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Artificial intelligence, social media, and intelligent learning: effects on academic performance and mental well-being of accounting students

Inteligencia artificial, redes sociales y aprendizaje inteligente: efectos en el rendimiento académico y el bienestar mental de los estudiantes de contabilidad

Inteligência artificial, mídias sociais e aprendizagem inteligente: efeitos no desempenho acadêmico e bem-estar mental de estudantes de ciências contábeis

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Abstract

Purpose: To investigate accounting students' perceptions concerning the effect of artificial intelligence (AI) and social media use on their academic performance and mental well-being, as well as to examine the mediating effect of intelligent learning on these relationships.

Methodology: The study adopted a quantitative approach, using a structured questionnaire to 222 undergraduate accounting students from universities located in the western and southwestern regions of Paraná. Data were analyzed using structural equation modeling through the partial least squares method (PLS-SEM).

Results: The results indicate that students perceive AI as a resource that favors their academic performance, but not their mental well-being. In contrast, social media, despite not influencing performance, demonstrated a relevant effect in promoting mental well-being. It was found that intelligent learning mediates the effects of AI on academic performance and social media on mental well-being, indicating that their effects manifest themselves when they are aligned with the contribution of each technology, cognitive in AI and emotional in social media.

Contributions of the Study: The study contributes by highlighting the effects of AI and social media on teaching, with intelligent learning acting as a mediator. It is evident that these technologies tend to support different aspects of the educational process, with AI associated with cognitive aspects and social media with the socio-emotional aspects of the learning experience. The conclusions can guide pedagogical practices aligned with students' perceptions and reinforce the integration of technology and emotional support in promoting students' mental well-being.

Keywords: Educational technologies; Academic performance; Mental Well-being; Intelligent Learning; Accounting Academics.

Resumen

Objetivo: Investigar la percepción de los estudiantes de ciencias contables sobre el efecto del uso de la inteligencia artificial (IA) y las redes sociales en su rendimiento académico y bienestar mental, así como examinar el efecto mediador del aprendizaje inteligente en estas relaciones.

Metodología: El estudio utilizó un enfoque cuantitativo, con la aplicación de un cuestionario estructurado a 222 estudiantes de pregrado en ciencias contables de universidades ubicadas en las regiones oeste y suroeste de Paraná. Para el análisis de los datos, se empleó modelado de ecuaciones estructurales mediante el método de mínimos cuadrados parciales (PLS-SEM).

Resultados: Los resultados indican que los estudiantes perciben la IA como un recurso que favorece su rendimiento académico, pero no su bienestar mental. Por el contrario, las redes sociales, aunque no influyen en el rendimiento, han demostrado tener un efecto relevante en la promoción del bienestar mental. Se ha comprobado que el aprendizaje inteligente media los efectos de la IA sobre el rendimiento académico y de las redes sociales sobre el bienestar mental, lo que indica que sus efectos se manifiestan cuando están alineados con la contribución de cada tecnología, cognitiva en la IA y emocional en las redes sociales.

Contribuciones del Estudio: El estudio contribuye al poner de manifiesto los efectos de la IA y las redes sociales en la enseñanza, con el aprendizaje inteligente actuando como mediador. Se observa que estas tecnologías tienden a respaldar distintos aspectos del proceso formativo, estando la IA relacionada con los aspectos cognitivos y las redes sociales con los aspectos socioemocionales de la experiencia de aprendizaje. Las conclusiones pueden orientar las prácticas pedagógicas alineadas con las percepciones de los alumnos y refuerzan la integración de la tecnología y el apoyo emocional en la promoción del bienestar mental de los estudiantes.

Palabras clave: Tecnologías educativas; Rendimiento académico; Bienestar mental; Aprendizaje inteligente; Estudiantes de contabilidad.

Resumo

Objetivo: Investigar a percepção dos alunos de ciências contábeis sobre o efeito do uso da inteligência artificial (IA) e das mídias sociais em seu desempenho acadêmico e bem-estar mental, bem como de examinar o efeito mediador da aprendizagem inteligente nessas relações.

Metodologia: O estudo utilizou abordagem quantitativa, com aplicação de um questionário estruturado a 222 estudantes de graduação em ciências contábeis de universidades localizadas nas regiões oeste e sudoeste do Paraná. Para análise dos dados, empregou-se modelagem de equações estruturais pelo método dos mínimos quadrados parciais (PLS-SEM).

Resultados: Os resultados indicam que os estudantes percebem a IA como um recurso que favorece seu desempenho acadêmico, mas não seu bem-estar mental. Em contrapartida, as mídias sociais, apesar de não influenciarem o desempenho, demonstraram efeito relevante na promoção do bem-estar mental. Verificou-se que a aprendizagem inteligente medeia os efeitos da IA sobre o desempenho acadêmico e das mídias sociais sobre o bem-estar mental, indicando, que seus efeitos se manifestam quando estão alinhados à contribuição de cada tecnologia, cognitiva na IA e emocional nas mídias sociais.

Contribuições do Estudo: O estudo contribui ao evidenciar os efeitos da IA e das mídias sociais no ensino, com a aprendizagem inteligente atuando como mediadora. Evidencia-se que essas tecnologias tendem a apoiar dimensões distintas do processo formativo, com a IA associada a aspectos cognitivos e as mídias sociais a aspectos socioemocionais da experiência de aprendizagem. A conclusões podem orientar práticas pedagógicas alinhadas às percepções dos alunos e reforçam a integração da tecnologia e apoio emocional na promoção do bem-estar mental dos estudantes.

Palavras-chave: Tecnologias educacionais; Desempenho acadêmico; Bem-estar Mental; Aprendizagem Inteligente; Acadêmicos de Contábeis.

1 Introduction

The educational trajectory is shaped by unique learning paths, influenced by several factors, including study strategies (Bressane et al., 2024). The presence of Artificial Intelligence (AI) and learning technologies has grown in the academic environment (Livberber & Ayvaz, 2023). The expansion of AI has intensified in areas such as business, technology and economic productivity, also reaching the educational field (Tanveer, Hassan & Bhaumik, 2020), enabling innovative experiences (Oliveira, Santos, Martins & Oliveira, 2023).

The incorporation of AI in higher education brings advantages and disadvantages inherent to technological progress (Zucco, Reis, Patricio, Reinert & Souza, 2023). The use of AI is transforming educational methodologies by analyzing representative volumes of data, identifying complex patterns and adapting teaching to the specific needs of each student (Duque et al., 2023). However, dependence on the use of artificial intelligence tools may be associated with negative effects such as reducing critical thinking and decreasing problem-solving skills (Zhang, Zhao, Zhou & Kim, 2024).

