Artigo Original

Encontros Bibli

AI AS A FACILITATOR OF CREATIVITY AND WELLBEING IN BUSINESS STUDENTS: A MULTIGROUP APPROACH BETWEEN PUBLIC AND PRIVATE UNIVERSITIES

IA como facilitadora de creatividad y bienestar en estudiantes de negocios: un enfoque multigrupo entre universidades públicas y privadas

IA como facilitadora de criatividade e bem-estar em estudantes de negócios: Uma abordagem multigrupo entre universidades públicas e privadas

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ABSTRAC

Objective: This article aims to explore the effect of perceived adaptability, perceived usefulness, and ease of use of AI on the creativity and well-being (happiness) of business students in universities in Mexico. Additionally, it seeks to analyse how these relationships differ between students from public and private universities, using a multi-group approach.
Method: A non-experimental quantitative approach with a cross-sectional design was adopted. The sample included 270 business students from both a public and a private university in Mexico. Data collection was conducted through an online questionnaire, using previously validated scales to measure perceived usefulness, ease of use, AI adoption, creativity, and happiness. Data were analysed using structural equation modelling (SEM) and multi-group analysis (MGA) to assess differences between groups.
Results: The main findings indicate that AI adoption significantly mediates the relationship between perceived usefulness, perceived ease of use, and outcomes in terms of creativity and well-being. AI adoption was found to have a stronger influence on creativity in public institutions, while its impact on happiness was more pronounced in private universities. These differences suggest that in resource-limited contexts, AI may compensate for the lack of other resources, enhancing creativity.
Conclusion: This study expands the Technology Acceptance Model (TAM) by including variables such as creativity and happiness, highlighting the importance of the socio-economic context in technological adoption in universities. The implications suggest that public institutions should focus on improving access to technologies such as AI, while private institutions must ensure ethical and responsible use, promoting both academic performance and student well-being.
Keywords: Artificial Intelligence adoption. Perceived usefulness. Creativity. Happiness. Higher education.

RESUMEN

Objetivo: El presente artículo tiene como objetivo explorar el efecto de la adaptabilidad percibida, la utilidad percibida y la facilidad de uso de la IA en la creatividad y el bienestar (felicidad) de los estudiantes de carreras de negocios en universidades de México. Asimismo, se busca analizar cómo estas relaciones pueden diferir entre estudiantes de universidades públicas y privadas, utilizando un enfoque multigrupo.
Método: Se adoptó un enfoque cuantitativo no experimental, con diseño transversal. La muestra incluyó 270 estudiantes universitarios de carreras de negocios, distribuidos entre una universidad pública y una privada en México. La recolección de datos se realizó a través de un cuestionario en línea, utilizando escalas previamente validadas para medir la utilidad

percibida, la facilidad de uso, la adopción de IA, la creatividad y la felicidad. Los datos fueron analizados mediante el uso de ecuaciones estructurales (SEM) y un análisis multigrupo (MGA) para evaluar las diferencias entre los grupos.
Resultados: Los principales hallazgos indican que la adopción de IA media significativamente la relación entre la utilidad percibida, la facilidad de uso percibida y los resultados en términos de creatividad y bienestar. Se encontró una mayor influencia de la adopción de IA en la creatividad en instituciones públicas, mientras que en las privadas el impacto fue más fuerte sobre la felicidad. Estas diferencias sugieren que, en contextos con recursos limitados, la IA puede compensar la falta de otros recursos, potenciando la creatividad.
Conclusión: Este estudio aporta una ampliación del Technology Acceptance Model (TAM) al incluir variables como la creatividad y la felicidad, destacando la importancia del contexto socioeconómico en la adopción tecnológica en universidades. Las implicaciones sugieren que las instituciones públicas deben centrarse en mejorar el acceso a tecnologías como la IA, mientras que las privadas deben asegurar un uso ético y responsable que promueva tanto el rendimiento académico como el bienestar emocional de los estudiantes.
Palabras clave: Adopción de Inteligencia Artificial. Utilidad percibida. Creatividad. Felicidad. Educación universitaria.

RESUMO
Objetivo: Este artigo tem como objetivo explorar o efeito da adaptabilidade percebida, utilidade percebida e facilidade de uso da IA na criatividade e bem-estar (felicidade) dos estudantes de negócios em universidades do México. Além disso, busca analisar como essas relações podem diferir entre estudantes de universidades públicas e privadas, utilizando uma abordagem multigrupo.
Método: Foi adotada uma abordagem quantitativa não experimental, com um desenho transversal. A amostra incluiu 270 estudantes universitários de cursos de negócios, distribuídos entre uma universidade pública e uma privada no México. A coleta de dados foi realizada por meio de um questionário online, utilizando escalas previamente validadas para medir a utilidade percebida, facilidade de uso, adoção de IA, criatividade e felicidade. Os dados foram analisados utilizando modelagem de equações estruturais (SEM) e análise multigrupo (MGA) para avaliar as diferenças entre os grupos.
Resultados: Os principais resultados indicam que a adoção de IA medeia significativamente a relação entre a utilidade percebida, a facilidade de uso percebida e os resultados em termos de criatividade e bem-estar. A adoção de IA teve uma influência maior na criatividade nas instituições públicas, enquanto nas privadas o impacto foi mais forte sobre a felicidade. Essas diferenças sugerem que, em contextos com recursos limitados, a IA pode compensar a falta de outros recursos, potencializando a criatividade.
Conclusão: Este estudo contribui para a ampliação do Modelo de Aceitação de Tecnologia (TAM), ao incluir variáveis como criatividade e felicidade, destacando a importância do contexto socioeconômico na adoção de tecnologias nas universidades. As implicações sugerem que as instituições públicas devem se concentrar em melhorar o acesso a tecnologias como a IA, enquanto as instituições privadas devem garantir um uso ético e responsável que promova tanto o desempenho acadêmico quanto o bem-estar emocional dos estudantes.
Palavras-chave: Adoção de IA. Utilidade percebida. Criatividade. Felicidade. Educação superior.

