



Analysis of the Effect or Role of Museum Digital Communication in Contemporary Education

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ABSTRACT

This study presents a comprehensive analysis of the effect and role of museum digital communication in contemporary education, focusing on Chinese university students. Utilizing a longitudinal approach, the research aimed to examine how digital communication tools employed by museums impact the educational experience of participants over time. The study encompassed a sample size of 380 Chinese university students and employed a quantitative research methodology. Data analysis was conducted through the utilization of SPSS software with the PROCESS MACROS 3.0 plugin. The research investigated the evolving dynamics between museum digital communication and contemporary education, shedding light on how these tools contribute to enhancing learning outcomes and engagement. By tracking participants' experiences longitudinally, the study sought to unveil trends and patterns that emerge over time, providing valuable insights into the evolving role of digital communication within the educational sphere. The Chinese university students' perspective offers a unique cultural context, allowing for a deeper understanding of the interaction between technology, education, and cultural heritage. The findings of this study contribute to the broader discourse on museum digital communication's significance in education, presenting empirical evidence of its impact on Chinese university students. The quantitative approach allows for a rigorous analysis of the relationships and effects, highlighting potential correlations between museum engagement through digital platforms and educational achievements. Furthermore, utilizing the PROCESS MACROS 3.0 plugin facilitates a comprehensive examination of potential mediators and moderators that might influence the observed effects. The results have implications for both academia and museum professionals.

Keywords: Digital Communication, Museum, Educational Achievement, Contemporary Education, Educational Technology.

INTRODUCTION

Museums play a significant role in the growth of education these days. Due to innovative and creative ways that digital communication has allowed museums to communicate with their travelers, the educational value of museum visits has improved (Cristobal-fransi, Ramón-Cardona, Daries, & Serra-Cantallops, 2021). This has caused curiosity about the function of museum digital communication in modern education to increase. Virtual tours, online exhibitions, interactive teaching resources, and social media interaction are just a few examples of the various ways that museums can communicate digitally (Li, 2022). These technologies can provide students

with access to museum collections and resources whenever they choose and from any location since they make intriguing and engaging material readily available. One Chinese museum that has incorporated digital technologies into its curriculum is the Palace Museum in Beijing, which offers virtual tours of its displays (Rivero, Navarro-Neri, García-Ceballos, & Aso, 2020). Chinese universities are also looking into how to use museum digital communication in their courses. Worldwide, higher education institutions, including both public and private universities in China, are using instructional technology more and more (Noehrer, Gilmore, Jay, & Yehudi, 2021). However, there is still discussion and interest in the issue of how receptive students are to educational technology in these institutions. Students' access to technology and resources, digital literacy abilities, and motivation are only a few of the aspects that affect how easily they can adapt to educational technology in China's public and private universities (Agostino, Arnaboldi, & Lampis, 2020). All students can profit from educational technology if there is an effort to close the gap between public and private universities in these areas. A wide range of subjects, such as educational technology, curriculum development, teaching methods, and student learning outcomes, are covered in the educational information about contemporary education in China's universities (Rivero et al., 2020). The utilization of instructional technology is a major area of attention in contemporary education in Chinese universities.

Contemporary education refers to the current and modern approach to teaching and learning that takes into account the evolving needs of students, advancements in technology, changes in society, and new educational theories and methodologies (Permatasari, Rech, Qohar, & Faizal, 2020). In contemporary society, museums serve as dynamic educational spaces that bridge formal and informal learning (Saraih, Wong, Asimiran, & Khambari, 2022). They facilitate multidisciplinary learning, fostering critical thinking, creativity, and cross-cultural understanding. Museums engage with societal issues, providing platforms for dialogue and reflection on topics ranging from history and science to social justice and environmental concerns (Hartmann, Plouffe, Kohsuwan, & Cote, 2020; Yaqin, Hartati, Salabi, Bahri, & Mizani, 2021). Contemporary education is crucial in China's public and private universities because it ensures that students work towards the same objectives and understand the same opportunities and obstacles (Permatasari et al., 2020). This may encourage stakeholder collaboration and cooperation, which may result in more successful educational policies and practices. Through constant communication and discussion, stakeholders can come to a shared understanding of modern education at Chinese institutions. This can take the form of frequent gatherings and forums where stakeholders can discuss and share their thoughts on new educational trends and advances (Zegwaard, Pretti, & Rowe, 2020). Private universities in China may have higher tuition costs and more demanding academic standards, which encourages greater levels of commitment from students who have devoted a lot of time and money to their studies (Wilcha, 2021). However, rigorous academic standards and curricula may also be found in public colleges in China, encouraging comparable levels of dedication from students (Owens & Hite, 2020). The term museum digital communication describes the application of digital technology to the dissemination of museum content, including interactive educational resources, online exhibitions, and virtual tours (Li, 2022). Students in Chinese universities should be aware of museum digital communication since it can give them access to museum collections and resources at any time, from anywhere, and can improve their educational experiences by delivering engaging and interactive content (Thornber et al., 2020). Making sure the content is linguistically and culturally appropriate for Chinese students is one obstacle to raising awareness of museum digital communication among students in Chinese institutions. Museums may need to alter their digital content in order to better meet the interests and needs of Chinese students (Noehrer et al., 2021; Tao, Reichert, Law, & Rao, 2022).