In today's society, social media has also become almost indispensable in everyday life, particularly among university students (Lau, 2017). In this context, students can share, discuss, and collaborate – through social networks – which leads to enriching and meaningful learning experiences as these platforms overcome barriers of place and time (Shafiq & Parveen, 2023).

Accounting students have demonstrated a growing interest in digital technologies, especially those focused on academic innovation and professional practice (Holanda & Negreiros, 2024). Faced with changes in the accounting sector, educators must adapt their teaching methods and curricula to ensure that graduates have the necessary skills (Tandiono, 2023). Professionally, AI benefits the accounting and finance industry by significantly reducing errors and increasing efficiency (Berdiyeva, Umar & Saeedi, 2023).

The incorporation of technologies in teaching favors the emergence of new pedagogical approaches, such as the so-called smart learning, which proposes the integration of technologies with the purpose of enriching the students' experience and optimizing their academic results (Popescu, 2014). The Theory of Social Learning (Bandura, 1977) was adopted in this research as the theoretical basis for exploring smart learning. This theory considers learning as a social process in which individuals interact with colleagues, models and contextual situations (Yu, Tian, Vogel & Kwok, 2010).

Studies indicate that AI and social media may have an impact on different dimensions of academic performance and mental well-being among university students (Shahzad, Xu, Lim, Yang & Khan, 2024). Integration of AI in educational environments goes beyond simple academic gains, often associated with changes in learning experience and student support (Dawoodbhoy et al., 2021). Regarding the use of social media, it is observed that they are used as tools for interaction and knowledge sharing in the educational context (Yu et al., 2010) and that knowledge sharing in social media improves academic performance (Shafiq & Parveen, 2023). Shahzad et al. (2024) verified that the use of artificial intelligence and social media contributes to the development of smart learning, which can influence the students' academic performance and mental well-being.

Despite this, the literature has emphasized negative effects of social media on students' academic performance and mental health (Lau, 2017; Flanigan & Babchuk, 2015; Oliveira et

al., 2024) as well as adverse effects of AI in teaching (Zhang et al., 2024). Although these studies are relevant, it still remains insufficiently explored if AI and social media, analyzed jointly, can also produce positive effects in the educational context, especially when considering the mediation of smart learning.

In the accounting sphere, despite the interest in AI and its influence, there is little understanding about the extent to which the impact of AI on accounting education is discussed (Tandiono, 2023), which reinforces the need to examine the effects of these technologies in a specific disciplinary context, such as that of accounting science training. In addition, there are still aspects related to the use of technologies in education that need to be discussed, especially regarding their impacts on the learning process, the appropriate ways of use and the potential benefits and risks associated with their use (Divino, 2024).

Faced with these gaps, the research question that guides this study **is what is the perception of accounting science students about the effect of using AI and social networks on their academic performance and mental well-being, and how smart learning mediates these relationships?** Thus, this research aims to investigate accounting students' perceptions of the effect of AI and social media use on their academic performance and mental well-being, as well as to examine the mediating effect of smart learning on these relationships.

AI and social media are advancing rapidly, entering universities and influencing multiple aspects of higher education (Yu et al., 2010; Tanveer et al., 2020). The integration of AI and social networks has become indispensable in their educational and daily experiences (Shahzad et al., 2024). In accounting, these factors are already manifested in both the professional and academic environment (Holanda & Negreiros, 2024). These aspects highlight the relevance of this research and justify the analysis of the effects of these technologies on the training in accounting sciences.

The contribution of this study is to examine a model that simultaneously analyzes the perceived effects of AI and social media on academic performance and mental well-being, incorporating smart learning as a mediator mechanism among accounting science students. It contributes to the theory by mobilizing the Theory of Social Learning to understand if the use of AI and social media can influence the academic performance and mental well-being of students through smart learning.

The practical contribution of the research consists of presenting conclusions that can guide higher education institutions (HEIs) in the adoption of pedagogical strategies aligned with students' perceptions about the use of AI and social media in the learning process. Socially, the study shows how the use of artificial intelligence and social media, mediated by smart learning, relates to the mental well-being of university students, reinforcing the importance of educational policies that integrate emotional support and technological innovation.

2 Literature Review

2.1 Theory of social learning

The Theory of Social Learning, proposed by Albert Bandura in 1977, is one of the main approaches to understanding how human behavior is shaped and influenced by the interaction between the individual and the environment (Yu et al., 2010). Bandura (1977) emphasizes the active role of cognition, attention, memory and self-assessment in learning and behavior. This perspective can be applied in the use of AI, as this technology can create collaborative and observational learning environments relevant to the development of skills in areas such as accounting (Li, Hong & Craig, 2023). The theory also emphasizes reflection, self-regulation and self-efficacy as key factors for the generation and innovation of behaviors (Bandura, 1977).

According to this theory, learning occurs through observation, imitation and modeling, being influenced by social interactions and environmental contexts (Boahene, Fang & Sampong, 2019). In the context of social networks, Social Learning Theory has been used to explain how university students interact with each other and with the classroom environment, and can influence their learning outcomes (Yu et al., 2010). Platforms such as Facebook® are commonly used by students in higher education institutions, allowing information exchange, collaboration in research and sharing study materials (Boahene et al., 2019). However, these virtual interactions should not be understood in a strictly positive way, since their effects vary according to the form of use of the platforms and do not always translate into direct benefits to learning or academic experience. Therefore, although they may favor the construction of knowledge and skills, as well as increase perceptions of satisfaction with academic life, these contributions depend on the conditions under which these interactions occur (Yu et al., 2010).

In short, this theory highlights that people learn by observing others, something central in social media and interactions with AI systems. Jia, Khassawneh, Mohammad and Cao (2024) point out that absorption capacity is decisive in the academic context. When elevated, it allows students and professors to internalize and use knowledge in a critical and innovative way, making learning effective (Jia et al., 2024). The Social Learning Theory offers a lens to interpret the model proposed in this study, because students can learn in digital environments by observing practices, receiving feedback, interacting with peers and internalizing technological stimuli (Boahene et al., 2019; Yu et al., 2010).

