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Impact of Education and Its Importance on e-Commerce Platforms Influencing College Students' Abilities and Performance-based Results

Ce Wang [1*], *Moon Hong Kim* [2]

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Abstract

A successful educational environment depends on excellent instruction. The learning of students and, thus, their performance, can be significantly improved by skilled and knowledgeable teachers who use engaging instructional tactics, offer clear explanations, provide constructive criticism, and foster a happy classroom environment. The study aims to comprehend how education and its value for e-commerce are affected by students' attitudes and performance, while also acknowledging the expanding significance of e-commerce platforms in today's digital economy. The study looks at performance, early perceptions of online learning, and attitudes to examine the relationship between intended behaviour, academic success, and the mediating effect of e-commerce adoption. SmartPLS is a useful tool for data analysis, but alternative statistical methods or supplementary analyses might be taken into consideration for future investigation. By utilizing longitudinal methods, expanding the sample size and diversity, and confirming the results across other cultural contexts, future research may be able to overcome these constraints. A multidimensional approach to the educational environment, the use of qualitative research methods, and the exploration of additional potential mediating and moderating variables would also help to advance our understanding of the complex relationship between education, e-commerce adoption, students attitudes, and the academic success of students. The study also investigates the educational environment's moderating impact on this relationship. The study's conclusions have applications for educational institutions, highlighting the necessity of enhancing the learning environment, encouraging e-commerce usage, and addressing misconceptions about online learning.

Keywords: Students Academic Performance; E-Commerce Adoption, Educational Environment; Students Attitudes; Students Online Learning; College Students

[1*] *Doctor, Business Administration (International Management), Woosong University, Daejeon, Korea, wangce199515@gmail.com*

[2] *Professor, Department of Railroad Management, Woosong University, Daejeon, Korea, mhkim@wsu.ac.kr*

Introduction

Education is incredibly important in determining a person's knowledge, abilities, and attitudes (Youssef et al., 2022). Understanding the influence of education and its significance on college students' views about studying online and their performance in relation to e-commerce is crucial given the rapid rise of educational platforms. This introduction lays the groundwork for investigating the connection between educational and e-commerce platforms and emphasizes the significance of researching this complex relationship (Dymek et al., 2023). If college students want to succeed in the digital economy, they must have a solid educational background (Iqbal et al., 2022). The ability to understand and use e-commerce platforms is a talent that education may give students, helping them to adapt and prosper in a world that is becoming more digital and networked. Students' perceptions of, willingness to utilize, and acceptance of online platforms are substantially influenced by their education, which has an effect on how they regard e-commerce (Mazana et al., 2020). Along with the growth of e-commerce, online learning platforms have also appeared, offering flexible and available educational possibilities. Online learning has grown in popularity, especially when it comes to e-commerce education, because it allows students to learn at their own pace and interact with e-commerce content (Aditya Suryawirawan, 2021). By incorporating e-commerce-related courses into the curriculum and utilizing online learning environments, teachers can help students better understand the concepts and practices of e-commerce. Understanding how education affects college students' attitudes, online learning, and performance is vital in the context of e-commerce. Researchers can gain insights into how education can affect students' views towards e-commerce, their involvement with online learning platforms, and ultimately their performance and readiness for the digital economy by looking at this relationship (Iqbal et al., 2022; Laksana, 2021).

Beyond the acquisition of technological skills, education has an impact on e-commerce platforms. It also includes the acquisition of critical soft skills, which are essential for success in the digital sphere (Hussein et al., 2020). Through educational experiences, students develop excellent communication, teamwork, adaptability, and leadership abilities that help them interact with consumers, work with peers, and adjust to changing market trends. Employers place a great value on these skills, which increase students' employability in the cutthroat job market (Xhelili et al., 2021).

Additionally, learning on e-commerce platforms gives college students a special chance to gauge their success and produce quantifiable outcomes. Students can evaluate the effectiveness of their plans, pinpoint areas for development, and tweak their methods to maximise results by using analytics and data-driven insights (Abdelrahman, 2020; Aditya Suryawirawan, 2021). This feedback loop improves their educational experience while also fostering a sense of responsibility and accountability for their activities. The capacity to assess performance encourages a growth attitude, motivating students to always seek innovation and progress in their work.

How students perceive and assess their experiences with online education is referred to as students' online learning perception (Laksana, 2021). It includes their attitudes, convictions, and viewpoints on the efficiency, practicality, engagement, and general excellence of online learning platforms and materials. The engagement, drive, and academic success of pupils can all be significantly impacted by attitudes. The term student performance relates to accomplishments and results in academic contexts. It includes their grades, test results, project completion rates, engagement in class, and overall curriculum comprehension. Performance is a gauge of how effectively students have retained and implemented the knowledge and skills they have been taught during their academic careers (Abuhassna et al., 2020).

Literature Review

Planned behaviour theory contends that attitudes towards e-commerce (such as perceived benefits and ease of use), subjective norms (such as the influence of friends, family, or social groups regarding e-commerce adoption), and perceived behavioural control (such as self-efficacy in using e-commerce platforms) can all affect people's intentions to adopt e-commerce (Aditya Suryawirawan, 2021). Higher adoption rates among students are possible as a result of positive

attitudes, subjective norms that favour e-commerce adoption, and a feeling of control over using it. Students' aspirations to engage in academic behaviours can affect how well they succeed (Alzahrani, 2019). According to TPB, students' intentions to engage in effective learning behaviours can be increased by having positive attitudes towards academic tasks, subjective norms that support academic engagement (such as encouragement from peers or teachers), and perceived behavioural control (such as confidence in one's ability to perform academically). Better performance outcomes are probably going to come from having higher intentions to work on academic assignments (Madigan & Curran, 2021). TPB can be used to better understand how students see online education. Students' intentions to participate in online learning can be influenced by their attitudes towards it, subjective norms that support its value (such as recommendations from peers or teachers), and perceived behavioural control (such as confidence in navigating online learning platforms) (Ramadhan et al., 2019). Positive intentions can improve students' engagement, satisfaction, and learning results while also fostering more favourable impressions of online education. TPB can be used to analyses students' attitudes in-depth. Students' intent to participate in learning activities can be increased by positive attitudes toward educational tasks, such as a conviction in the value of education, interest in the subject matter, and a sense of relevance and enjoyment. Positive attitudes are frequently linked to increased motivation, more effort, and better academic results. TPB acknowledges the impact of social and subjective norms in the educational setting. Positive expectations from parents, friends, and teachers are examples of supportive subjective norms that can have an impact on students' attitudes, intentions, and behaviours (Abdel-Basset, Manogaran, Mohamed, & Rushdy, 2019). Additionally, a good learning environment can increase students' perceived behavioural control, resulting in more positive intents and better academic performance. This environment should include high-quality teaching, resources that are accessible, a supportive school climate, and access to technology. According to TPB, intentions to engage in academic behaviours are the forerunners of actual academic behaviours and achievement and are impacted by attitudes, subjective standards, and perceived behavioural control. Higher academic performance intentions can result in more effort, engagement, and usage of efficient learning techniques, all of which have a favourable effect on students' academic success (Ramadhan et al., 2019).