1 INTRODUCTION

The Fourth Industrial Revolution, commonly known as Industry 4.0, has radically reconfigured production and organisational processes across practically all spheres of society (Ghobakhloo, 2019). Grounded in automation, the Internet of Things (IoT), Artificial Intelligence (AI), and robotics, this industrial revolution has established new paradigms of efficiency and connectivity, transforming the industrial and social landscape (Mahmood & Mubarik, 2020). However, as technologies continue to evolve, Industry 5.0 emerges as a new phase of transformation, where the human factor is once again taking center stage through interaction with emerging technologies (Brunetti et al., 2022). Thus, this new stage seeks a more harmonious collaboration between humans and machines, striving for a balance between automation and human creativity (Ghobakhloo et al., 2023).

In this scenario of technological transformation and adoption, higher education has not been immune to the profound changes driven by these advances (Núñez-Canal et al., 2021). Over the past decades, educational institutions have faced the challenge of

transforming their pedagogical approaches and methodologies to prepare students for a working and social environment increasingly shaped by digitalisation, automation and the use of technological tools (Bitar; Davidovich, 2024). Traditional methodologies, which in many cases still prevail, have been challenged by the advent of new tools and emerging technologies, such as generative artificial intelligence (Liu et al., 2023). These technologies have the potential to redefine not only teaching processes but also the overall learning experience (Bahroun et al., 2023).

On the one hand, for both public and private educational institutions, the adoption of these technologies implies a reconfiguration of their academic and methodological offerings (Gallagher & Breines, 2020). On the other hand, students, particularly those in business studies, must develop not only technical but also creative and adaptive skills, enabling them to navigate a constantly evolving environment (Morris; König, 2020). However, this transformation process presents significant challenges, especially in relation to students' perceptions and attitudes towards different tools, such as AI (Chounta et al., 2021). From this, factors such as perceived usefulness, ease of use and adoption of these technologies play a central role in the integration of AI into their learning process (Wang et al., 2021).

In line with the above, although technological advancements have permeated both public and private higher education systems, there are substantial differences between them (De Mello Silva; De Vargas, 2021). According to Okoye et al. (2022), public institutions in many cases, face resource constraints that may slow the adoption of emerging technologies, while private institutions tend to have more flexibility to implementing pedagogical and technological innovations. Thus, these disparities create a gap in the way students from public and private universities perceive and use emerging technologies, including AI (Rodríguez-Abitia et al., 2020). Specifically, when reviewing the existing literature, there is a lack of empirical research analysing the impact of AI use on key aspects such as creativity and student happiness in these differentiated contexts (Wang et al., 2022).

In this regard, a significant gap in the literature emerges: although studies explore the impact of AI in various educational domains, few have delved deeply into its relationship with student creativity and happiness, particularly in higher education contexts in emerging countries like Mexico (Ivanov et al., 2024). The exploration of these variables is crucial, as creativity is shaping up to be an indispensable skill in the Industry 5.0 era, and happiness, understood as subjective well-being, is a key factor for academic and professional success (Salvadorinho & Teixeira, 2023). Therefore, understanding how the use of AI influences

these factors could provide practical tools to design pedagogical strategies that not only foster innovation, but also promote students' holistic well-being.

Based on the above, the present research aims to explore the effect of perceived usefulness, perceived ease of use and adoption of AI on the creativity and happiness of business students. Additionally, it will analyse how these relationships may differ between public and private universities in Mexico, using a multi-group approach. Furthermore, this study is intended as a key contribution to address the gaps identified in the literature, providing empirical evidence to enrich the understanding of the impact of AI use on students and serve as a basis for future research in emerging contexts.

Finally, the structure of this article is organised as follows. First, a literature review is presented on student creativity and happiness, and the adoption of AI in higher education. Then, the methodologies used for the multi-group analysis are described, followed by the results obtained. Subsequently, the findings are discussed, highlighting the implications for educational institutions and the differences between public and private systems. Finally, the study's conclusions and recommendations for future research are presented.

2 LITERATURE REVIEW

2.1 Creativity

Creativity is an essential foundation in contemporary education, as it fosters students' ability to generate novel and efficient solutions in various academic contexts (Calavia et al., 2020). In this context, where emerging technologies are reshaping labour and social dynamics, creativity has become an indispensable skill for the holistic development of students (Thornhill-Miller et al., 2023). This ability not only promotes innovation but also contributes to a deeper and more critical understanding of problems, facilitating the generation of multidimensional solutions (Amiri et al., 2020). In addition, creativity encompasses aspects such as divergent thinking, originality, and flexibility, which allow students to adopt a more adaptive mindset, open to new ideas in the educational environment (Haim; Aschauer, 2024).

Recently, the relevance of investigating creativity in the academic sphere has become undeniable. Technological advancements and the growing importance of soft skills in the labour market have led educational institutions to reconfigure their pedagogical approaches, prioritising the development of creative competencies (Goulart et al., 2021). In this sense, creativity is seen as a strategic tool to enhance not only academic performance but also

student well-being, highlighting its importance in both personal and professional spheres (Anderson et al., 2021).

Based on these premises, the relationship between student creativity and happiness has been the subject of various investigations, revealing mixed results. For instance, a study conducted in Malaysia by Tan et al. (2019) with a sample of 1,146 university students concluded that creativity promotes student happiness. In contrast, a study carried out in Yogyakarta by Diponegoro and Hanurawan (2022), in Indonesia during the COVID-19 pandemic, showed opposite results. They found that the stress generated by remote learning modalities negatively affected students' perception of happiness, and although students continued to use their creative skills, these did not significantly impact their well-being.