The study holds significant importance in the realm of contemporary education, particularly for university students. In an era characterized by rapid technological advancements and changing educational paradigms, the role of museums as educational institutions has expanded to encompass digital communication platforms (Akour et al., 2022; Pundziene, Nikou, & Bouwman, 2021). Understanding the effect of museum digital communication on university students' educational experiences offers valuable insights for both academia and museum practitioners. Museums serve as essential repositories of cultural heritage, history, and knowledge (Mehrvarz, Heidari, Farrokhnia, & Noroozi, 2021). They play a pivotal role in public education by providing access to curated information, artifacts, and experiences that enrich understanding. Museums act as bridges between the past, present, and future, fostering a sense of identity, promoting cultural appreciation, and nurturing intellectual curiosity (Zhu, Xu, Wang, Yan, & Zhao, 2022).

Digital museums have transformed the traditional museum experience by extending their reach beyond physical boundaries (Mehrvarz et al., 2021). They offer interactive and immersive platforms for engagement, enabling individuals to explore exhibits, artifacts, and educational content remotely. Digital museums facilitate personalized learning experiences, catering to diverse learning styles and preferences, while also appealing to tech-savvy audiences (Rondoni & Grasso, 2021). Despite the growing integration of digital communication in museums and education, there remains a gap in understanding the nuanced relationships between educational

informativeness, effectiveness, shared understanding of education, adaptability to educational technology, and the mediating and moderating roles of museum digital communication awareness and educational commitment (Liu et al., 2020; Nguyen & Tran, 2022). Existing research often focuses on individual aspects without considering the comprehensive interplay between these variables.

The present study aims to address this research gap by exploring the intricate relationships between these variables among university students. Specifically, it investigates the mediation effect of museum digital communication awareness on the relationship between educational variables and adaptability to educational technology. Furthermore, the moderating role of educational commitment in this context will be examined (Huang & Zhang, 2022; Rim & Kim, 2023). The current study investigates the impact or function of museum digital communication in modern Chinese public and private universities. The present research established a theory of knowledge transmission. This theory refers to “how knowledge is transmitted from one person or group to others” (Yanti et al., 2020). According to this theory, knowledge can be passed down orally, through observation, or through personal experience. The goals of this study are, in accordance with the framework, 1. Museum digital communication awareness mediates the significant relationship between educational informativeness and the adaptability of educational technology. 2. Museum digital communication awareness mediates the significant relationship between the effectiveness and adaptability of educational technology. 3. Museum digital communication awareness mediates the significant relationship between a shared understanding of education and the adaptability of educational technology. 4. Educational commitment moderates the significant relationship between museum digital communication awareness and the adaptability of educational technology. 5. Museum digital communication awareness has a significant impact on the adaptability of educational technology.