Students' views towards e-commerce, subjective standards, and perceived behavioural control can all have an impact on their intents to use e-commerce platforms in China. College students' intentions to use e-commerce platforms may improve if they have favourable attitudes towards it and believe it to be efficient, convenient, and offer a large selection of products (Kanojiya, 2020). Their adoption intentions may also be influenced by subjective standards, such as the opinions of friends, family, and social circles who support online shopping. Students' intentions to adopt e-commerce can also be influenced by perceived behavioural control, such as self-efficacy in utilizing e-commerce platforms and familiarity with online buying. The use of e-commerce platforms may have an impact on how well pupils achieve (Sobaih et al., 2022). E-commerce gives students the chance to use online learning resources, buy textbooks, and access resources. By simplifying students' learning processes, assisting with research, and improving study productivity, efficient and quick access to resources can have a positive effect on students' academic achievement. Additionally, e-commerce platforms might include extra learning materials like online courses or educational apps, which can support in-class instruction and improve academic success. Empirical research and data analysis are required to fully comprehend the unique interactions in the setting of college students in China (Gustems-Carnicer et al., 2019).

Moreover, studying the influence of education on college students' attitudes, online learning, and performance in relation to e-commerce platforms can inform educational institutions, policymakers, and curriculum developers (Abuhassna et al., 2020). It can guide them in designing effective strategies to incorporate e-commerce education into curricula, provide adequate resources and support for online learning, and foster a positive educational environment that promotes students' success in the digital age (Madigan & Curran, 2021). Positive views towards e-commerce, such as its practicality, accessibility of resources, and possible advantages for online learning, may improve Chinese college students' intentions to use e-commerce platforms. Student adoption behaviour may also be influenced by subjective norms like peer pressure or teacher recommendations (Lakhal & Khechine, 2021). Additionally, students' adoption choices may be influenced by perceived behavioural control, including their comfort level with using e-commerce

platforms and their technological aptitude. Students' attitudes, opinions, and levels of satisfaction with participating in educational activities on online platforms are referred to as their impression of online learning (Chatterjee & Correia, 2020). Students' opinions of online learning may change as e-commerce platforms are adopted for this type of instruction. Positive opinions of online learning can include thinking of it as adaptable, available, interactive, and providing a variety of learning tools. Additionally, it might entail favourable assessments of online learning environments, high-caliber content, and interactions with peers and instructors (Wei & Chou, 2020). The freedom that online learning affords is valued by many students. They can access lectures and course materials whenever it is convenient for them, balancing their study with other responsibilities like employment, family, and extracurricular activities. Students can save time and money by forgoing the requirement to commute to school with online learning. Students who have mobility or transportation issues, they can study from the convenience of their homes or any location with internet access (Laksana, 2021; Xu et al., 2021).

Learning at your own speed is frequently possible with online courses. This can be helpful for those who like to read through content more slowly or who need more time to understand difficult ideas. For pupils who have trouble managing their time and their own discipline, though, it might be difficult (Al-Rahmi et al., 2021). Online platforms frequently offer a multitude of resources, including multimedia content, message forums, and online libraries. Beyond what might be possible in traditional classrooms, students can access a variety of materials and participate in online discussions with classmates (Youssef et al., 2022). It is now simpler for students to have personalised learning experiences thanks to the usage of e-commerce in education. Online platforms frequently include user-specific interactive features, customised learning paths, and adaptive learning methods. Prior studies have shown that e-commerce-enabled customised learning experiences can raise students' motivation, engagement, and subject-matter comprehension, which will benefit their academic development (Akour et al., 2022; Sarfraz et al., 2022). Students may now collaborate and learn together thanks to e-commerce platforms. Through online discussion boards, small-group activities, and shared materials, students can take part in collaborative learning activities outside of the traditional classroom (Iqbal et al., 2022).

E-commerce adoption is the process of integrating electronic commerce platforms and technologies into educational environments. This includes internet technologies including virtual classrooms, digital resources, and online learning platforms (Mazana et al., 2020). E-commerce is growing in popularity in the educational industry because it can provide accessibility, convenience, and flexibility in learning. It is of great interest to examine the relationship between e-commerce adoption and student academic attainment. E-commerce technology utilised in education may enhance students' learning outcomes, claim certain research (Namoun & Alshanqiti, 2021). Online resources, for instance, can provide users with access to a wide range of educational resources as well as customised learning possibilities and group learning. Several factors can affect the adoption of e-commerce technology in a learning environment. These include the availability of pertinent online materials, technological infrastructure, the digital literacy levels of students and teachers, institutional support, perceived utility, and usability (Octavia et al., 2020; Rastrollo-Guerrero et al., 2020).