Thus, smart learning can be understood as a possible mechanism through which the use of technologies is related to academic and psychological outcomes (Shahzad et al., 2024). This relationship, however, should not be presumed to be automatic or homogeneous, since it may vary according to the type of technology, the purpose of use and the context in which the interaction occurs. In this direction, when the technological resource favors customization, immediate feedback and task resolution, the theoretical expectation falls mainly on the cognitive dimension, when it favors communication, belonging and interpersonal support, the expectation falls on the emotional dimension (Yu, 2023).

2.2 Artificial intelligence in accounting teaching

In recent years, AI and machine learning technologies have evolved rapidly and have been integrated into several areas (Livberber & Ayvaz, 2023). Accounting covers routine tasks and analysis of significant data volumes, which makes AI considered a technology with application potential in this field (Korol & Romashko, 2024). This technology has been pointed out in the literature as a resource capable of supporting activities such as data collection, consulting and fraud detection (Holanda & Negreiros, 2024). Therefore, a representative change in the accounting profession is expected in the coming years (Brabete, Barbu, Cîrciumaru, Goagără & Berceanu, 2024). In the academic field of accounting, studies also indicate that students have resorted to AI as support in solving activities and clarifying doubts (Holanda & Negreiros, 2024).

AI affected accounting education, making universities reformulate their teaching methods and adapt to industry innovations (Yue, 2020). The reconfiguration process of education in accounting is complex (Brabete et al., 2024), this technology has demanded reforms in content, environment, team and evaluation systems, to train accounting talents with advanced skills (Guomin, 2019). The adoption of AI in education brings the promise to create inclusive and effective learning environments, serving students from diverse backgrounds and skills (Zaman, 2023).

In this sense, AI has the potential to revolutionize the field of education (Mulally, 2024). Its integration into educational systems can significantly improve academic performance, increasing the inclusion and efficiency of learning (Yusuf, 2024; Shahzad et al., 2024). Its benefits include task simplification and personalized teaching (Mulally, 2024). This personalized learning can increase student engagement and consequently their academic performance (Ejjami, 2024).

Although AI has relevant benefits for education, its use also involves challenges such as excessive reliance on technology, risks to data privacy and potential practices of academic dishonesty (Vieriu & Petrea, 2025). Among these challenges, the possibility that excessive use of AI reduces the development of critical thinking and problem-solving skills (Zhang et al., 2024) is highlighted. Still, studies indicate that the use of AI tends to be associated with improvements in students' academic performance (Dawoodbhoy et al., 2021).

In the light of the Social Learning Theory, the functionalities of AI favor guided observation processes, continuous feedback and self-regulation of learning, which makes AI adhere to the cognitive dimension of academic experience. Thus, its use is expected to contribute to the students' academic performance (Boahene et al., 2019). Therefore, the following hypothesis was developed:

H1: Accounting science students realize that the use of AI-based systems is positively associated with their academic performance.

Generative AI is a type of artificial intelligence that employs *machine* learning and deep learning techniques to create new data autonomously (Yu & Guo, 2023). ChatGPT® is a generative AI widely used in the academic environment, facilitating access to information for teaching purposes, as well as generating texts as a human being (Livberber & Ayvaz, 2023). AI is presented in the literature as a technology with the potential to support mental health care provision, offering scalable, personalized and cost-effective solutions (Zafar, 2024). According to Javaid, Haleem, and Singh (2023), these technologies offer quick and personalized responses

that help you understand content and manage stress and anxiety. In the educational context, the customization of teaching provided by AI can favor learning environments adapted to the students' individual needs , and can lead to a balanced and less stressful educational experience (Chen et al., 2020).

However, authors such as Zhang et al. (2024) reflect that excessive reliance on this tool can reduce students' self-confidence and increase their stress and anxiety levels; especially if they cannot succeed without AI support. Gontijo and Araújo (2021) argue that as these technologies become an integral part of everyday life, the positive effect of AI is evident both in academic performance and in the students' well-being. Shahzad et al. (2024) state that AI influences both academic performance and mental well-being. However, their possible emotional effects tend to be less immediate than their cognitive effects, because they depend on the way the student perceives, incorporates and resignifies this technological support in their learning routine (Yu et al., 2010).

Zafar's research (2024) demonstrates that AI-driven technologies – *including chatbots* – virtual reality simulations and learning algorithms can revolutionize the scenario of mental health interventions for university students. Together, these findings indicate that the effects of AI on mental well-being are not univocal in the educational context. However, considering the potential of these technologies to offer support, guidance and personalized resources to students, it is expected that their use will be perceived positively in relation to mental well-being, which leads to the following hypothesis:

H2: Accounting science students realize that AI has a positive impact on mental well-being.

2.3 Social Media

Social media are technological tools that connect people and promote virtual interactions (Juliani, Juliani, Souza, & Bettio, 2012). Examples include: Facebook®, Instagram®, LinkedIn®, TikTok® and WhatsApp®. These media can be auxiliary tools in teaching strategies, benefiting learning, although they dispute the attention of students with other daily activities (Shahzad et al., 2024). This dynamic, inside and outside the classroom, sets challenges for educators, who need to understand social media as a consolidated social fact (Lima, Gomes, Ferreira & Walter, 2019). When students use social networks for academic purposes, their results may be favored, and academic performance may be influenced by the knowledge sharing function of these networks (Shafiq & Parveen, 2023).

In the educational context, social networks provide easy access to communication and immediate information, aligning with the activities of users (Santos & Santos, 2014). The study by Shahzad et al. (2024) indicates that – given the positive impact of social networks on students' performance – educational institutions should focus on effective integration of them into pedagogical practices, rather than adopting widespread bans or restrictions. Santos (2022) points out that social networks can help shy individuals excel in the group and transmit messages quickly and efficiently.

While social media can offer a rich environment in social interactions that promote learning (Yu et al., 2010), excessive and unregulated use of these platforms can turn into a vicious cycle, where their dependence to relieve stress and loneliness ends up exacerbating the very problems they aimed to solve (Homaid, 2022). In addition, the risk of misinformation is a constant concern, considering that not all shared information is verified or has a scientific basis. In order for the use of social media to be positive in sharing and learning accounting knowledge,

it is necessary for users to develop the ability to identify the authenticity of information (Xie, Chiu, & Ho, 2024).

There is an extensive discussion about the impact of social media on teaching, in the literature, both positive results (Yu et al., 2010; Shafiq & Parveen, 2023) and negative results (Flanigan & Babchuk, 2015; Lau, 2017) are highlighted. These mixed results serve as an appeal for further research (Doleck & Lajoie, 2018). According to the Social Learning Theory, people learn by observing and imitating other individuals (Bandura, 1977). In this sense, social media can function as a means of connection among students, professors and content, stimulating the learning process and, consequently, the academic performance. Therefore, the following hypothesis is proposed:

H3: Accounting science students perceive social media positively associated with their academic performance.