Moreover, the relationship between student creativity and the adoption of AI tools has been analysed, revealing a positive relationship in some contexts. An example of this is a study by Amiri et al. (2020) in Iran, with 720 medical students, which demonstrated that those who adapted better to AI tools exhibited higher levels of creativity. However, another study conducted in Spain by Álvarez-Huerta et al. (2021), with university students, presented a more critical view. The findings revealed that excessive reliance on AI-based technologies, rather than fostering creativity, could inhibit divergent thinking, as students tended to follow predefined solutions offered by technology instead of generating original ideas.

Finally, the perceived usefulness and ease of use of AI are two components that influence student creativity. In South Korea, Kim (2022), in a study with 526 students, observed that those who perceived AI as a useful and easy-to-use tool showed a significant improvement in their levels of creativity. The integration of AI in the educational environment allowed students to explore new ways of solving problems and expand their creative capacity. Nonetheless, a study conducted by Casinillo (2022) in the Philippines revealed that, although students acknowledged the ease of use of AI, this did not always translate into an increase in their creativity.

2.2 Happiness or Subjective Well-being

Happiness or well-being among students has become a significant area of focus in contemporary academic research due to its influence on academic performance and personal development (Kaya; Erdem, 2021). Happiness, also referred to as subjective well-being, refers to an individual's evaluation of their overall satisfaction and emotional well-being, including factors such as mood, life satisfaction, and positive emotions (Diener, 2000). This factor is considered fundamental for academic success and emotional balance within the

educational context (Zhang et al., 2022). In an environment where academic demands and technological challenges are increasingly rigorous, studying how happiness influences students' adaptation and performance has become vital for the development of effective educational policies (Benevene et al., 2020).

In light of these findings, interest in student happiness has grown exponentially in global academia (Skrzypiec et al., 2024). In recent years, researchers and educators have recognised that students' emotional well-being not only impacts their academic performance but also their ability to adapt to new learning environments, such as the emerging use of AI-based technologies (Dai et al., 2020). Additionally, the growing academic pressure and challenges of online education, especially during the COVID-19 pandemic, have highlighted the importance of fostering an educational environment that supports emotional well-being alongside learning (Stockinger et al., 2021).

Regarding the perceived adaptability of AI and student happiness, a study conducted in Germany by Stockinger et al. (2021) with a sample of 89 university students during the COVID-19 pandemic revealed that students' adaptability was positively correlated with positive academic emotions, such as hope, and negatively correlated with emotions like anxiety and despair. Conversely, a study by Solekhah (2021) in Indonesia, involving 111 secondary students, showed that although students adapted to online learning, most reported negative emotions such as boredom and loneliness, which negatively affected their happiness during the distance learning process. Furthermore, the literature highlights that improving communication dynamics and emotional support can have a positive impact on student well-being, reinforcing the importance of technological tools that foster a healthy emotional learning environment (Salazar Altamirano et al., 2024).

Similarly, associations have been found between perceived usefulness of AI and perceived ease of use, which also influence happiness. Evidence of this comes from a study conducted in Turkey by Öztemel and Yıldız-Akyol (2019) with 525 university students, which revealed that those who perceived AI as a useful and easy-to-use tool reported higher levels of happiness and greater adaptability to their future careers. However, a study by Zheng et al. (2022) in Hong Kong, conducted with 781 primary school students, showed contradictory results. Although some students valued the usefulness of online learning tools, less than half of the students were satisfied with the effectiveness of online learning, which negatively impacted their emotional well-being. This suggests that the perception of AI's ease of use and

usefulness can have a variable impact on student happiness, influenced by contextual factors such as age, educational sector, and prior experience with technology.

2.3 AI Adoption

The adoption of artificial intelligence (AI) refers to the process through which individuals and organisations integrate AI-based technologies to enhance their performance and efficiency (Wamba-Taguimdje et al., 2020). This concept has been primarily studied through models such as the Technology Acceptance Model (TAM), which highlights perceived usefulness and ease of use as key factors in the acceptance of new technologies (Kim et al., 2023). In this context, the adoption of AI not only transforms operational environments but also introduces new forms of interaction between humans and machines, which highlights the importance of its analysis in different sectors (Javaid et al., 2022).

In this line, the significance of researching AI adoption lies in its cross-sectoral impact on industries such as education, healthcare, and finance (Zahlan et al., 2023). In academia, understanding the factors that drive AI adoption is crucial for designing strategies that promote its effective use (Chatterjee & Bhattacharjee, 2020). According to Pillai and Sivathanu (2020) in their systematic review, most empirical research shows that both perceived ease of use and usefulness are determinants for AI acceptance, emphasising the need to create environments that facilitate its integration.

Based on the above, a study conducted by Damerji and Salimi (2021) in Canada, focusing on accounting students, demonstrated that perceived usefulness and ease of use directly influence AI adoption among university students. The study found that technological preparedness was crucial for adoption, and that both usefulness and ease of use mediated this relationship. However, another study in Malaysia by Rahman et al. (2021), examining AI usage in the banking sector among students, found that while perceived usefulness influenced adoption, ease of use had no significant impact. This underscores the importance of context in shaping how these factors are perceived.

2.4 Perceived Usefulness of AI

Perceived usefulness, in this case of artificial intelligence (AI), is defined as the users' perception of the benefits that this technology can bring in terms of productivity, efficiency, and improved decision-making (Cao et al., 2021). This concept is also central to models such as the Technology Acceptance Model (TAM), which posits that perceived usefulness is one of the key factors driving the adoption of new technologies (Kim et al., 2021). In this regard,

Al-Sharafi et al. (2022) suggest that perceived usefulness is closely linked to user happiness and their intention to continue using AI, particularly in educational and workplace environments.