The incorporation of online platforms and technologies for educational purposes is referred to as e-commerce adoption in education. The effectiveness of e-commerce adoption is significantly influenced by how students view online learning (Adams & Blair, 2019; Aditya Suryawirawan, 2021). Positive impressions, such as seeing online learning to be practical, adaptable, and participatory, can support students' motivation and engagement. The term "student attitude" describes how students feel about using e-commerce in the classroom generally. Positive attitudes can increase people's willingness to interact with online learning platforms and resources, such as the perception that e-commerce technologies are helpful, simple to use, and advantageous for learning (Ismaili, 2020). Adoption of e-commerce can affect students' performance by giving them access to a variety of educational resources, individualised learning possibilities, and collaborative chances. By effectively utilising e-commerce technology, students' knowledge, critical thinking, and problem-solving skills can be increased, raising academic accomplishment. This area of research examines the adoption of e-commerce, students' perceptions of online learning, their attitudes, their behaviour, their academic success, and the educational environment (Yusuf & Fajri, 2022). Researchers use quantitative and qualitative research methods to examine these variables

and how they interact. In order to increase students' academic accomplishment in a positive learning environment, researchers are exploring effective ways to employ e-commerce technologies (Ariansyah et al., 2021; Madigan & Kim, 2021).

Hypothesis Development and Conceptual Framework

The current study determines that impact of education and its importance on e-commerce platforms influencing college students' abilities and performance-based results. The current study established own planned behaviour theory. This theory refers as " that uses people's attitudes, arbitrary norms, and perceived behavioural control to explain and forecast human behaviour " (Youssef et al., 2022). According to above literature some hypothesis were developed.

1. E-commerce adoption plays the mediating role in students' performance and students' academic achievement.

2. E-commerce adoption plays the mediating role in students' online learning perception and students' academic achievement.

3. E-commerce adoption plays the mediating role in students' attitude and students' academic achievement.

4. E-commerce adoption has a significant impact on students' academic achievement.

5. Educational environment plays the moderating role in e-commerce adoption and students' academic achievement.

Methodology

This research was design on the basis of a deductive approach where quantitative research was used on the basis of primary data. This research is descriptive in nature and based on the hypotheses testing by collecting the data from the respondents. These respondents were, students of Chinese colleges, and data was collected by using the adapted questionnaire. The cross-sectional approach was used in terms of time horizon and respondents were approached just for once to get the proper response. The students of Chinese colleges were the targeted population and this was known, which is why non-probability sampling technique was used in this research, and under this technique the method which was used for the collection was convenience sampling. Total 450 questionnaire were distributed and 390 were received as filled properly. The respondent rate was almost 87%, which is quite significant for carrying out the further step of statistical analysis. For conducting the statistical analysis after the collection of the data, SMART PLS was used as a software to perform all the require test for testing the hypotheses. Validation of the instrument and normality of the data was also evaluated before testing the research model and proposed relationships.

Instrument

To collect the data from Chinese students from colleges the adapted questionnaire was used as an instrument and items against the each variable were adapted from different sources on the basis of the context of the study which was proposed earlier. To measure the independent variable Students' Performance total of 3 items were adapted from the scale used by Clark et al., 2021, Students Online Learning Perception as a predictor variable the scale developed by Clark et al., 2021 was used and 5 items were adapted. Students Attitude was also the independent variable and it was measured by using the scale used by Hussein et al., 2020 and 4 items were adapted to measure this variable in the context of the study. For E-commerce adoption, total 3 items were adapted from the scale used by Octavia et al., 2020 and it was used as a mediating variable in this research. The moderating variable educational environment was measured by adapting the 6 items scale by Ramadhan et al., 2019. The outcome variable of the study, students' academic achievement was measured by the scale developed by Chen & Yang, 2019 and 3 items were adapted. The demographic information was also inquired from the respondent in the adapted questionnaire and close ended options regarding the gender age, education and area were asked. While distributing the questionnaire the purpose of the study was clearly observed by the respondents as it was mentioned in the first section of the questionnaire before the demographic section which was the second section of the instrument. In the last section of the instrument all

the items against the each variable was mentioned on the basis of a 5-point Likert scale. Where 5 was the highest option indicated the strongly agree option and 1 indicated the strongly disagree option. While gathering the data, surety was given to the respondents that the data will be used for research purposes and will be kept secret. After collecting the data the reliability of the instrument was tested and the value of Cronbach alpha suggested that the instrument was reliable. All the values against each variable were more than 0.70 which is the level of acceptance for Cronbach alpha.

Measurement Model

A measurement model is used to analyze or quantify the link between latent variables or constructs and their observable indicators or measures. It is frequently used in disciplines like psychology, the social sciences, and market research to comprehend and analyze complicated events that cannot be seen directly. The measurement model makes the assumption that some underlying constructs or variables can be deduced from observable signs but cannot be directly measured. Ideas like IQ, personality traits, attitudes, or satisfaction are examples of latent constructs. (Purwanto et al., 2021)

Structural model

Structural equation modelling (SEM) can be used to build a structural model of the Planned Behaviour Theory (PBT) in relation to students' academic success, taking into account their behaviour, initial impressions of online learning, attitudes, as well as the mediating role of e-commerce adoption and the moderating role of the educational environment. Examining the connections between latent constructs, observable variables, and suggested mediating and moderating variables is possible with SEM. While taking into account the mediating impact of e-commerce adoption and the moderating role of the educational environment, this study will look at the direct and indirect effects of performance, first perception of online learning, and attitudes on students' academic success. Within the context of the Planned Behaviour Theory, this thorough analysis will offer insights into the intricate links and mechanisms driving academic performance (Purwanto et al., 2021).

Results

Demographics

The impact of planned behaviour theory on students' academic success is related to their performance, their initial perception of online learning, and their attitudes, as well as the mediating roles of e-commerce adoption and the moderating roles of the educational environment. Students from Chinese institutions concurred that gender, age, area, and education level were the factors most crucial to determining students' academic success. Table 1 shows the demographics of study.

Table 1. Demographic profile

Demography	Description	No. Of Responses	%
Gender	Male	210	54
	Female	180	46
Age	10-15	160	41
	15-22	150	38
	Above 22	80	21
Education Level	1st Year	190	49
	2nd Year	130	33
	Others	70	18
Area	Urban	220	56
	Rural	170	44

The results in table 1 show the gender of male Chinese college students was 54% and female was 46%. The age of college students in China 10-15 was 41%, 15-22 was 21% while above 22 was 21%. The education of college students in China 1st year was 49%, 2nd year was 33% and others

was 18%. The area of college students in China urban was 56%, and rural was 44%.

