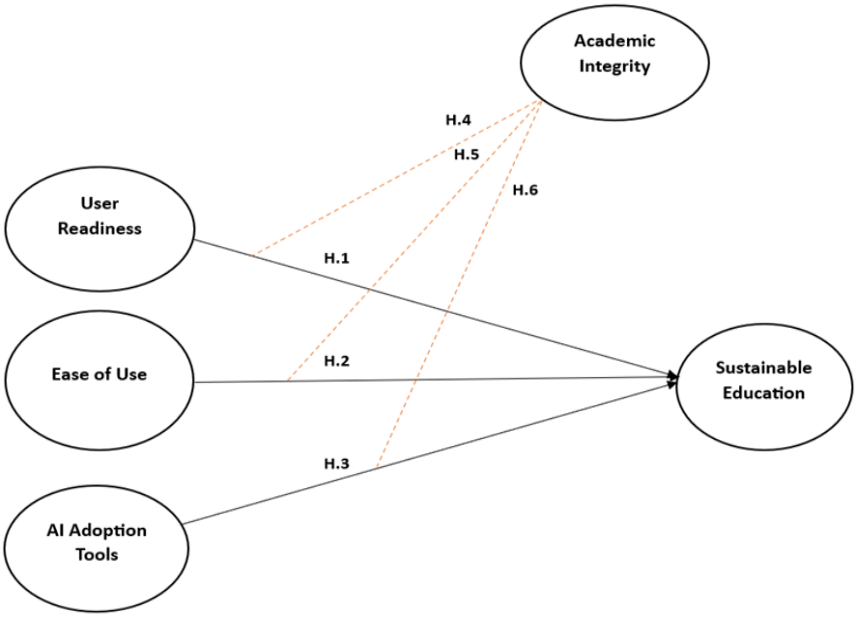

Figure 1. The study variable

2. Research method

Research examined faculty employees at 10 public universities across Jordan and gained 384 valid responses through a survey process. The research group includes lecturers, assistant professors, associate professors, and part-time instructors. Their combined input represents 77% of all participants. Our research sample chose participants randomly to represent all key university staff categories, including teaching level, professional experience, age, gender, and educational background. Additional interviews on a semi-formal basis supported our results while letting us investigate digital changes and AI applications in education. The seven universities list 7699 people who work as faculty members here. The demographic data of the sample is in Appendix 1.

Six key components are used to build the research model. From the findings of research, we extracted 28 items that are based on five major elements, i.e, sustainability education, academic integrity, ease of use, AI adoption tools, and user readiness. We adapted measurement models from [56, 57] to measure user readiness and ease of use with 12 items. The 5 items set out by the framework of [58, 59] were used to assess AI adoption tools. Adapted from [60], Sustainability accounting education is examined using the STEESA model and evaluated using 5 items. Secondly, a scale was developed for academic integrity as described in technology adoption literature models [61], which consists of 6 items. To analyze the opinions precisely, the research team used the 5-point Likert scale in a way to ensure survey participants were able to respond strongly or weakly agree to questions. The reason why this rating system is endorsed by the stakeholders is that they can rely on it to measure their varied thoughts accurately. The proven measurement scales used in this research are necessary to provide a structured and also backed study design for digital transformation and sustainability accounting education connection exploration. The legitimate research approach allows us to measure such effects as academic

integrity systems and user readiness on the achievement of sustainability accounting education objectives by means of AI adoption tools. This is our study will indeed provide extremely important information about explaining why some component(s) lead to a digital transformation success while making education more sustainable.

3. Results

3.1. Measurement model validity and reliability

The Figure 2 graph shows that all measurement items have clear associations with the study's constructs since they surpass 0.40 in their factor values as recommended by [62]. The high factor values between the construct items and factors show they effectively reflect each other. The large factor weights show that each item accurately measures what its construct represents. The research findings confirm that the measurement system in this study produces reliable results.