In the current context, studying the perceived usefulness of AI is important, as this technology is rapidly revolutionising various sectors, especially education (Okunlaya et al., 2022). Due to its ability to analyze large volumes of data and automate processes, AI has driven its widespread adoption in several areas (Ribeiro et al., 2021). For this reason, understanding how users perceive its usefulness is critical for enhancing operations in areas such as healthcare, education, and financial services, where AI is increasingly implemented to improve decision-making processes (Kar; Kushwaha, 2021; Leddy; McCreanor, 2024). In higher education, for example, the growing use of advanced technologies is reshaping teaching and learning systems, providing students with personalised experiences and offering educators new forms of evaluation (Alamri et al., 2020).

In this regard, an empirical study conducted at Partium Christian University in Romania by Ardelean and Veres (2023) explored students' perceptions of AI among a sample of 222 students. The results showed that most students viewed AI as a useful tool for enhancing learning, particularly in content personalisation and administrative assistance. However, some students expressed concerns about its effect on areas such as assessment and admission processes. Conversely, a study by Holmes and Anastopoulou (2019) in the UK, involving distance education students, found that while AI was perceived as useful in improving the learning experience, some students felt overly reliant on the technology, which significantly reduced their motivation to engage with the content independently.

2.5 Perceived Ease of Use of AI

Perceived ease of use of AI in university contexts refers to the evaluation made by students and educators regarding how easy it is to use artificial intelligence tools in the teaching and learning process (Darayseh, 2023). This concept holds significant value within the Technology Acceptance Model (TAM), which suggests that technology is more readily accepted when users perceive it as easy to manage (Gado et al., 2021). In the university setting, perceived ease of use is a critical parameter for the adoption of AI, as a positive user experience can facilitate the integration of these technologies into academic environments, thereby promoting more dynamic and personalised learning (Darayseh, 2023).

2.6 Mediation and the TAM Model

The justification for the mediation of variables such as AI adoption, perceived usefulness, and perceived ease of use within the framework of the Technology Acceptance Model (TAM) is particularly relevant in the university context, especially when considering business students in Mexico. In this framework, it is essential to break down how perceptions of these variables may differ between students from public and private universities, given that technological opportunities and available resources often vary significantly between these sectors.

The TAM, traditionally used to predict technological adoption, posits that perceived usefulness (the belief that a technology will enhance performance) and perceived ease of use (the perception that the technology is easy to use) are key determinants of the adoption of technologies such as AI (Davis, 1989). By incorporating variables such as creativity and happiness into this model, and given that the model mediates these relationships, the intention is to expand its explanatory capacity to consider not only the factors that facilitate technological acceptance but also the effects these technologies may have on students' emotional well-being and creative abilities.

In this context, the differences between public and private sectors regarding access to AI tools among business students in Mexico can significantly influence the adoption and perceived usefulness of these technologies (Wang et al., 2021). In private universities, where technological resources tend to be more abundant, students may perceive AI as a highly useful and easy-to-use tool, facilitating its adoption (Gado et al., 2021). This, in turn, could enhance their creativity by allowing them to explore new problem-solving methods and improve their happiness by reducing stress related to the complexity of academic tasks. On the other hand, in public universities, where technological resources may be more limited, the perceived ease of use and usefulness of AI might be lower, hindering adoption and, consequently, reducing its positive impact on creativity and student well-being (Damerji; Salimi, 2021).

In this challenging environment, incorporating these variables into the TAM within a Mexican context provides a valuable contribution to the model, as it highlights the importance of considering not only traditional technological factors but also the emotional and creative elements that influence learning. Additionally, it allows for the examination of possible structural differences between public and private university students, which may explain variations in the adoption and use of AI-based technologies.

An illustrative case is the research by Chatterjee and Bhattacharjee (2020), which explored how AI adoption in higher education could improve teaching, learning, and governance in Indian institutions. Through a model based on the "Unified Theory of Acceptance and Use of Technology" (UTAUT), derived from the TAM model, this study evaluated students' and faculty members' perceptions of AI's perceived usefulness and ease of use. With a sample of 329 participants, the findings indicated that perceived usefulness and ease of use were significant factors facilitating AI adoption. However, the study also highlighted that these factors could vary depending on the educational context, aligning with the need to analyse how AI can influence aspects such as creativity and happiness in business students in Mexico, distinguishing between public and private institutions.

In this way, the TAM could be strengthened by including creativity and happiness, which allow for an exploration of how AI not only facilitates learning but also impacts the personal and emotional development of business students. This analysis is particularly relevant in Mexico, where inequalities in access to technology between public and private institutions can significantly influence the educational experience (Rodríguez-Abitia et al., 2020). By exploring these differences, this study aims to provide a more robust foundation for designing educational policies that promote more equitable AI adoption, maximising its benefits both in terms of academic performance and overall student well-being, especially in the context of emerging countries.

Based on these arguments, the following hypotheses are proposed to unravel the synergies between AI adoption, perceived usefulness of AI, perceived ease of use of AI, happiness, and creativity, as well as the possible differences between public and private university students:

H1: The ease of use of AI has a positive and significant effect on AI adoption among business students in Mexico.

H2: The perceived usefulness of AI has a positive and significant effect on the perceived usefulness of AI among business students in Mexico.

H3: AI adoption has a positive and significant effect on the creativity of business students in Mexico.

H4: AI adoption has a positive and significant effect on the happiness of business students in Mexico.

H5: AI adoption mediates the relationship between perceived usefulness of AI and creativity among business students in Mexico.

H6: AI adoption mediates the relationship between perceived usefulness of AI and happiness among business students in Mexico.

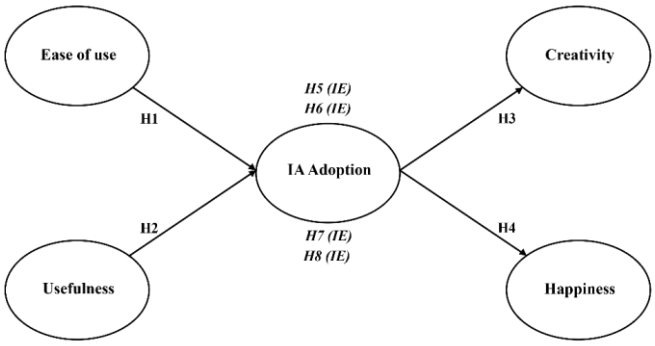
H7: AI adoption mediates the relationship between ease of use of AI and creativity among business students in Mexico.