Composite reliability, Cronbach's Alpha, and AVE

In the context of structural equation modelling (SEM) or measurement models, average variance extracted (AVE), composite reliability, and Cronbach's alpha are often employed measures in the assessment of construct reliability and validity. In the context of students' academic achievement, let's investigate how these measurements might be used to the factors associated with the Theory of Planned Behaviour (TPB). Composite reliability is a metric for assessing a latent construct's internal consistency or dependability. It evaluates how accurately the observed indicators reflect the underlying construct. Another common internal consistency reliability metric in research is Cronbach's Alpha. AVE is a convergent validity metric that gauges how much variance the construct captures in comparison to measurement error (Sobaih & Elshaer, 2022). It displays the percentage of variance that all of a construct's indicators have in common. SEM, or structural equation modelling, can be used to evaluate these interactions and their relevance with regard to the mediating function of e-commerce adoption and the moderating effect of the educational environment. Table 2 shows the values of composite reliability, Cronbach's alpha and AVE values.

Table 2. Composite reliability, Cronbach's Alpha, and AVE values

Construct	Item	Loadings	CA	CR	AVE
Students' Performance	SP1	0.924	0.870	0.920	0.793
	SP2	0.922			
	SP31	0.823			
Students Online Learning Perception	SOL1	0.785	0.781	0.855	0.547
	SOL2	0.799			
	SOL3	0.743			
	SOL4	0.805			
	SOL5	0.814			
Student Attitude	SA1	0.925	0.935	0.953	0.837
	SA2	0.907			
	SA3	0.906			
	SA4	0.920			
E-commerce Adoption	ECA1	0.889	0.749	0.857	0.668
	ECA2	0.762			
	ECA3	0.795			
Educational Environment	EE1	0.851	0.749	0.857	0.668
	EE2	0.914			
	EE3	0.924			
	EE4	0.906			
	EE5	0.838			
Students' Academic Achievement	SSA1	0.907	0.851	0.910	0.771
	SSA2	0.850			
	SSA3	0.875			

"Note: CR=composite reliability; AVE=average variance extracted; CA= Cronbach's Alpha"

Discriminant validity

Use the Average Variance Extracted (AVE) and correlation analysis to evaluate the discriminant validity of the variables within the Theory of Planned Behaviour (TPB) framework in relation to students' academic success, performance, initial perception of online learning, attitudes, as well as the mediating role of e-commerce adoption and moderating role of the educational environment (Sobaih & Elshaer, 2022). Researcher can evaluate the discriminant validity of the

TPB framework's variables relating to students' academic success, performance, first perception of online learning, attitudes, e-commerce adoption, and the educational environment by going through these steps. The discriminant validity of the components is supported if the AVE values are higher than 0.50 and the correlations among the constructs are low to moderate. Table 3 and Figure 1 show the discriminant validity of this study.

Table 3. Discriminant validity

	ECD	EE	SSA	SA	SOL	SP
E-commerce Adoption	0.817					
Educational Environment	0.422	0.887				
Students' Academic Achievement	0.432	0.747	0.878			
Students' Attitude	0.366	0.766	0.722	0.915		
Students' online learning	0.378	0.544	0.646	0.724	0.740	
Students' performance	0.597	0.664	0.460	0.617	0.448	0.891

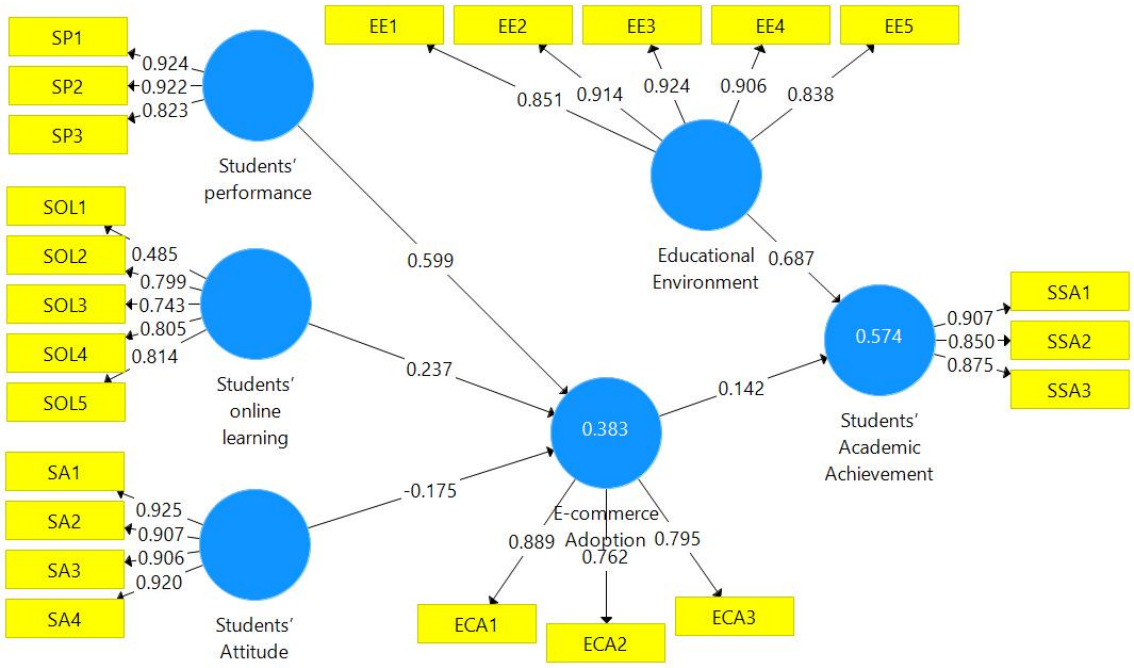

Figure 1. Assessment of Algorithm

R-Square

There is regression-based approach or structural equation modelling (SEM) have been applied to evaluate the R-squared (coefficient of determination) of the Planned Behaviour Theory (PBT) in relation to students' academic success, performance, initial perception of online learning, attitudes, as well as the mediating role of e-commerce adoption and the moderating role of the educational environment. Without taking into account the mediating and moderating effects, the regression analysis will assist in understanding the direct effects of the variables on academic success. It will show that how much of the variation in academic success can be explained by the chosen predictors on their own. Researcher can evaluate the R-squared value of the Planned Behaviour Theory in relation to students' academic progress by conducting regression analysis and using SEM (Purwanto et al., 2021). Researcher can also comprehend the contributions of the predictors, as well as the mediating and moderating variables, to the explained variance. Within the context of the Planned Behaviour Theory, these studies offer insightful information on the connections and mechanisms behind academic performance. Table 4 shows that the value of R-Square and Adjusted R square of e-commerce adoption and students' academic

performance(Table 4).