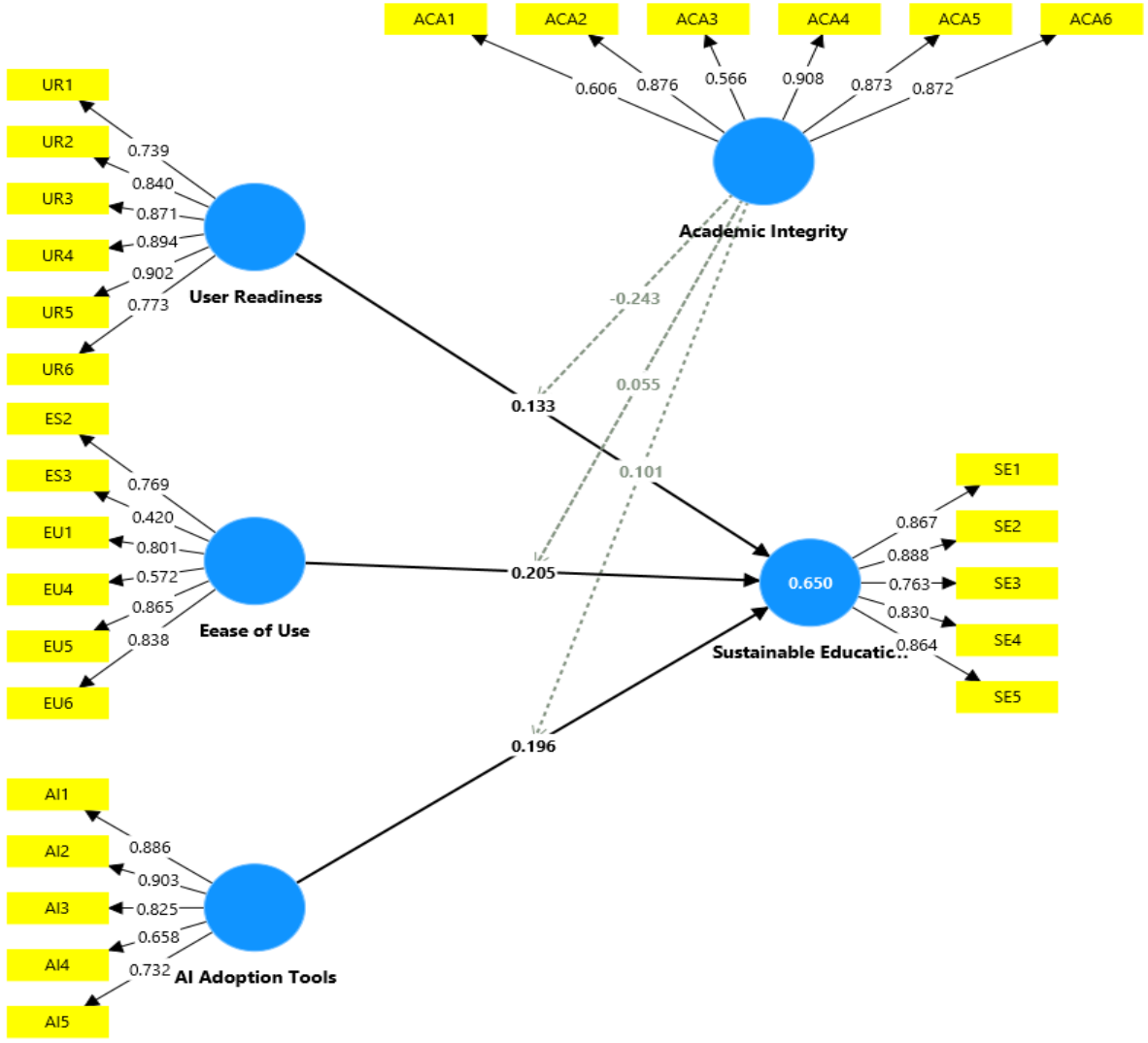

Figure 2. Outer loadings for study latent variables items; Source: Prepared by authors using Smart PLS 4.1

3.2. Constructing reliability and validity

The table demonstrates two methods to check the questionnaire's internal reliability, named Cronbach's alpha and rho-c. According to [63], both indicators displayed reliable results since they exceeded the suggested threshold of 0.60. Also, the research employs average variance extracted (AVE) as a measure to evaluate construct validity, which must exceed 0.50 for good results. The research validity tests indicate that every tested factor in this study passed the necessary standards as reported by [63].