H8: AI adoption mediates the relationship between ease of use of AI and happiness among business students in Mexico.

H9: There are differences in the relationships between perceived usefulness of AI, ease of use of AI, AI adoption, creativity, and happiness among business students in Mexico between public and private universities.

The theoretical model associated with these hypotheses is shown in Figure 1.

Figure 1. Proposed theoretical model.



Source: Own elaboration, 2024

3 METHODOLOGY

3.1 Participants and Procedure

The present study adopted a quantitative, non-experimental, cross-sectional design aimed at analysing the relationship between ease of use, perceived usefulness, AI adoption, creativity, and happiness. Data collection was carried out through an online questionnaire administered to a sample of 270 undergraduate business students from one public and one private university. The data were collected during September 2024, using a non-probability sampling technique.

In terms of demographics, 61.11% of the participants identified as female, 37.04% as male, and 1.85% selected "Other". Regarding marital status, 90% reported being single, 5.56% were married, and 4.44% were living in a domestic partnership. Concerning the type

of institution, 71.85% of the participants attended a public university, while 28.15% were from a private university. Additionally, 61.85% of the respondents combined their studies with employment, whereas 38.15% were dedicated exclusively to studying. The participants' ages ranged from 18 to 54 years, with an average age of 21.12 years and a standard deviation of 3.54. The full details of the sample composition are presented in Table 1.

Table 1. Descriptive data

Variable	Options	Frecuency	Percentage
Sex	Female	165	61.11%
	Male	100	37.04%
	Other	5	1.85%
Marital status	Single	243	90.00%
	Married	15	5.56%
	Cohabiting	12	4.44%
Type of institution	Public	194	71.85%
	Private	76	28.15%
Employment status	Studying and working	167	61.85%
	Only studying	103	38.15%
Variable	**Limits**	**Mean**	**Standard deviation**
Age	18 a 54 years	21.12	3.54

Source: Own elaboration, 2024

3.2 Instruments

The data collection instrument consisted of a questionnaire adapted from scales previously validated in scientific literature. Perceived usefulness was measured using five items based on Davies' (1989) proposal, while ease of use was assessed through five items following Venkatesh's (2000) perspective. AI adoption was measured using three items in line with Ajzen's (1991) recommendations. Additionally, happiness was evaluated using three items adapted from the concepts introduced by Shetu et al. (2021). Finally, creativity was measured through a student-adapted scale, using eight indicators from Zhou and George (2001), as adapted in Ayob et al. (2021) study. All items were measured using a five-point Likert scale, where 1 indicated "Strongly disagree" and 5 indicated "Strongly agree."

3.3 Data Analysis Technique

In this research, Jamovi software, version 2.3.28, was used to analyse the relationships between the variables of ease of use, perceived usefulness, AI adoption, creativity, and happiness. The analysis began with a univariate exploration of the variables,

calculating measures of central tendency such as the mean and standard deviation, as well as assessing skewness and kurtosis to verify the internal consistency of the items. Next, an exploratory factor analysis was conducted, and the reliability of the instrument was evaluated.

Subsequently, Structural Equation Modelling (SEM) was applied using the PLS-SEM approach, which allowed for the validation of the proposed model and the examination of the relationships between the variables. Finally, a multi-group analysis (MGA) was performed to explore differences between students from public and private institutions, to identify variations in the effects of the variables across both educational contexts, following the methodology recommended by Homburg et al. (2021).

4 RESULTS AND DISCUSSION

4.1 Exploratory Factor Analysis (EFA)

To assess the validity and reliability of the constructs under study, an exploratory factor analysis (EFA) was performed, as shown in Table 2. The results indicated correlations between the items, with values ranging from 0.514 to 0.826, reflecting significant and high associations ($p<0.001$), supporting the validity of the constructs analysed. Additionally, the communalities of the items ranged from 0.512 to 0.873, showing adequate levels across all variables. The KMO test produced values above 0.7 in all dimensions, confirming acceptable sampling adequacy for factor analysis. Notably, the highest values were recorded in creativity (0.891) and ease of use (0.870), indicating excellent suitability for the analysis, according to Kaiser's standards (1974).

Furthermore, Bartlett's test of sphericity was significant for all variables ($p<0.001$), suggesting that the correlations between the items are sufficiently large for factor analysis. The explained variance exceeded 69% across all variables, reaching up to 84.76% in happiness, indicating that the selected items adequately capture the variability of the constructs, consistent with the recommendations by Hair et al. (2014). These results validate the relevance of the instrument for measuring the variables of interest in this study.

Table 2. Exploratory Factor Analysis

Variable	Ease of use	Usefulness	IA adoption	Happiness	Creativity
Correlations between items	0.514 < - > 0.781	0.500 < - > 0.785	0.594 < - > 0.723	0.737 < - > 0.826	0.517 < - > 0.819
Leve lof correlations	Alta	Alta	Alta	Alta	Alta
Significance	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001

Communalities	0.512 < - > 0.812	0.575 < - > 0.785	0.701 < - > 0.805	0.806 < - > 0.873	0.600 < - > 0.770
Level of communalities	Adecuadas	Adecuadas	Adecuadas	Adecuadas	Adecuadas
KMO Test	0.870	0.84	0.713	0.745	0.891
Barlett´s Test	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001
Total variance explicated	72.77%	71.22%	76.39%	84.76%	69.58%

Source: Own elaboration, 2024

4.2 Structural Equation Modelling

The analysis process began with the validation of the constructs, followed by an assessment of the model fit using Jamovi software. Subsequently, a multi-group analysis was conducted to compare the relationships between ease of use, perceived usefulness, AI adoption, creativity, and happiness among students from public and private institutions. This approach enabled a thorough examination of the interactions between variables, while identifying significant differences between the two types of institutions. These findings provide a solid foundation for interpreting the results, contributing to a deeper understanding of the dynamics between the groups, which is crucial for comparative studies in heterogeneous educational contexts.