Table 4. Assessment of R square

	R Square	**Adjusted R2**
E-commerce Adoption	0.383	0.378
Students' Academic Achievement	0.574	0.572

Direct relationship

The direct relationships are the connections between the latent constructs and the relevant observed variables or indicators in the structural model of the Planned Behaviour Theory (PBT) on students' academic progress. The influence or impact of the latent constructs on the observable variables is represented by these direct relationships. Researchers can investigate the impact of performance, initial impressions of online learning, and attitudes on students' academic progress by defining the direct linkages in the structural model (Purwanto et al., 2021). These connections shed light on how these elements affect or support students' academic success directly. Table 5 shows that the direct relationship between an E-commerce Adoption and Students' Academic Achievement.

Table 5. Direct Effect

	Original Sample (O)	**T Statistics**	**P Values**	**Decision**
E-commerce Adoption -> Students' Academic Achievement	0.187	4.520	0.000	Accepted

Mediating Effect

In the structural model of the Planned Behavior Theory (PBT) on students' academic success, the mediating effect refers to the indirect relationship between the independent variables and the dependent variable through a mediating variable. The mediating variable serves as a mechanism or process through which the effects of the independent variables are transmitted to the dependent variable. Specify the path or coefficient between the mediating variable (e-commerce adoption) and the dependent variable (academic achievement) (Purwanto et al., 2021). This path represents the indirect effect of the independent variables on the dependent variable through the mediating variable. Table 6 and Figure 2 show the mediating role that e-commerce adoption on students' performance, students' online learning, students' attitude and students' academic achievement.

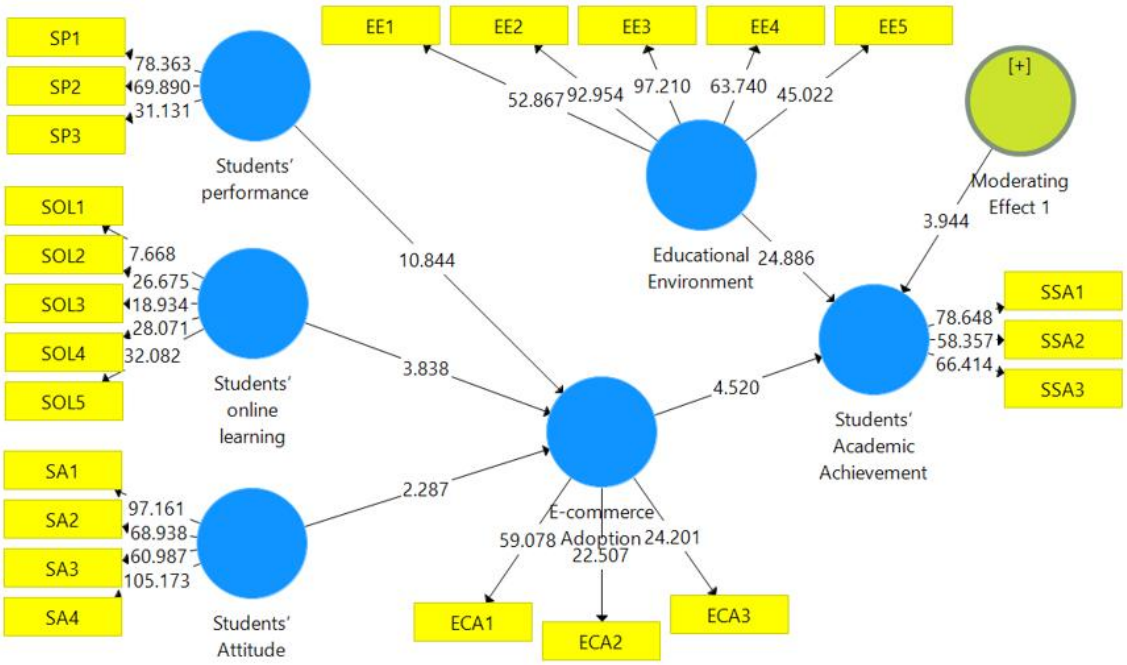

Figure 2. Assessment of Bootstrapping

Table 6. Mediating Effect

	Original Sample (O)	T Statistics	P Values	Decision
Students' performance -> E-commerce Adoption -> Students' Academic Achievement	0.112	4.350	0.000	Accepted
Students' Attitude -> E-commerce Adoption -> Students' Academic Achievement	-0.033	2.163	0.031	Accepted
Students' online learning -> E-commerce Adoption -> Students' Academic Achievement	0.044	2.938	0.003	Accepted

Moderating Effect

In the structural model of the Planned Behavior Theory (PBT) on students' academic success, the moderating effect refers to the influence of a moderating variable on the relationship between the independent variables and the dependent variable (Purwanto et al., 2021). The moderating variable interacts with the independent variables, influencing the strength or direction of the relationships (Figure 3). This analysis allows researcher to examine how the educational environment influences the strength and direction of these relationships, providing a deeper understanding of the contextual factors that impact academic achievement. Table 7 demonstrates that educational environment plays moderating role between e-commerce adoption and students' academic achievement (B = -0.125, P = 0.000).