Table 1. Cronbach's alpha, composite reliability (CR), AVE

Variable	Cronbach's Alpha	rho_c	AVE
Ease of Use	0.824	0.866	0.531
User Readiness	0.915	0.934	0.703
AI Adoption Tools	0.864	0.901	0.650
Sustainability Education	0.898	0.925	0.711
Academic Integrity	0.877	0.910	0.634

3.3. Discriminant validity

The HTMT test helps validate distinct groups of items when compared to dissimilar groups. The research shows the maximum acceptable correlation of 0.90 between groups of related constructs but only 0.85 between dissimilar construct pairs. Table 2 shows that all values meet these standards to prove that the research study constructs have discriminant validity [64].

Table 2. HTMT Discriminant Validity

Variables	1	2	3	4
1. Ease of Use				
2. User Readiness	0.767			
3. AI Adoption Tools	0.699	0.602		
4. Sustainability Accounting Education	0.610	0.678	0.663	
5. Academic Integrity	0.639	0.598	0.839	0.758

The Fornell-Larcker criterion indicates the need for assessing discriminant validity among the constructs presented. The correlation coefficients suggest significant relationships among variables, particularly among AI adoption tools, academic integrity, and ease of use. To ensure each construct uniquely captures its intended concept, it is essential to calculate the average variance extracted (AVE) for all constructs and verify that the square root of each AVE exceeds the correlation values. This step will confirm the distinctiveness and validity of the constructs in our model.

Table 3. Fornell- Lacker

Variables	1	2	3	4	5
1. AI Adoption Tools	0.806				
2. Academic Integrity	0.750	0.796			
3. Ease of Use	0.634	0.598	0.729		
4. Sustainability Accounting education	0.609	0.684	0.587	0.844	
5. User Readiness	0.536	0.554	0.690	0.624	0.839

3.4. Structural model validity and reliability

The variance inflation factors (VIF) validate Table 3 by showing validity and reliability of the exogenous variables such as ease of use, user readiness, AI adoption tools, and academic integrity. According to [63], a VIF score below 5 proves that exogenous variables will not exhibit multicollinearity when tested in the model. The table results show that all VIF values stay below 5, which proves the selected variables work well for structural model evaluation.

Table 3. Variance inflation factors (VIF)

Exogenous Variables	VIF
Ease of Use	3.847
User Readiness	2.612
AI Adoption Tools	2.900
Academic Integrity	4.022

The coefficient for determining sustainability accounting education stands at 0.65. The three factors, ease of use, user readiness, and AI adoption tools, account for 65% of the variation in sustainability accounting education outcomes. Research studies assign strong value (0.75), moderate value (0.50), and weak value (0.25) to an R^2 indicator according to [62]. This study includes academic integrity as one of its key influencing factors.

3.5. Hypothesis testing

The hypothesis testing results suggest that there is a significant relationship between the variables that were tested. The path coefficient (β) for testing the first hypothesis that user readiness has a positive and significant impact on sustainability education is 0.133, T-value is 2.188, and P-value is 0.029 as presented in Table 3. This implies that sustainability accounting education initiatives are improved by reading to users beforehand. The second hypothesis delineates the effect of ease of use on sustainability education. Further, evidence also comes from the significant positive support between these variables as revealed by the 0.205 path coefficients, 2.166 T-value, and 0.030 P-value (Table 3). Furthermore, the second hypothesis regarding the impact of AI adoption tools on sustainability accounting education is shown with a path coefficient of 0.196, T-value of 2.558, and P-value of 0.011, indicating that the effort towards the adoption of AI tools is significant in contributing to sustainability education. The fourth hypothesis investigates the moderating effect of academic integrity on the relationship between user readiness and sustainability education. The results validate this hypothesis, for it exhibits a negative path coefficient of -0.243 (T-value 4.308 and P-value 0.000). Either this or higher levels of academic integrity moderate the positive relation between user readiness and sustainability education, meaning that the positive relation gets weaker at higher levels of academic integrity.