The intensive use of social media among students has generated concerns about its effect on psychological well-being (Canonigo, Uy & Culajara, 2024). Social media facilitate communication and relate to learning by creating information, contacts and support systems (Mosharrafa, Akther & Siddique, 2023; Yu et al., 2010). Social media also acts as a valuable resource for university students, providing opportunities to create social networks and promote dialogs that help relieve mental tension (Kross et al., 2021). Steinfield, Ellison & Lampe (2008) identified, in their research, a positive influence of Facebook® on self-esteem and satisfaction measures.

However, with the daily involvement of students in social networks, concerns arise about the harmful effects of these platforms on the students' well-being (Mosharrafa et al., 2023). Some authors, such as Braghieri, Levy and Makarin (2022) claim that social media has a negative effect on mental health, contributing to the increase of mental diseases among adolescents and young people in recent decades. In addition, social media addiction can lead to procrastination due to the easy access and wide range of distraction possibilities offered by these platforms (Meurer & Costa, 2024).

Contrary evidence in the literature indicates that the use of social media improves mental health and academic performance of university students, with mental health acting as a positive mediator, improving academic performance (Mosharrafa et al., 2023). Canonigo et al. (2024) also concluded that the use of social media, especially information sharing, social interaction, news engagement, and collaborative learning, are positive predictors of students' psychological well-being.

While classroom interactions are valuable, students can turn to channels such as social networks to freely express their feelings, form friendships, and access information, which is timely for their mental health and academic performance (Yu et al., 2010). In addition, social media can help address the development and maintenance needs of young adult relationships during the transition to university (Steinfield et al., 2008). Unlike AI, whose use tends to be associated with task personalization and cognitive processing, social media operates with greater intensity through interaction, dialogue and feeling of belonging (Shafiq & Parveen, 2023; Steinfield et al., 2008). Thus, its theoretical contribution in the model is closer to the emotional dimension of the university experience, although it can also impact on learning and academic performance. Based on this discussion, the following hypothesis was proposed:

H4: Accounting science students perceive social media positively associated with their mental well-being.

2.4 Mediating effect of smart learning

With the technological advances that permeate education, there is a growing demand for intelligent, social, interactive and student-centered learning environments, in which students are encouraged to take a self-directed role in the development of 21st century skills (Cheung, Wang & Kwok, 2021). Smart learning is an educational paradigm that employs advanced technologies, including AI and social media, to improve both the students' experience and the learning outcomes (Popescu, 2014). This way of learning involves personalized and adaptive experiences (Hilal et al., 2022).

The concept of smart learning is constantly evolving. For Zhu, Yu and Riezebos (2016), it emphasizes the flexibility, adaptability and use of technology. Yang, Shi, Zhu and Sun (2025) claim that technologies are the foundation for education transformation, as they not only enhance the personalization, interactivity and adaptability of teaching, but also optimize the allocation of educational resources and drive the intelligent transformation of learning environments. As a result, smart learning environments enable students to learn flexibly and work collaboratively, contributing to the development of individual and collective intelligence of learners (Zhu et al., 2016).

With the incorporation of technologies in education, students become progressively active, developing dynamic cognitive capacities (Santos, Jorge & Winkler., 2021). Smart learning represents a link between the use of technologies, such as AI and social media, and the academic performance of students, and can act as a mediator mechanism in the relations between these technologies, academic performance and mental well-being (Shahzad et al., 2024). AI can customize educational content by recommending teaching resources and strategies based on the individual needs of each student (Souza et al., 2023). Therefore, the integration of AI presents significant opportunities to improve student's performance through personalized bonding (Castro, Chiappe, Becerra & Sepúlveda, 2024).

When associated with artificial intelligence, smart learning tends to support processes related to monitoring and improving academic performance, since these technologies allow to customize learning, analyze educational data and predict student outcomes, offering subsidies to guide the teaching and learning process (Chen et al., 2020; Yusuf, 2024). Social media platforms can strengthen smart learning by facilitating the dissemination of knowledge, stimulating online dialogue and promoting the sharing of resources among students (Beerbaum, 2023). These collaborative environments expand opportunities for interaction, exchange of experiences and collective construction of knowledge, elements that tend to favor student engagement and the development of cognitive and socio-emotional skills (Boahene et al., 2019).

According to Shahzad et al. (2024), the integration of smart learning in educational and mental health contexts is necessary so that it can act as a mediator mechanism in the relationship between the use of technologies and the results perceived by students, academic performance and mental well-being. Thus, the expected mediation stems from the ability of smart learning to organize, interpret and enhance the stimuli produced by the technologies used by students. Considering that the use of AI and social media can favor smart learning, contributing to the students' academic performance and mental well-being, the following hypotheses are:

H5: Smart learning positively mediates the relationship between the use of AI, social media and the academic performance of accounting science students.

H6: Smart learning positively mediates the relationship between the use of AI, social media, and the accounting students' mental well-being.

3 Methodological Procedures

This research follows a descriptive quantitative design, characterized as *survey* research . In epistemological terms, the study adopts a positivist perspective, since it seeks to test relationships between latent constructs from the self-reported perceptions of students through structural equation modeling. This study aims to investigate accounting students' perceptions of the effect of AI and social media use on their academic performance and mental well-being, as well as to examine the mediating effect of smart learning on these relationships. To achieve this goal, an approach based on structural equation modeling was adopted, suitable to simultaneously test the proposed relationships between the constructs of the model, including the direct effects and mediators of smart learning (Hair, Black, Babin, Anderson & Tatham, 2009).

For data collection, a structured questionnaire with 33 questions was used, adapted from an instrument previously developed and validated by Shahzad et al. (2024). The scale covers the constructs of artificial intelligence (AI), social media (SM), smart learning (SL), academic performance (AP) and mental well-being (MWB), which are aligned with the objectives of this research. The variables were measured using five-point Likert scales, ranging from "I totally disagree" to "I totally agree".

The target population of this research was composed of accounting science students enrolled in higher education institutions located in the west and southwest regions of the state of Paraná. Due to the undetermined size of the student population, the convenience sampling technique was used, that is, exclusively based on the availability of the respondents (Gray, 2016). Prior to the application of the questionnaire, a semantic validation was performed through a pre-test with students, seeking to evaluate the clarity and understanding of the questions. From the observations obtained, small drafting adjustments were made to improve the instrument.