4.2.1 Convergent and Discriminant Validity

The analysis of convergent validity was evaluated using three key indicators: Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE), for both the entire sample and the separate groups of students from public and private institutions (see Table 3). The results show that Cronbach's alpha for all constructs ranges from 0.842 to 0.915 in the full sample, suggesting good internal consistency, with similarly high values for the separate groups (public and private). This indicates that the items composing each construct are reliable and consistent. According to Hair et al. (2014), Cronbach's alpha values above 0.7 indicate adequate internal consistency, which is met in all cases.

Moreover, the composite reliability values exceeded 0.8 in all cases, confirming the reliability of the instrument. Additionally, the AVE values were above 0.5 for all variables, indicating adequate convergent validity, as more than 50% of the variance in the items is explained by their respective constructs. These results are within the recommended ranges for convergent validity, as outlined by Hair et al. (2014), supporting the suitability of the instrument for measuring the constructs among students from public and private institutions.

Table 3. Convergent Validity

	Cronbach´s Alpha			Composite Reliability			AVE		
	Full sample	Public	Private	Full sample	Public	Private	Full sample	Public	Private
Ease of use	0.896	0.899	0.872	0.896	0.944	0.925	0.742	0.749	0.703
Usefulness	0.904	0.896	0.920	0.904	0.941	0.926	0.760	0.743	0.796
IA adoption	0.842	0.849	0.809	0.812	0.889	0.857	0.597	0.606	0.552
Creativity	0.915	0.914	0.915	0.909	0.951	0.937	0.665	0.666	0.642
Happiness	0.910	0.916	0.894	0.912	0.955	0.941	0.775	0.787	0.748

Source: Own elaboration, 2024

Table 4 presents the results of the discriminant validity analysis using the HTMT (Heterotrait-Monotrait Ratio) criterion, comparing the constructs of ease of use, perceived usefulness, AI adoption, creativity, and happiness. The HTMT values obtained are within the acceptable ranges, with a maximum of 0.781 between happiness and AI adoption, which is below the recommended threshold of 0.85 proposed by Henseler et al. (2015) for establishing adequate discriminant validity. This analysis confirms that the constructs are sufficiently distinct from one another and do not exhibit collinearity issues.

Table 4. Discriminant Validity

	HTMT criterion				
	1	2	3	4	5
1 Ease of use					
2 Usefulness	0.580				
3 IA adoption	0.744	0.762			
4 Creativity	0.603	0.539	0.606		
5 Happiness	0.474	0.673	0.781	0.419	

Source: Own elaboration, 2024

4.2.2 Model Fit Indicators

The model fit indices, both for the full sample and for the multi-group analysis (MGA), are presented in Table 5. Regarding the global fit, the CMIN/DF values are acceptable, although the p-value is marginal (<0.05). On the other hand, the SRMR and RMSEA indicators are within the recommended ranges (0.05 < and > 0.08), with values ranging between 0.056 and 0.071, indicating a good residual fit. In terms of incremental fit, the CFI, IFI, and TLI values exceed the 0.900 threshold, suggesting that the model adequately explains the observed relationships in the data. Finally, the PGFI parsimonious fit index is also acceptable, with values within the recommended ranges, supporting the model's simplicity and efficiency.

According to Hair et al. (2014), these values are within the acceptable levels for structural equation models (SEM).

Table 5. Model Fit

Type of fit	Fit measure	Acceptance level	Full sample	MGA	Acceptability
Absolute or o global	CMIN	CMIN = double of DF	239	368	Acceptable
	P value	> 0.05	0.000	0.000	Marginal
	SRMR	0.05 < y> 0.08	0.056	0.060	Acceptable
	RMSEA	0.05 < y> 0.08	0.066	0.071	Acceptable
Incremental	CFI	> 0.900	0.964	0.959	Acceptable
	IFI	> 0.900	0.965	0.960	Acceptable
	TLI	> 0.900	0.956	0.950	Acceptable
Parsimony	PGFI	0.5 < y > 0.7	0.634	0.630	Acceptable

Source: Own elaboration, 2024

4.3 Multi-group Analysis

For the multi-group analysis, measurement invariance was first evaluated between students from public and private institutions to ensure that the constructs were comparable across both groups. Subsequently, hypothesis testing was conducted, which allowed for an examination of the proposed relationships within each group, providing a solid foundation for interpreting the observed differences.

4.3.1 Invariance Analysis

The results of the invariance analysis conducted using Jamovi show that the differences between the configural, metric, and scalar models are minimal, suggesting that the imposed constraints do not significantly affect the model fit (see Table 6). The comparative fit index (CFI) remains stable (0.954 and 0.953), confirming that both metric and scalar invariance hold adequately, as a difference of less than 0.01 is considered acceptable (Yuan & Chan, 2016). Additionally, the root mean square error of approximation (RMSEA) shows a slight decrease (from 0.075 to 0.072), while the standardised root mean square residual (SRMR) remains below 0.08, reflecting a good model fit (Liang et al., 2018). Moreover, the values of the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) decrease, indicating that models with additional constraints are more parsimonious without compromising the quality of the fit (Khine, 2013).