However, distinct from that is the fifth hypothesis, which examines the moderating role of academic integrity on absorbing ease of use and sustainability accounting education, as there is a path coefficient of 0.055, a T-value of 1.088, and a p-value of 0.277, which therefore shows an insignificance of the hypothesis. The sixth hypothesis is about the moderating effect of academic integrity in the relationship between AI adoption tools with sustainability education. The following is confirmed in Table 4 by a path coefficient with a T-value of 2.447 and a P-value of 0.014, that is, the path implies a significant relationship. Such findings demonstrate the need for all aspects regarding user readiness, ease of use of AI tools, as well as academic integrity in supporting the relationships of sustainability education.

Table 4. Hypothesis testing

Hypothesis	Path	B	T Value	P	Significance
H1	User Readiness, →Sustainability Accounting Education	0.133	2.188	0.029	Significant
H2	Ease of Use → Sustainability Accounting Education	0.205	2.166	0.030	Significant
H3	AI Adoption Tools, →Sustainability Accounting Education	0.196	2.558	0.011	Significant
H4	Academic Integrity * User Readiness → Sustainability Accounting Education	-0.243	4.308	0.000	Significant
H5	Academic Integrity * Ease of Use → Sustainability Accounting Education	0.055	1.088	0.277	Insignificant
H6	Academic Integrity * AI Adoption Tools → Sustainability Accounting Education	0.101	2.447	0.014	Significant

Q^2 value is a measure of the model's predictive power for out-of-sample data or its capacity to predict new observations that are not involved in the estimation of the model. If a PLS path model is significantly predictive and relevant, the model can predict the unknown data. An indication of the predictive relevance of the structural model for specific dependent constructs is given by Q^2 values beyond zero for particular reflective endogenous latent variables in the structural model. For Sustainability accounting education, the Q^2 value is 0.635; therefore, the model is fit for its purpose to produce accurate predictions for this construct [62].

4. Discussion

The aim of this study is to investigate the influences of AI adoption tools, user readiness, and ease of use on sustainability education, while academic integrity is the moderating factor for the study. The results enabled significant conclusions to be made about how these factors interact and ultimately affect the sustainability of education in an increasingly digitalized academic setting.

Sustainability accounting education is confirmed to be improved by AI adoption tools through the increase of accessibility, scalability, and learning efficiency. AI for education is used to build personalization for learning, automate the administrative processes, and help to optimize the allocation of resources. These results are supported by past research [44, 46], which emphasizes the contribution of AI in augmenting educational outcomes. However, this success is not solely dependent on successful AI adoption but also on institutional readiness and ethical aspects that bring with them the need for proper policies for a structured implementation.

Moreover, it shows that ease of use has a positive effect on sustainability education, meaning that easy-to-use electronic platforms act as a facilitator for the adoption and engagement of the students and the educators. It aligns with the established literature, technology that is intuitive and easy to use breaks the barriers to learning and increases motivation for use [38, 65]. Given this, educational institutes need to focus on building digital tools that are user accessible and in alignment with their need so that there will be a seamless transition to technology-driven learning.

Another major finding of this research is that academic integrity moderates the relationship toward sustainability accounting education of the users' readiness. Results surprisingly show that higher academic integrity may moderate the effect of user readiness on sustainability education, and could serve as a barrier to technology adoption. Academic integrity is essential for ethical learning, and, indeed, AI-driven education will reduce the stress on students for personal reasons, such as teaching, but too much too soon can discourage innovation and limit the benefits of AI-driven education. However, the relationship between AI adoption tools and sustainability accounting education was positively moderated by academic integrity, confirming that an effective integration of integrity policies improves the AI effectiveness by preventing ethical and responsible technology utilization.

In facilitating sustainability education, the role of user readiness was found as a key factor. Results reveal that transforming into digital form is more effective when there is more readiness in the user (to adapt, to be open to technology usage). This is similar to previous studies [32, 34], where it is mentioned that when students and faculty are well prepared, transitioning to a digital learning environment becomes easier. Therefore, institutions must invest in training programs and support mechanisms in order to improve digital literacy and user confidence in AI education.

These contributions contribute to the discussions, both theoretical and practical discussed on digital transformations in the educational area. The study contributes to the literature by investigating the interaction of user readiness, AI adoption, and the ease of use with academic integrity leading to sustainability education. From a practical angle, the research offers very beneficial teaching to policymakers, university executives, and educators wanting to employ AI and other digital devices. To achieve the best outcome from digital transformation that leverages technological innovation for the greatest benefit, institutions have to navigate this balancing act, harnessing the best of innovation while maintaining their ethical academic practices.