Data collection was carried out in August and September 2024. The questionnaire was distributed online and forwarded to the coordinators of the courses, which they disclosed to the students. The sample size was defined using G*®Power software, considering a margin of error of 5%, a confidence level of 95% and two predictive variables (AI and SM), as recommended by Hair et al. (2021). Based on the proposed model, it was calculated that at least 68 observations would be needed to perform the analysis. The study included 222 students of Accounting Sciences, a number higher than the minimum of 68 observations estimated for the analysis.

The data collected were analyzed using structural equations modeling of partial least squares, using the SmartPLS software®. The analysis process initially involved the respondents' descriptive analysis, followed by the evaluation of the measurement model, which examined the validity and reliability of the constructs, through the analysis of factor loads, Cronbach's Alpha, composite reliability and mean variance extracted. Subsequently, the analysis of the structural model was conducted, with the objective of testing the proposed hypotheses, including the direct relations between the constructs and the mediating effect of smart learning. Finally, the results were discussed based on the literature.

4 Results and Analysis

4.1 Respondents' descriptive analysis

In order to characterize the sample respondents, information related to gender, age and time of daily use of the internet was collected, as detailed in Table 1.

Table 1
Students' Profile

Demographic	Absolute frequency (n: 222)	Relative frequency (%: 100)
Gender		
Female	125	56.3%
Male	96	43.2%
Neutral	1	0.5%
Age		
17 years or less	3	1.35%
18 to 21 years	120	54.06%
22 to 38 years	77	34.68%
29 to 35 years	13	5.86%
More than 35 years	9	4.05%
Daily use of the internet for academic purposes		
1 to 4 hours	174	78.4%
4 to 8 hours	41	18.4%
More than 8 hours	7	3.2%

Source: *Research data.*

It is observed that the majority of students in the sample are female. In addition, the predominant age group is 18 to 21 years (54.06%), followed by 22 to 28 years (34.68%). As for daily use of the internet for academic purposes, 78.4% of students use one to four hours, 18.4% from four to eight hours, and only 3.2% over 8 hours. In summary, the data reveal a mostly female sample, young, and with moderate use of the internet for academic activities.

This profile is adequate to respond to the problem of the study, because it is aligned with the target audience of the research. Studies such as those of Shahzad et al. (2024) indicate that young university students are habitual users of digital technologies and tend to have well-defined perceptions about their effects on academic performance and mental well-being, which reinforces the adequacy of the sample to the proposed objectives.

4.2 Measuring model

To verify whether the data collection method influenced the results, the Harman factor test was applied using SPSS® software. This test verifies if a single factor concentrates a high portion of the total variance between the variables, which could indicate an undue influence of the method. Based on the test results, the first factor explained 32.486% of the total variance, indicating that the collection method had no undue influence on the observed variables, minimizing the risk of common method bias.

The validity and reliability of the constructs were evaluated through the analysis of the coefficients of composite reliability (CC), Cronbach's Alpha (α), mean variance extracted (VME) and factor loads (CF). According to Hair, Hult, Ringle & Sarstedt (2014), Cronbach's Alpha and CC values are considered acceptable when greater than 0.70. The convergent validity, verified by means of VME, is considered satisfactory when it presents values above 0.50 (Hair et al., 2009). The results obtained are presented in Table 2.

Table 2

Results of the measurement model

Variable	Item	CF	α	CC	VME
Artificial Intelligence (AI)			0.918	0.935	0.675
AI1	I adopt AI-based systems to study	0.822			
AI2	I think that AI-based systems help me improve my performance in studies	0.902			
AI3	I think that AI-based systems help me improve my learning performance	0.888			
AI4	I believe that AI-based systems help me cooperate well with other people.	0.743			
AI5	I believe that AI-based systems help me improve the efficiency of my learning.	0.896			
AI7	ChatGPT® is a useful and effective technology for learning	0.744			
AI8	Asking additional questions helps you find the right answer	0.704			
Social Media(SM)			0.814	0.868	0.570
SM2	I can get faster feedback from my colleagues using social media	0.709			
SM3	I can get faster feedback from my instructor using social media	0.702			
SM4	I increase my participation in classes when I can contribute through social networks	0.820			
SM5	I do multitasking with my social media account as I study	0.781			
SM6	I can communicate effectively through social networks	0.755			
Academic Performance(AP)			0.857	0.903	0.701
AP1	I focus on the quality of the study using AI and social networks	0.866			
AP2	I focus on the accuracy of study through AI and social media	0.756			
AP4	I developed the skills needed for my future career using AI and social media	0.780			
AP5	Continuous search for career development opportunities using new applications, ChatGPT ,®etc.	0.843			
Mental Well-being (MWB)			0.878	0.911	0.672
MWB1	I have felt optimistic about the future	0.757			
MWB3	I have dealt well with the problems	0.812			
MWB4	I have thought clearly	0.857			
MWB5	I have felt close to other people	0.788			
MWB6	I have been able to decide on things	0.878			
Smart Learning (SL)			0.703	0.871	0.771
SL4	I like to learn about new topics and tools like Generative IAS (ChatGPT)®	0.886			
SL5	I am pleased to learn new social media applications	0.870			

Source: *Research data.*

As shown in Table 2, each variable exceeded the expected threshold. Cronbach's alpha values (α) were 0.918 for AI, 0.814 for SM, 0.703 for SL, 0.857 for AP and 0.878 for MWB,

indicating good internal consistency in all constructs. In addition, CC values were 0.935 for AI, 0.868 for SM, 0.871 for SL, 0.903 for AP, and 0.911 for MWB. All constructs presented CC above 0.70, reaffirming the high reliability of the measurements.

The values obtained from VME were 0.675 for Artificial Intelligence, 0.570 for Social Media, 0.771 for Smart Learning, 0.701 for Academic Performance, and 0.672 for Mental Well-being. As one can see, all constructs exceeded the recommended minimum threshold, confirming convergent validity.

According to Hair et al. (2014), indicators with factor loads lower than 0.70 should be excluded, as they may compromise the convergent validity of the model. The factorial loads of the items maintained were higher than this limit, reinforcing the quality of the measurements. However, the indicators SL1, SL2, SL3, AP3, MWB2, AI6 and SM1 because they do not meet the minimum criterion, which could compromise the validity of the corresponding constructs.