Table 6. Fit Indices for Invariance Models

Model	X^2	ΔX^2	CFI	ΔCFI	RMSEA	ΔRMSEA	SRMR	AIC	BIC
Configural	384		0.954		0.075		0.060	9823.792	10251.534
Metric	398	-14	0.953	0.001	0.074	0.001	0.067	9814.621	10199.589
Scalar	410	-12	0.953	0	0.072	0.002	0.068	9801.816	10144.01

Source: Own elaboration, 2024

4.3.2 Hypothesis Testing

As shown in Table 7, the direct effects reveal significant relationships between the proposed variables. For H1, the relationship between ease of use and AI adoption shows positive and significant coefficients in the total sample (β = 0.327; p < 0.001), among students from public institutions (β = 0.300; p < 0.001), and private institutions (β = 0.439; p < 0.001), with a moderate difference between both groups (Δ = -0.139). For H2, the relationship between perceived usefulness and AI adoption is significant in the total sample (β = 0.470; p < 0.001), among public institution students (β = 0.486; p < 0.001), and private institution students (β = 0.427; p < 0.001), with a difference of Δ = 0.059. For H3, the relationship between AI adoption and creativity is stronger among public institution students (β = 0.641; p < 0.001) compared to private institution students (β = 0.359; p < 0.01), with a notable difference of Δ = 0.282. In H4, the relationship between AI adoption and happiness is significant in the total sample (β = 1.063; p < 0.001), among public institutions (β = 1.048; p < 0.001), and private institutions (β = 1.185; p < 0.001), with a difference of Δ = -0.137.

Regarding indirect effects, H5 indicates that the mediated relationship between ease of use and creativity through AI adoption is significant in the total sample (β = 0.189; p < 0.001), among public institutions (β = 0.192; p < 0.001), and private institutions (β = 0.158; p < 0.01), with a difference of Δ = 0.034. For H6, the mediation of perceived usefulness on creativity is stronger among public institution students (β = 0.312; p < 0.001) than private institution students (β = 0.153; p < 0.05), and also significant in the total sample (β = 0.272; p < 0.001), with a difference of Δ = 0.159. Regarding H7, the mediated relationship between ease of use and happiness through AI adoption is stronger among private institution students (β = 0.520; p < 0.001) compared to public institution students (β = 0.315; p < 0.001), and in the total sample (β = 0.347; p < 0.001), with a difference of Δ = -0.205. Finally, in H8, the mediation of perceived usefulness on happiness through AI adoption is significant in the total sample (β = 0.499; p < 0.001), among public institutions (β = 0.510; p < 0.001), and private institutions (β = 0.505; p < 0.001), with a minimal difference of Δ = 0.005.

Table 7. Hypothesis Testing

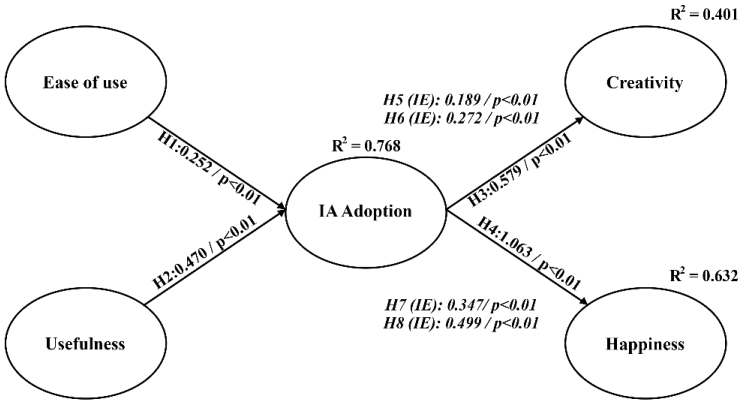
Direct effects							
Hypothesis	**Variables**				**Full sample**	**Public**	**Private**	**MGA Difference**
H1	ADP	<---	FAC		0.327	0.300	0.439	-0.139
H2	ADP	<---	UTP		0.470	0.486	0.427	0.059
H3	CRE	<---	ADP		0.579	0.641	0.359	0.282
H4	FEL	<---	ADP		1.063	1.048	1.185	-0.137
Indirects effects								
H5	CRE	<---	ADP	<--- FAC	0.189	0.192	0.158	0.034
H6	CRE	<---	ADP	<--- UTP	0.272	0.312	0.153	0.159
H7	FEL	<---	ADP	<--- FAC	0.347	0.315	0.520	-0.205
H8	FEL	<---	ADP	<--- UTP	0.499	0.510	0.505	0.005

Source: Own elaboration, 2024

Figure 2 presents the structural model developed for the analysis of the entire sample of business students, illustrating the relationships between the variables of ease of use, perceived usefulness, AI adoption, creativity, and happiness. The arrows in the model represent both direct and indirect effects between the proposed variables, highlighting the influence of AI adoption as a mediating variable in the indirect relationships between ease of use and perceived usefulness with creativity and happiness.

The R^2 values obtained for AI adoption (R^2 = 0.768), creativity (R^2 = 0.401), and happiness (R^2 = 0.632) indicate that the model explains a considerable proportion of the variability in each of these variables. According to the interpretation criteria for R^2 in social sciences, established by Chin (1998), values between 0.33 and 0.67 are considered moderate, while those above 0.67 are considered high. Based on these parameters, the results suggest that the proposed model exhibits an adequate fit.

Figure 2. Structural Model (Total Sample)



Source: Own elaboration, 2024

5 DISCUSSION

The results of this study largely confirm previous findings on the adoption of artificial intelligence (AI) in educational contexts, with differentiated implications between students from public and private institutions. Firstly, the significant relationship between ease of use and AI adoption (H1) in both types of institutions aligns with the literature, which highlights the importance of ease of use in technological acceptance (Davis, 1989; Gado et al., 2021). However, the fact that this relationship is stronger among students from private institutions ($\beta = 0.439$) suggests that access to better technological resources in these institutions may facilitate greater AI adoption. This difference in technological access between public and private institutions, as discussed by Rodríguez-Abitia et al. (2020), could explain the variations in coefficients between both groups.