The study has some limitations despite its contributions. Consequently, the research was limited to the Jordanian universities, which might limit the generalizability of the findings to other contexts. Finally, the cross-sectional research cannot detect the long-run evolution of AI adoption and user willingness to learn in education. Further research could widen the research scope by incorporating various educational settings and employing a longitudinal analysis to observe longitudinal changes.

Thus, the conclusion includes the fact that AI adoption tools, ease of use, and user readiness enable sustainability education. Nonetheless, the findings indicate that the role of academic integrity in digital transformation is not

easy in that it can either support or impede digital transformation depending on how it is implemented. Therefore, educational institutions can pave the way for a learning environment after learning the future readiness and sustainability through the future through promotion of AI-driven innovation, digital readiness, and a balanced and inclusive academic integrity policy.

5. Conclusion

The goal was to evaluate the effect of the adoption of AI tools and ease of use, and user readiness toward a sustainability accounting education and academic integrity as a moderating variable. After all, AI adoption tools and ease of use are most important for making AI adoptable in education in order to increase its educational sustainability. Integrating AI-driven technologies into learning environments can enable institutions to expand access to quality education, reduce costs, improve efficiency, enhance learning engagement, and therefore, create a more adaptive and inclusive educational system. The study also demonstrates how the relationship of academic integrity with these relationships is moderated. Academic integrity policies are important to meet ethical needs, and, on the other hand, extreme punishment for violating these policies may be a hindrance to using technologies. In parallel, academic integrity effectively mitigates the adoption of AI, hinting that frameworks of ethics can improve the responsibility of AI in education. The other key findings are the importance of user readiness to guarantee successful AI-driven education implementation. According to research, indeed, it's the digitally prepared individual who will be more likely to successfully onboard AI. Since this is the case, institutions need to invest in a digital literacy and preparedness program to reap the full benefits of AI adoption. In the theoretical and practical case of digital education and sustainability, these findings also contribute. This helps universities and policymakers as to how AI can be effectively used in educational tools, but in a way they are adopted ethically within the academic practices. To be more effective in setting a future-ready learning environment, universities can achieve a better blend of academic integrity, ease of use, and technological innovation.

6. Implications and recommendations

In terms of enhancing the sustainability of AI-driven education, seemingly, some strategic measures need to be taken by the educational institutions, policymakers, and stakeholders. Personalized learning experiences and better administrative efficiency can be greatly enhanced with AI adoption in education. AI-driven learning tools should be introduced in universities while guaranteeing that clear ethical policies are in place, determining how to use AI responsibly. Instead, focus should be on building AI-based platforms that augment student engagement as well as help instructors. Another crucial element for the AI adoption success in education is improving the digital readiness of educators and students. Therefore, institutions should focus on training programs that are detailed and able to improve faculty and student preparedness for AI-based learning. There are a number of ways in which digital literacy workshops and continuous professional development can help stakeholders embrace new technologies. Additionally, universities should encourage a digital adaptability culture by providing easily available online resources and attitudinal acceptability regarding the ongoing change in technology. An important aspect that makes AI adoption in education easy to execute is the ease of use of digital tools. AI-driven platforms in universities must be user-friendly and have intuitive interfaces so that the learning cycle of students and educators is minimal. Regular feedback mechanisms should be introduced to facilitate the identification of usability challenges as well as insights for further continuous improvements. Prioritizing usability allows the institutions to make students likely to interact and contribute to the growth of AI-based education tools. In an AI-driven environment for education, striking a balance between academic integrity and digital innovation is vital. Policies for the institutional stance in adopting AI must ensure flexibility while upholding academic integrity. Strict measures to enforce integrity are required so that unethical practices do not happen; however, overly rigid policies tend to slow technological advancements. Universities should establish adaptive integrity frameworks for the use of responsible AI that do not interfere with the open and just academic environment espoused for encouraging innovation. AI adoption strategies should be based at the core on a sustainability digital education framework. These strategies must be in line with the national and global

sustainability goals, e.g., REACH2025, the Jordan digital transformation initiative. Firms should make guarantees that AI learning tools have been made accessible to all students, including the underserved groups and disabled people, if possible. Embracing inclusivity, institutions can create a fairer and longer-lasting educational system for a range of students to learn from and grow.