In addition to the statistical criterion, this decision was analyzed in line with the conceptual coherence of the constructs in the empirical context of the research. Considering that the instrument was adapted from Shahzad et al. (2024) For students of Accounting Sciences from universities in the west and southwest of Paran, it is admitted that some indicators have presented less semantic adherence to the reality of the respondents, which may have limited their association to the proposed theoretical dimensions. Thus, the exclusion of these items also sought to safeguard the conceptual consistency of measurement in the investigated context.

Finally, the discriminant validity, which indicates whether the constructs or latent variables are distinct from each other (Hair et al., 2014) was evaluated by the Fornell-Larcker criterion. This criterion compares the square root of the VME of each construct with the correlations between the other constructs. As shown in Table 3, the values of the square root of the VME are located diagonally, while the correlations are out of the diagonal.

Table 3

Evaluation of discriminant validity by Fornell-Larcker

Variable	SL	MWB	AP	AI	SM
Smart learning (SL)	0.878				
Mental Well-being (MWB)	0.343	0.819			
Academic Performance (AP)	0.567	0.335	0.837		
Artificial Intelligence (AI)	0.650	0.239	0.622	0.822	
Social Media (SM)	0.496	0.322	0.452	0.479	0.755

Source: *Research data.*

The Fornell-Larcker criterion is considered met when the factorial loads exceed that of any other construct (Fornell & Larcker, 1981; Chin, 1998). Therefore, the data from Table 3 show that this requirement was met, because the square roots of the VME were higher than the correlations between the constructs, confirming the discriminant validity.

In addition, the Heterotrait-Monotrait Ratio of Correlations (HTMT) complemented the evaluation of discriminant validity, as shown in Table 4. The established criterion is that HTMT values should be less than 0.85 for discriminant validity to be confirmed.

Table 4

Evaluation of discriminant validity by means of the Heterotrait-Monotrait Ratio of Correlations (HTMT)

Variável	SL	MWB	AP	AI	SM
Smart learning (SL)					

Mental Well-being (MWB)	0,430			
Academic Performance (AP)	0,725	0,388		
Artificial Intelligence (AI)	0,809	0,263	0,693	
Social Media (SM)	0,645	0,354	0,516	0,550

Source: *Research data.*

As shown in Table 4, all HTMT values between the constructs varied between 0.263 and 0.809, being below the limit of 0.85. These results reinforce the discriminant validity among the constructs, including SL, which maintained mediating relationships with the other constructs, even after adjustments made in the factorial loads and previous validations.

Finally, the analysis of the Variance Inflation Factor (VIF) evaluated multicollinearity among the constructs of the model. As recommended by Hair, Hollingsworth, Randolph, & Chong (2017), values below 5 indicate that there is no significant overlap between the constructs. All the values obtained in the present study met this criterion, which confirms the absence of multicollinearity and reinforces the statistical quality and robustness of the measurement model, ensuring greater reliability in the interpretation of the structural results.

In short, the measurement model was subjected to rigorous reliability and validity tests, including the analysis of internal consistency, convergent validity, discriminant validity and absence of multicollinearity, consolidating itself as a statistically robust measure for the evaluation of the relationships between the constructs. According to Hair et al. (2014), the confirmation of these criteria ensures the quality of structural models in research with structural equation modeling, ensuring reliability and accuracy in the results.

4.3 Structural Model

After evaluating the reliability and validity in the measurement model, we move to the structural model using the PLS-SEM (Partial Least Squares Structural Equation Modeling) method. Several statistical metrics, including effect size (f^2), t values, predictive relevance (Q^2), determination coefficient (R^2) and path coefficients, were obtained in the structural model. Using the bootstrapping technique in the SmartPLS software®, it was possible to verify the statistical significance of the studied relationships. This procedure identified the direction, magnitude and significance of the effects of independent variables on dependents. The factor loads and the measurement model are presented in Figure 1.

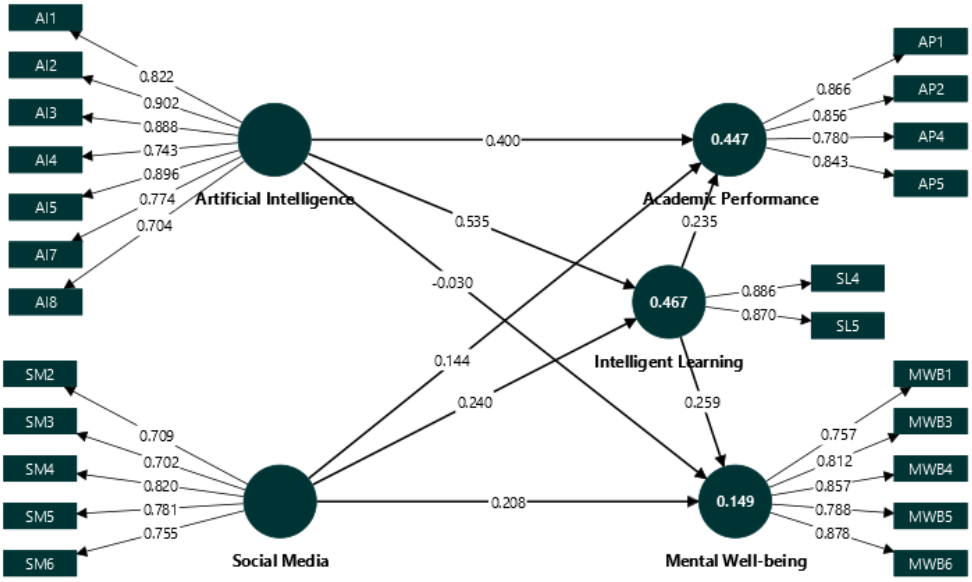

Figure 1 *Structural Model*
Source: *Research data.*

The results strongly support hypothesis H1. The analysis indicated that AI has a significant influence on academic performance (Path Coefficient = 0.400, t = 5.362, p < 0.001). However, the relationship between AI and Mental Well-Being (H2) was negative and not significant (Path Coefficient = -0.030, t = 0.356, p= 0.722), demonstrating that AI does not have a significant effect on mental well-being.

Similarly, hypothesis H3 was not supported, since the relationship between Social Media and Academic Performance was positive, but not significant (Path Coefficient= 0.144, t = 1.820, p= 0.069). The impact of Social Media on Mental Welfare (H4) was positive and significant (Path Coefficient = 0.20, t= 2.322, p=0.020). On the other hand, students realize that both Artificial Intelligence (Path Coefficient= 0.535, t= 8.094, p< = 0.001) and Social Media (Path Coefficient =0.240. t= 3.543, p =0.000) exert a positive and significant influence on Smart Learning, in turn, it positively affects Academic Performance (Path Coefficient =0.235, t= 3.279, p < 0.001) and Mental Well-Being (Path Coefficient = 0.259, t= 3.241, p <0.001).