Table 7. Moderator hypothesis testing

	B-Value	T-Value	P Value	Decision
E-commerce Adoption * Educational Environment-> Students' Academic Achievement	-0.125	3.944	0.000	Accepted

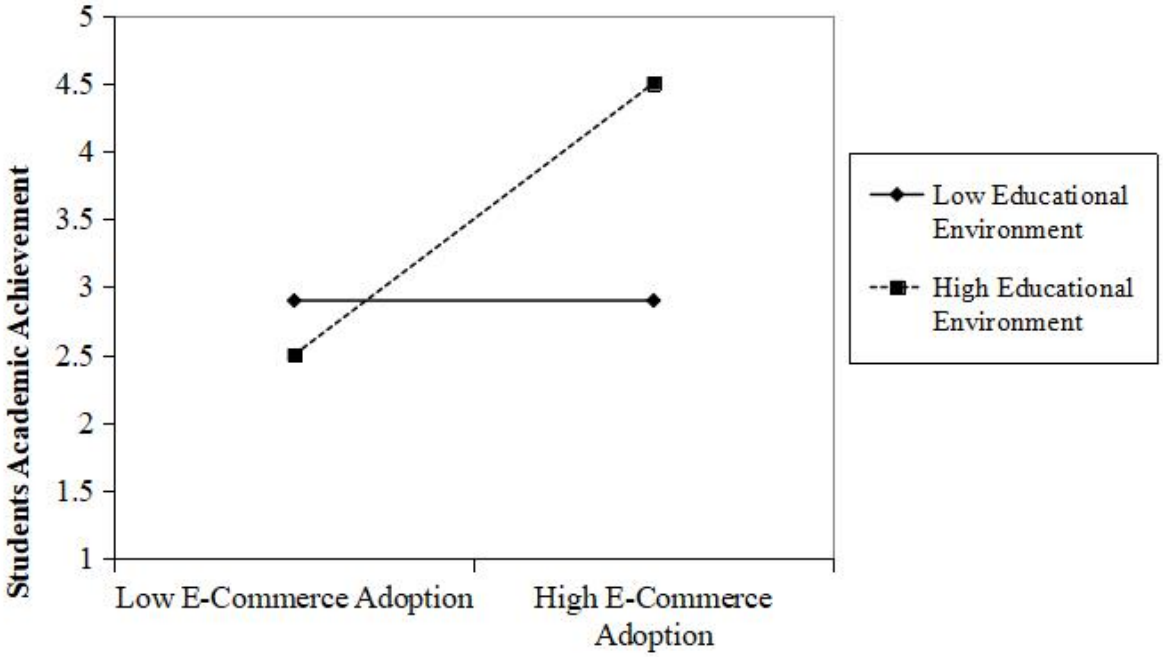

Figure 3. Moderating effect

Discussion

The goal of the current study is to identify how college students' talents and performance-based results are influenced by education and its significance for e-commerce platforms. The impact of planned behaviour theory on students' academic success is related to their performance, their initial perception of online learning, and their attitudes, as well as the mediating roles of e-commerce adoption and the moderating roles in the educational environment. All hypotheses were accepted.

Results shows that significant impact of e-commerce adoption plays mediating role of students' performance, students' online learning perception, students' attitude, and students' academic achievement. The conversation could center on how students' performance in terms of their capacity to access resources, participate in online learning, and use digital tools to improve their educational experience is impacted by the growth of e-commerce (Hussein et al., 2020). Online learning perception refers to students' beliefs, attitudes, and feelings about the effectiveness and value of online learning. This element investigates how students see the use of online tools for learning and e-commerce platforms. It may take into account elements like usability, perceived value, and satisfaction with online learning opportunities. How student academic success is impacted by e-commerce adoption, both in terms of learning outcomes and the development of real-world skills appropriate for the digital age. It can look at how e-commerce adoption affects the dynamics and interactions between these factors by acting as a mediator between them.

Findings shows that e-commerce adoption has significant impact on students' academic achievement. Due to the use of e-commerce, students can study whenever and however they choose. Online courses and educational platforms, students can learn at their own speed outside of traditional classroom settings. Children perform better academically when they have more freedom to customize their education, focus on their interests, and manage their time in accordance with their individual needs (Xhelili et al., 2021). Interactive elements, multimedia information, and gamified components are frequently used in e-commerce platforms' teaching tools. These interesting and exciting learning activities can grab students' interest, pep it up, and encourage active engagement in the learning process. Students are consequently more likely to remember material, cultivate critical thinking abilities, and attain better academic results. The

confidence, motivation, and general academic achievement of pupils can all benefit from improved teacher-student contact. The adoption of e-commerce exposes pupils to technology literacy, digital tools, and online research techniques. Students learn crucial digital skills, like information retrieval, data analysis, and online communication, as they maneuvers through e-commerce platforms. These digital literacy abilities give pupils the crucial skills needed in the current workforce in addition to being important for academic success.

Results shows that educational environment plays significant but negative moderating role on e-commerce adoption and students' academic achievement. Through online discussion boards, virtual group projects, and peer-to-peer learning communities, e-commerce adoption helps students collaborate. Features that allow for direct and quick connection between students and educators are frequently found on e-commerce platforms. This makes it easier for teachers to provide regular feedback, clear up any confusion, and provide students with individualized coaching, fostering a more encouraging and engaging learning environment. Although a poor learning environment can hinder academic achievement, it's important to also take other factors like each child's individual characteristics, parental support, and outside influences into consideration (Clark et al., 2021). Although using e-commerce may not be directly tied to academic performance, it can still be a beneficial skill in the current digital economy and may indirectly affect job prospects.

Implications

The purpose of the current study was to investigate how education affected college students' perceptions of and performance on e-commerce platforms. Additionally, the study looked into how the Planned Behaviour Theory affected students' academic success, taking into account elements like performance, initial attitudes towards online learning, attitudes, the mediating role of e-commerce adoption, and the moderating role of the educational environment. A better educational environment may have a positive effect on students' attitudes, performance in e-commerce adoption, and academic success, according to the study. To establish a favourable learning environment for e-commerce-related skills, institutions should concentrate on offering resources, assistance, and training. The study emphasizes the initial perspective of online learning as an influential element. Educational institutions should make an investment in resolving any unfavorable attitudes or worries about online learning platforms, offering sufficient support, and making sure that students are prepared for and at ease using e-commerce platforms. By assessing its impact on students' academic progress, the study adds to the theoretical knowledge of the Planned Behaviour Theory. The results highlight the importance of attitudes, perceived behavioural control, and arbitrary norms in determining students' intentions and behaviours regarding the adoption of e-commerce and academic success. The study offers proof that e-commerce has a mediating role. This implies that e-commerce platform adoption may be a means via which attitudes and intentions affect academic accomplishment. This discovery advances our knowledge of the link between educational results and technology adoption. The study emphasises the educational environment's moderating role. It implies that the relationship between e-commerce adoption and students' attitudes and performance might be influenced by the quality of the educational environment. This research underlines the significance of an encouraging and welcoming learning environment in promoting effective e-commerce uptake and academic performance. The practical implications of this study point to the need for educational institutions to prioritise enhancing the learning environment, encouraging the adoption of e-commerce, and resolving misconceptions about online learning. The theoretical ramifications emphasise the importance of the Planned Behaviour Theory, the mediating effect of e-commerce adoption, and the moderating effect of the educational environment in influencing students' attitudes and performance with regard to e-commerce platforms. These findings can influence curriculum design, instructional methods, and educational policy to better prepare students for the digital economy and raise academic performance.