7. Further research directions

This study provides a valuable insight into the adoption of AI with sustainability accounting education, but still needs more exploration on other aspects. Tracking the evolution of AI in relation to its use in the education sector over time would require longitudinal studies on AI adoption in education. Research of this kind would give a better insight into the long-term impact of AI on educational sustainability and how the readiness of the user evolves. Future studies should take a look at how AI adoption continues to affect the business and what to do about it to support digital transformation efforts. However, more research is needed, extending beyond the Jordanian context, so as to increase the generalizability of findings. Because this study is about Jordanian universities, future research on AI adoption should be conducted in many geographical and cultural localities. Assessing different challenges and opportunities of AI-driven education in developed and developing countries can be studied comparatively. However, understanding the unique influencers of the adoption of AI in different regions will provide a more comprehensive as well as more holistic insight into the global picture. Other potential moderators and mediators of the relationship between AI adoption and sustainability accounting education should be examined to further clarify the factors to which this relationship is sensitive. These relationships can be subject to institutional policies, faculty attitudes, and student engagement levels.

Furthermore, psychological factors like technology anxiety and resistance to change could also be studied with the aim of pinpointing barriers to the adoption of AI and outlining measures for encouraging user acceptance of digital tools. With AI becoming an increasingly integral part of education, there is a future research requirement of assessing the ethical and legal implications of the adoption of AI in secondary and tertiary education. The key concerns are data privacy, algorithmic bias, intellectual property rights, and how AI can fit in with academic evaluations. By conducting this investigation, institutions develop policies on the utilization of ethical AI and combat possible risks of AI in education. It is also found out in other future studies what the role of AI is in raising pedagogical teaching and whether AI AI-driven learning environment is a substitute or complement of traditional teaching. Understanding how faculty adapts instructional strategy to AI-based education models will give insights into the evolving role of educators when utilizing AI-based education models. Thus, institutions can use this research to improve AI teaching methodologies of their institution and their best practices to use AI in academic areas.

Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Middle East University. The Research Ethics Committee has confirmed that no ethical approval is required.

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Data availability statement

The data presented in this study are available on request from the corresponding author due to the privacy of the research.

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Conflicts of interest

No potential conflicts of interest were reported by the author(s).

Author contribution

The contribution to the paper is as follows: Conceptualization, T.A.A.M and S.M.A.; methodology, A.F.H, A.Y.A.B.A, and R.A.; software, R.A., K.A,A., and A.F.H.; validation, T.A.A.M., and A.Y.A.B.A.; formal analysis, R.A., A.F.H., and S.M.A.; investigation, T.A.A.M, and S.M.A.; resources, T.A.A.M.; data curation, S.M.A.; writing—original draft preparation, K.A,A., A.Y.A.B.A and S.M.A.; writing—review and editing, T.A.A.M., and K.A,A.; visualization, R.A.; supervision, T.A.A.M, and S.M.A.; project administration, A.F.H.; funding acquisition, A.F.H. All the authors have read and agreed to the published version of the manuscript.

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Appendix 1

#	Demographic variables		Number	Percentage
1	Gender	Female	182	47%
		Male	202	53%
2	Age	25-34	18	4.67%
		35-44	92	23.94%
		45-54	130	33.85%
		55-64	130	33.85%
		65+	12	3.14%
3	Academic Rank	Full Professor	145	37.76%
		Associate Professor	80	20.83%
		Assistant Professor	55	14.34%
		Lecturer (Part-time)	60	15.63%
		Administrator	44	11.44%
4	Years of Experience in Academia	Less than 1 year	8	2.08%
		1-5 years	21	5.47%
		6-10 years	43	11.15%
		11-15 years	75	19.53%
		16-20 years	118	30.72%
		More than 20 years	113	29.52%
5	Highest degree earned	Diploma	0	0.00%
		Bachelor's	20	5.21%
		Master's	98	25.52%
		Ph.D./Doctorate	266	69.27%