Hypotheses H5 and H6 were tested to verify the mediating effect of Smart Learning. The results indicate that learning significantly mediated the relationship between Artificial Intelligence and Academic Performance, as well as between Social Media and Mental Welfare. In the relations between Artificial Intelligence and Mental Welfare, and between Social Media and Academic Performance, mediation was not statistically confirmed.

R^2 values were 0.467 for Smart Learning, 0.149 for Mental Welfare, and 0.447 for Academic Performance. These values indicate that 46.7% of the variation in Smart Learning, and 44.7% in Academic Performance are explained by independent variables, while 14.9% of the variation in Mental Welfare is explained by the model variables. The low value of R^2 for mental well-being reflects that this dimension is influenced by multiple factors that go beyond the use of technologies, such as personal conditions, social support, academic context and emotional aspects of students.

Finally, the effect size (f^2) analysis was performed, whose values range from small (0.02), medium (0.15), to large (0.35). The effect sizes varied from small to medium. Thus, AI demonstrated a great effect on Smart Learning ($f^2 = 0.415$), indicating a substantial contribution to the explained variation of this variable. The influence of AI on Academic Performance showed a medium effect ($f^2 = 0.158$), indicating a moderate contribution. Social Media had a small effect on Smart Learning ($f^2 = 0.083$) and a very small effect on Mental Well-Being ($f^2 = 0.036$) and Academic Performance $f^2 = (0.027)$, showing limited contribution to explain these variables.

In practice, these results demonstrate that AI has a greater capacity to influence aspects related to the learning process and academic performance of students, while the use of social media has a more limited effect on these dimensions. Although both technologies are present in the academic daily life, their effects do not occur with the same intensity, AI may represent a more relevant resource to support learning activities in the analyzed educational context.

4.4 Discussion of the results

Hypothesis H1 was confirmed: accounting science students believe that the use of AI favors their academic performance. This result reinforces the growing appreciation of AI as a tool to support learning, especially for its potential to customize the individual needs of the students. The literature indicates that the implementation of AI in education can improve students' academic performance, especially when combined with customized study strategies that help overcome learning difficulties (Yusuf, 2024; Bressane et al., 2024). In the perspective of Shahzad et al. (2024), these results emphasize the need for HEIs to integrate AI into their educational models, creating a dynamic learning environment responsive to the students' individual needs. The personalization of teaching becomes an increasingly close reality (Zaman, 2023).

However, it is necessary to consider the challenges associated with the implementation of AI in education, especially regarding the possible dependence of this technology and the potential negative cognitive effects in the long term (Vieriu & Petrea, 2025). It is emphasized that the results of this study exclusively reflect the perception of students in relation to their own academic performance. Thus, the observed effects may be related to the way students interpret and use these technologies in their learning process. Therefore, the result does not eliminate the concerns present in the literature about possible negative effects arising from the use of AI, but indicates that these effects may not be fully recognized or perceived by the students themselves.

Regarding mental well-being, AI did not present significant effect, leading to rejection of the second hypothesis. Although AI is recognized for its potential in several areas, its effect on students' mental well-being was not significantly perceived in the academic environment. Although studies such as Zafar's (2024) indicate the potential of AI to transform mental health care, these benefits seem to be more related to clinical and therapeutic contexts than to educational everyday life. In higher education, the use of AI is more linked to cognitive and performance aspects than to emotional support.

Hypothesis H3, which proposed a positive association between the use of social media and academic performance, was not confirmed, indicating that students do not perceive these platforms as resources that directly contribute to their academic results. This finding differs from previous studies, such as those of Shafiq and Parveen (2023), which highlight the benefits of social networks in student life, especially in supporting academic success. Although authors

such as Yu et al. (2010) argue that social media promotes social integration and university engagement, data reveal that students do not perceive these benefits as concrete academic gains. This may indicate that the predominantly recreational use of social media limits its perceived effectiveness in the educational context.

In the Brazilian context, Meurer and Costa (2024) point out that the use of social networks can configure a form of cyberloafing, characterized by access to networks during academic activities for purposes not related to the study. According to the authors, this dynamic tends to hinder the maintenance of students' attention in the classroom, since social media offers several possibilities of distraction. Thus, the results may indicate that students do not perceive social media as tools that contribute directly to academic performance, but as platforms often used for distraction. This may be related to the digital culture of students, in which these media are predominantly used for communication and entertainment, not necessarily associated with academic activities or performance improvement.

Hypothesis H4, which deals with the positive effect of social media on mental well-being, was confirmed. This result reinforces the idea that, although social networks do not directly affect academic performance, they exert a relevant effect on emotional support and the construction of support networks, promoting feelings of belonging and connection among students (Mosharrafa et al., 2023). Therefore, the research shows that social media are more effective in meeting the students' emotional needs than in directly contributing to their academic results.

The articulation of the results with the Social Learning Theory reveals that the students' behavior and learning are influenced by the interaction with the technological environment, although in different ways according to the nature of the tool used. The positive perception of AI on academic performance demonstrates that this technology can act as a cognitive support resource, helping students in solving tasks and overcoming learning difficulties (Li et al., 2023). On the other hand, the impact of social media on mental well-being reinforces the premise of the theory that social interactions and environmental support are important elements for the development of the feeling of belonging and satisfaction in the academic context (Yu et al., 2010).

Regarding the mediating effect of Smart Learning, hypothesis H5 was partially confirmed. It was verified that this variable acts as a mediator in the relationship between the use of AI and academic performance, but did not significantly measure the relationship between social media and performance. Indicating that smart learning enhances the effects of AI in the academic context, especially by enabling customized and adaptive experiences that respond to the individual needs of students (Souza et al., 2023). However, this mediation does not apply to social media, demonstrating that students do not see them as direct support for learning, even in intelligent educational contexts. This result contradicts the expectation that opportunities for interaction, exchange of experiences and collective construction of knowledge on these platforms would translate into gains in learning and developing cognitive skills (Boahene et al., 2019).