On the other hand, the findings from H2 show that perceived usefulness also significantly influences AI adoption in both public and private institutions, confirming its central role in the acceptance of new technologies (Kim et al., 2021). The slight difference observed between the two groups ($\Delta = 0.059$) suggests that, regardless of the type of institution, students similarly value the usefulness of AI when they recognise the benefits it can offer to their learning. This result is consistent with previous research that highlights the importance of perceived usefulness in the technological adoption process (Pillai; Sivathanu, 2020).

Regarding creativity, the H3 results suggest that AI adoption has a greater impact on public institution students ($\beta = 0.641$) compared to private institution students ($\beta = 0.359$). This finding is significant as it partially contradicts studies like that of Álvarez-Huerta et al. (2021), which found that a greater dependence on AI could inhibit creativity. In this scenario, AI's ability to compensate for the lack of other educational resources seems to foster a more creative environment in public institutions, a phenomenon that deserves further investigation in future studies.

As for happiness, the H4 results reveal a strong relationship between AI adoption and students' subjective well-being in both types of institutions. These results are consistent with studies such as that of Öztemel; Yıldız-Akyol (2019), which highlighted that a positive perception of AI can increase students' satisfaction and happiness. The difference between public and private institutions ($\Delta = -0.137$) suggests that, while AI adoption significantly impacts student happiness, the institutional context may influence how this well-being is perceived and experienced.

Regarding indirect effects, the H5 and H6 results highlight that AI adoption significantly mediates the relationship between ease of use and creativity, and between perceived usefulness and creativity, especially in public institutions. This reinforces the idea that in contexts where technological resources are more limited, AI adoption may play a key role in stimulating student creativity (Amiri et al., 2020). The stronger mediation observed in public institutions for these relationships suggests that AI may be compensating for some technological deficiencies, which translates into a greater impact on creativity.

In terms of the effects on happiness, the H7 and H8 results indicate that AI adoption also mediates the relationships between ease of use and perceived usefulness with happiness, with this mediation being stronger in private institutions for the relationship between ease of use and happiness. This finding is consistent with previous studies suggesting that students who find it easier to use technology tend to experience higher levels of subjective well-being (Stockinger et al., 2021). The stronger mediation observed among private institution students could be related to the lower technological friction they face compared to public institution students, facilitating a more seamless and positive experience with AI.

6 CONCLUSIONS

The conclusions of this study confirm the prominent role of generative artificial intelligence (AI) in education, particularly in fostering student creativity and happiness among business students in Mexican universities. The research demonstrated that perceived ease of use and perceived usefulness of AI are strategic components for its adoption, and this adoption significantly mediates the relationship between the technology and students' emotional and creative outcomes. These findings are consistent with the Technology Acceptance Model (TAM), while also enriching it by integrating variables such as happiness and creativity in university contexts.

A key aspect of this study is the differentiation between the perceptions of students from public and private universities. While private institution students showed a greater willingness to adopt AI, driven by a higher perception of ease of use, public institution students experienced a greater impact of AI adoption on their creativity. This suggests that, in contexts where technological resources are limited, AI can compensate for deficiencies and promote creative development, which has important implications for educational policies.

Finally, this study makes a theoretical contribution by expanding the TAM, integrating emotional and creative variables, and highlighting the differences between educational sectors. On a practical level, the results suggest that public institutions should focus on improving access to technologies like AI, while private institutions should ensure responsible usage that promotes not only academic performance but also student well-being. Future studies could focus on evaluating the role of self-efficacy in AI adoption and how AI impacts students' emotional resilience in unequal educational contexts.

6.1 Theoretical Contributions

This study provides significant theoretical contributions to the field of technological acceptance in education by extending the Technology Acceptance Model (TAM) through the inclusion of psycho-emotional variables such as creativity and happiness. This extension of the model not only allows for the analysis of the adoption of technologies like AI in terms of perceived usefulness and ease of use but also evaluates how these technologies impact students' well-being and creative abilities. Furthermore, by considering the differences between public and private institutions, this study highlights the importance of the socio-economic context in technological adoption, adding a new dimension to the analysis of TAM in emerging educational environments.

6.2 Practical Implications

This study presents important practical implications for educational institutions integrating AI. For effective adoption, it is essential to ensure its ease of use and emphasise its usefulness in improving learning. Public universities should focus on improving access to technology, while private universities should ensure that AI usage also promotes students' emotional well-being. Additionally, both should foster ethical and responsible use, ensuring that AI respects privacy and avoids over-dependence. These recommendations can guide policies that ensure equitable and ethical adoption of AI in the educational environment.

6.3 Limitations and Future Research Directions

This study has some limitations that should be considered when interpreting the results. It focused on business students in Mexico, limiting generalisation to other contexts and disciplines. Additionally, factors such as cultural or socio-economic diversity that could influence AI adoption were not addressed. AI appears to foster a more creative environment

in public institutions, compensating for the lack of educational resources, an aspect that requires further research.

Future research could explore how AI can provide emotional support and its impact on student creativity and well-being. It would also be valuable to investigate students perceived self-efficacy in using AI and how this affects adoption and academic performance. Moreover, it would be important to study gender differences in AI adoption and its effect on creativity and well-being, offering a more inclusive perspective.

Another interesting avenue would be to investigate the use of the metaverse in combination with AI to create immersive and collaborative environments that promote group well-being and creativity, evaluating how these virtual spaces affect students' sense of belonging. Finally, exploring personalised learning paths based on AI that adapt to students' emotional state and creative needs, and how this influences their well-being and creativity, could be an exciting area of research.

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FINANCIAMENTO
Não se aplica.

CONSENTIMENTO DE USO DE IMAGEM
Não se aplica.

APROVAÇÃO DE COMITÊ DE ÉTICA EM PESQUISA
Não se aplica.

CONFLITO DE INTERESSES
Não se aplica.

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