Conclusion

This study focused on a number of variables, including performance, initial perceptions of online learning, attitudes, the mediating role of e-commerce adoption, as well as the moderating role of the educational environment, to examine the effect of the Planned Behaviour Theory on college students' academic success. The findings offer both theoretical and practical consequences while shedding light on the intricate interaction between these variables. The study's practical implications emphasise the need to improve the learning environment so that students' attitudes towards e-commerce adoption and academic accomplishment are supported. By focusing on the Planned Behaviour Theory's impact on students' academic progress, this study's theoretical implications help us comprehend it better. The results highlight how attitudes, perceived behavioural control, and arbitrary rules influence students' intentions and actions in relation to e-commerce adoption and academic success. The study also emphasises the mediating function of e-commerce adoption, arguing that e-commerce platform adoption acts as a mechanism through which attitudes and intentions affect academic accomplishment. The moderating function of the educational environment also highlights the significance of a positive educational environment in promoting effective e-commerce uptake and academic performance. Future studies might use longitudinal designs to look at changes over time, expand the sample size and diversify the participants, investigate alternate statistical methods for analysis, and validate the results in various social and cultural situations. By analysing the effect of the Planned Behaviour Theory on students' academic success in the context of e-commerce adoption, this study adds to the body of current work. Educational institutions can successfully design interventions and strategies to support students' success in the digital era by studying the elements that affect students' attitudes and performance in regard to e-commerce. Further exploring the intricacies of the educational environment, e-commerce adoption, attitudes, and academic accomplishment is made possible by the study's insights, which help us grasp these interwoven variables.

Limitations and Future Research

There are a number of limitations to the study outlined, which should be taken into account. Future studies may also focus on certain regions to address these issues and improve our comprehension. The study used a cross-sectional methodology and a quantitative research design, which may have limited its capacity to demonstrate causation or track changes over time. To study the long-term effects of the educational environment, e-commerce adoption, and attitudes on students' academic progress, future research might take into account using longitudinal designs. The study concentrated on gathering information from Chinese college students. Future studies could evaluate potential cultural differences in the relationship between educational environment, e-commerce adoption, attitudes, and academic success in order to strengthen the external validity of the findings. The SmartPLS data analysis programme was used in the investigation. Even though SmartPLS is a helpful tool for structural equation modelling, future study may want to apply further analyses or alternative statistical methods to gain a deeper understanding of the research variables and their relationships. The study looked into the moderating impact of the educational environment and the mediating impact of e-commerce adoption. There might be more unaccounted-for mediating or moderating factors, though. Additionally, it would be beneficial to validate the findings using qualitative research techniques in order to comprehend the underlying mechanisms and contextual variables that affect students' attitudes and performance in adopting e-commerce better. Future studies might use a multifaceted strategy to look into several facets of the educational environment, including curriculum design, instructional strategies, technological resources, and support systems. This would give a more nuanced understanding of the ways in which particular aspects of the educational environment influence students' views, adoption of e-commerce, and academic success. Scholars can improve our knowledge of the connection between the educational environment, e-commerce adoption, attitudes, and students' academic success while also enhancing the robustness and applicability of the findings by addressing these limitations and investigating the suggested areas for future research.

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References

Abdel-Basset, M., Manogaran, G., Mohamed, M., & Rushdy, E. (2019). Internet of things in smart education environment: Supportive framework in the decision-making process. *Concurrency and Computation: Practice and Experience, 31*(10), e4515.

Abdelrahman, R. M. (2020). Metacognitive awareness and academic motivation and their impact on academic achievement of Ajman University students. *Heliyon, 6*(9), e04192.

Abuhassna, H., Al-Rahmi, W. M., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. B. M., & Darwish, M. (2020). Development of a new model on utilizing online learning platforms to improve students' academic achievements and satisfaction. *International Journal of Educational Technology in Higher Education, 17*(1).

Adams, R. V., & Blair, E. (2019). Impact of Time Management Behaviors on Undergraduate Engineering Students' Performance. *SAGE Open, 9*(1).

Aditya Suryawirawan, O. (2021). The effect of college students' technology acceptance on e-commerce adoption. *BISMA (Bisnis dan Manajemen) 14*(1), 46-62.

Akour, I., Alnazzawi, N., Alshurideh, M., Almaiah, M. A., Al Kurdi, B., Alfaisal, R. M., & Salloum, S. (2022). A Conceptual Model for Investigating the Effect of Privacy Concerns on E-Commerce Adoption: A Study on United Arab Emirates Consumers. *Electronics (Switzerland), 11*(22), 3648.

Al-Rahmi, W. M., Yahaya, N., Alamri, M. M., Alyoussef, I. Y., Al-Rahmi, A. M., & Kamin, Y. Bin. (2021). Integrating innovation diffusion theory with technology acceptance model: supporting students' attitude towards using a massive open online courses (MOOCs) systems. *Interactive Learning Environments, 29*(8), 1380-1392.

Alzahrani, J. (2019). The impact of e-commerce adoption on business strategy in Saudi Arabian small and medium enterprises (SMEs). *Review of Economics and Political Science, 4*(1), 73-88.

Ariansyah, K., Sirait, E. R. E., Nugroho, B. A., & Suryanegara, M. (2021). Drivers of and barriers to e-commerce adoption in Indonesia: Individuals' perspectives and the implications. *Telecommunications Policy, 45*(8), 102219.

Chatterjee, R., & Correia, A. P. (2020). Online Students' Attitudes Toward Collaborative Learning and Sense of Community. *American Journal of Distance Education, 34*(1), 53-68.