Similarly, it was observed that smart learning significantly mediated the relationship between social media and mental well-being, but its effects were not significant for the relationship between AI and mental well-being; hypothesis H6 was only partially confirmed. It is concluded that the mediation of smart learning is related to the nature of the contributions of each technology, favoring cognitive development when associated with AI and promoting emotional benefits when linked to the use of social media. In addition, according to Shahzad et

al. (2024), for smart learning to act as a mediator, it is necessary to implement policies that promote integration in educational and mental well-being contexts.

5 Final Considerations

This study investigated accounting students' perceptions of the effect of AI and social media use on their academic performance and mental well-being, and the mediating effect of smart learning. Evidence was found that, in the perception of students, the use of AI contributes positively to academic performance, although no significant effect on mental well-being has been identified. On the other hand, social media did not show a significant relationship with academic performance, but showed a positive and significant influence on the mental well-being of students.

Smart learning mediated the relationship between AI and academic performance, as well as between social media and mental well-being. However, the mediation between AI and mental well-being, as well as between social media and academic performance, was not statistically confirmed. These results indicate that the positive mediation of smart learning occurs when its contributions are aligned with the predominant nature of each technology – cognitive, in the case of AI – and emotional – in the case of social media.

In summary, only hypotheses H1 and H4 were confirmed, while hypotheses H5 and H6 were partially supported. The results reinforce the recognition of AI as an ally in learning; especially for its ability to customize teaching according to the students' needs. Although social media has not shown a direct impact on academic performance, its positive effect on students' well-being highlights its relevance in social interactions and in the formation of support networks. Such evidence addresses the gap highlighted by Tandiono (2023), regarding the understanding of the effects of AI on accounting education; by Shahzad et al. (2024), by emphasizing the integration of emerging technologies in the promotion of mental health and academic performance. The results suggest the importance of educational initiatives that combine technological innovation with learning strategies and emotional support, in order to favor formative practices more aligned with the current demands of higher education.

This study enriches the literature by demonstrating the effects of AI and social media in higher education, integrating smart learning as a mediator in the relations studied. As a contribution, it is evidenced a functional differentiation in the role of technologies in the smart learning process, in which AI tends to mobilize cognitive dimensions, while social media relate more to socio-emotional dimensions. These findings can guide higher education institutions in implementing pedagogical strategies aligned with students' perceptions of the use of AI and social media in learning. In addition, the study highlights the effect of technologies on the promotion of mental well-being of accounting science students, supporting educational policies that integrate emotional support and technological innovation.

Among the limitations of this research, it is emphasized that the results could be different if the respondents were from another higher course, or even from other educational levels. Convenience sampling and regional sample delimitation may limit the generalization of results to other educational contexts. In addition, because it is a cross-sectional study, data were collected at a single moment, which prevents the follow-up of possible changes in the relationships between variables over time. It is also noteworthy that the information was obtained based on the self-perception of the respondents, which may be subject to response bias. Finally, the exclusion of some indicators in the measurement model may have influenced the final composition of the analyzed variables.

Future research could expand the sample, including students from different courses, institutions, and regions. In addition, longitudinal studies could be conducted to track over time how the use of AI and social media relates to students' academic performance and mental well-being. Future research may also use different data collection strategies, combining perceptual measures with objective academic performance indicators in order to reduce possible response bias. Finally, new investigations can explore other indicators related to smart learning and the use of educational technologies, contributing to the construction of measurement models and to the advancement of discussions about the integration of these technologies in the educational environment.

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APPENDIX - QUESTIONNAIRE

Section 1. Characterization of the respondent

1. Gender: ( ) Male ( ) Female
2. Age: ( ) 17 years or less ( ) 18 to 21 years ( ) 22 to 28 years ( ) 29 to 35 years ( )More than 35 years
3. Daily use of the internet for academic purposes: ( ) 1 to 4 hours ( ) 4 to 8 hours ( ) More than 8 hours

Section 2. (Please answer all the research questions)
1. Artificial intelligence

Indicate your level of agreement or disagreement with each statement by selecting one of the following options:		**I strongly disagree**	**I disagree**	**Neutral**	**I agree**	**I totally agree**
AI1	I use AI-based systems for studying.					
AI2	I think AI-based systems help me improve my academic performance.					
AI3	I think AI-based systems help me improve my learning performance.					
AI4	I believe that AI-based systems help me cooperate well with other people.					
AI5	I believe that AI-based systems help me improve the efficiency of my learning.					
AI6	I'm impressed with ChatGPT's features.					

AI7	ChatGPT® is a useful and effective technology for learning.					
AI8	Asking follow-up questions helps to find the correct answer.					

2. Social media

Indicate your level of agreement or disagreement with each statement by selecting one of the following options:		**I strongly disagree**	**I disagree**	**Neutral**	**I agree**	**I totally agree**
SM1	I feel that community learning becomes more interactive when using social media.					
SM2	I can get faster feedback from my colleagues by using social media.					
SM3	I can get faster feedback from my instructor by using social media.					
SM4	I increase my participation in classes when I can contribute through social media.					
SM5	I multitask using my social media account while studying.					
SM6	I can communicate effectively through social media.					

3. Academic Performance

Indicate your level of agreement or disagreement with each statement by selecting one of the following options:		**I strongly disagree**	**I disagree**	**Neutral**	**I agree**	**I totally agree**
AP1	I focus on the quality of study using AI and social media.					
AP2	I focus on the accuracy of the study through AI and social media.					
AP3	I achieved my personal career goals.					
AP4	I developed the skills necessary for my future career using AI and social media.					
AP5	Continuously seeking career development opportunities using new applications, ChatGPT®, etc.					

4. Mental well-being

Indicate your level of agreement or disagreement with each statement by selecting one of the following options:		**I strongly disagree**	**I disagree**	**Neutral**	**I agree**	**I totally agree**
MWB1	I've been feeling optimistic about the future.					
MWB2	I've been feeling relaxed.					
MWB3	I've been handling the problems well.					

MWB4	I have been thinking clearly.					
MWB5	I've been feeling close to other people.					
MWB6	I have been able to make decisions about things.					

5. Smart learning

Indicate your level of agreement or disagreement with each statement by selecting one of the following options:		**I strongly disagree**	**I disagree**	**Neutral**	**I agree**	**I totally agree**
SL1	I enjoy reading about diverse subjects.					
SL2	I hope to support the group's objectives.					
SL3	I feel great when I know I've outperformed other students.					
SL4	I enjoy learning about new topics and tools such as generative AI (ChatGPT®).					
SL5	I feel satisfaction when I learn new social networking applications.					

Source: *Adapted from Shahzad et al. (2024).*