Chen, C. H., & Yang, Y. C. (2019). Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. *Educational Research Review, 26*, 71-81.

Clark, A. E., Nong, H., Zhu, H., & Zhu, R. (2021). Compensating for academic loss: Online learning and student performance during the COVID-19 pandemic. *China Economic Review, 68*, 101629.

Dymek, D., Didkivska, S., Grabowski, M., Paliwoda-Pękosz, G., & Vakaliuk, T. A. (2023, March). Students' Perception of Online Learning During the COVID-19 Pandemic: Polish and Ukrainian Perspectives. In I*nformation Technology for Management: Approaches to Improving Business and Society: AIST 2022 Track and 17th Conference, ISM 2022, Held as Part of FedCSIS 2022, Sofia, Bulgaria, September 4-7, 2022, Extended and Revised Selected Papers* (pp. 127-147). Cham, Switzerland: Springer Nature Switzerland.

Gustems-Carnicer, J., Calderón, C., & Calderón-Garrido, D. (2019). Stress, coping strategies and academic achievement in teacher education students. *European Journal of Teacher Education, 42*(3), 375-390.

Hussein, E., Daoud, S., Alrabaiah, H., & Badawi, R. (2020). Exploring undergraduate students' attitudes towards emergency online learning during COVID-19: A case from the UAE. *Children and Youth Services Review, 119*, 105699.

Iqbal, S. A., Ashiq, M., Rehman, S. U., Rashid, S., & Tayyab, N. (2022). Students' Perceptions and Experiences of Online Education in Pakistani Universities and Higher Education Institutes during COVID-19. *Education Sciences, 12*(3), 166.

Ismaili, Y. (2020). Evaluation of students' attitude toward distance learning during the pandemic (Covid-19): a case study of ELTE university. *On the Horizon, 29*(1), 17-30.

Kanojiya, A. R. (2020). The Impact of Online Learning during Covid-19 Pandemic: Students Perspective Maharashtra, India. *International Journal for Research in Applied Science and Engineering Technology, 8*(11), 686-690.

Lakhal, S., & Khechine, H. (2021). Technological factors of students' persistence in online courses in higher education: The moderating role of gender, age and prior online course experience. *Education and Information Technologies, 26*(3), 3347-3373.

Laksana, D. N. L. (2021). Implementation of Online Learning in The Pandemic Covid-19: Student Perception in Areas with Minimum Internet Access. *Journal of Education Technology, 4*(4), 502.

Madigan, D. J., & Curran, T. (2021). Does Burnout Affect Academic Achievement? A Meta-Analysis of over 100,000 Students. *Educational Psychology Review, 33*(2), 387-405.

Madigan, D. J., & Kim, L. E. (2021). Does teacher burnout affect students? A systematic review of its association with academic achievement and student-reported outcomes. *International Journal of Educational Research, 105*, 101714.

Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2020). Assessing Students' Performance in Mathematics in Tanzania: The Teacher's Perspective. *International Electronic Journal of Mathematics Education, 15*(3), em0589.

Namoun, A., & Alshanqiti, A. (2021). Predicting student performance using data mining and learning analytics techniques: A systematic literature review. Applied Sciences (Switzerland), 11(1), 1-28. https://doi.org/10.3390/app11010237

Octavia, A., Indrawijaya, S., Sriayudha, Y., Heriberta, Hasbullah, H., & Asrini. (2020). Impact on e-commerce adoption on entrepreneurial orientation and market orientation in business performance of smes. *Asian Economic and Financial Review, 10*(5), 516-525.

Purwanto, A., Asbari, M., & Santoso, T. I. (2021). Education Management Research Data Analysis: Comparison of Results between Lisrel, Tetrad, GSCA, Amos, SmartPLS, WarpPLS, and SPSS For Small Samples. *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam, 6*(2), 382-399.

Ramadhan, S., Sukma, E., & Indriyani, V. (2019, August). Environmental education and disaster mitigation through language learning. In *IOP conference series: Earth and environmental science* (Vol. 314, No. 1, p. 012054). Bristol, UK: IOP Publishing.

Rastrollo-Guerrero, J. L., Gómez-Pulido, J. A., & Durán-Domínguez, A. (2020). Analyzing and predicting students' performance by means of machine learning: A review. *Applied Sciences (Switzerland), 10*(3), 1042.

Sarfraz, M., Hussain, G., Shahid, M., Riaz, A., Muavia, M., Fahed, Y. S., ... Abdullah, M. T. (2022). Medical Students' Online Learning Perceptions, Online Learning Readiness, and Learning Outcomes during COVID-19: The Moderating Role of Teacher's Readiness to Teach Online. *International Journal of Environmental Research and Public Health, 19*(6), 3520.

Sobaih, A. E. E., & Elshaer, I. A. (2022). Personal Traits and Digital Entrepreneurship: A Mediation Model Using SmartPLS Data Analysis. *Mathematics, 10*(21), 1-19.

Sobaih, A. E. E., Hasanein, A., & Elshaer, I. A. (2022). Higher Education in and after COVID-19: The Impact of Using Social Network Applications for E-Learning on Students' Academic Performance. *Sustainability (Switzerland), 14*(9), 5195.

Wei, H. C., & Chou, C. (2020). Online learning performance and satisfaction: do perceptions and readiness matter?. *Distance Education, 41*(1), 48-69.

Xhelili, P., Ibrahimi, E., Rruci, E., & Sheme, K. (2021). Adaptation and Perception of Online Learning during COVID-19 Pandemic by Albanian University Students. *International Journal on Studies in Education, 3*(2), 103-111.

Xu, J., Huang, J., Zhang, Z., & Gu, X. (2021). The impact of family capital on farmers' participation in farmland transfer: Evidence from rural China. *Land, 10*(12), 1434-1457.

Youssef, A. Ben, Dahmani, M., & Ragni, L. (2022). ICT Use, Digital Skills and Students' Academic Performance: Exploring the Digital Divide. *Information (Switzerland), 13*(3), 1-19.

Yusuf, R., & Fajri, I. (2022). Differences in behavior, engagement and environmental knowledge on waste management for science and social students through the campus program. *Heliyon, 8*(2), e08912.