LITERATURE REVIEW

The current study examines how modern Chinese public and private university students respond to museum digital communication and how knowledge transmission theory has changed. This theory states that knowledge is gained and acquired through social experiences and social contacts, not through inherent and natural means (Yanti et al., 2020). According to knowledge transmission theory, it is something that students gradually learn through interaction with each other, teachers, and their environment. Knowledge transfer is important because it is the idea and information that are conveyed from one person to another through conversation (Yen & Leasure, 2019). Direct instruction, feedback, and cooperation are just a few of the many forms that communication can take in the classroom. The precise transmission and reception of knowledge, as well as the promotion of student comprehension and engagement, depend on effective communication. The versatility of instructional technology is one of its key advantages (Kearney, González, Graczyk, & Fornander, 2019). This adaptation can lead to more effective learning outcomes since students are more engaged and motivated when the information is tailored to their needs. Furthermore, because it provides fresh and engaging ways to interact with knowledge, educational technology can help boost dedication to learning (Yagotin, Degtyarenko, Bosenko, Plisko, & Dolinsky, 2019). Teachers may create more dynamic and engaging learning experiences that can catch and hold the attention of their students by utilizing multimedia resources, such as movies, interactive simulations, and games. By giving students access to educational resources and fostering greater involvement, collaboration, and communication between students and teachers, a common concept of education can aid in the promotion of learning and knowledge (Khan, Hameed, Yu, & Khan, 2017). A common notion of education can help to facilitate the concept of knowledge transmission. Teachers and students are both better able to interact and collaborate to enhance learning and knowledge (Yanti et al., 2020).

The term museum digital communication awareness relates to students' understanding, attitudes, and views of how digital communication tools are used in museums to support learning (Asheim, Isaksen, & Trippl, 2020). According to studies, interactive displays, virtual tours, and educational apps can all improve learning outcomes by encouraging engagement, motivation, and comprehension (Li, Li, & Li, 2022). The efficiency of museum digital communication tools in promoting learning outcomes can be influenced by a variety of aspects, including educational informativeness, efficacy, common concept of education, and adaptation of educational technology (Lamassaari, Hietajärvi, Salmela-Aro, Hakkarainen, & Lonka, 2022). While educational effectiveness refers to a program's capacity to produce the desired results, educational informativeness relates to the standard and relevancy of the educational content. By fostering communication, cooperation, and knowledge transfer, a shared understanding of education and the adaptation of educational technology can also affect how well museum digital communication tools work (Li et al., 2022). Students who are well-versed in museum digital communication

might be more inclined to interact with hands-on displays or take virtual tours, which would increase instructional effectiveness and promote a common understanding of education (Li, 2022). Because it lays the groundwork for incorporating new technologies into educational programs, a commitment to education is essential to the success of digital efforts (Saraih et al., 2022). Because it affects the development, application, and evaluation of these activities, awareness is crucial to their success. Digital technologies have great promise, and museums that recognize this are more inclined to invest in them and employ them in their teaching initiatives (Raygan & Moradkhani, 2020). Adaptable educational technology, allows customization and tailoring of learning experiences to suit individual learning preferences. Previous research has demonstrated the positive effects of educational informativeness and adaptability on learning outcomes, highlighting the importance of technology-mediated education (Mahfud, Aprily, Saputro, Siswanto, & Suyitno, 2022).

Cristobal-fransi and Management (2021) investigated how digital communication technologies in museums might support visitor-learning objectives. The study discovered a positive relationship between visitor learning outcomes and museum digital communication technologies, such as interactive exhibitions, virtual tours, and educational applications. Pietroni (2019) discovered that the association between these tools and learning outcomes was mediated by visitors' awareness of museum digital communication. Agostino et al. (2020) looked at the connection between visitor engagement and digital communication technologies in museums. Zingone (2019) discovered a positive relationship between visitor engagement and museum digital communication technologies, such as interactive displays, virtual tours, and instructional apps. The study also discovered that the awareness of museum digital communication was a mediating factor in the connection between these tools and visitor engagement. Thornber et al. (2020) looked into how digital communication technologies in museums may support visitor learning and engagement. Kuntsman and Rattle (2019) discovered a positive relationship between visitor learning outcomes and engagement and museum digital communication technologies, including interactive exhibitions, virtual tours, and educational applications. Permatasari et al. (2020) also discovered that the association between these tools and engagement and learning outcomes was moderated by visitors' awareness of museum digital communication. Museum digital communication awareness pertains to the integration of digital tools, platforms, and strategies in disseminating educational content within museum settings (Li et al., 2022). With the rise of digital platforms, museums have recognized the potential to engage audiences more effectively through interactive exhibits, virtual tours, and multimedia presentations. The integration of digital communication in museums offers the opportunity to enhance the delivery of educational content and foster deeper connections with visitors (Raygan & Moradkhani, 2020).

Educational commitment describes how students and teachers are committed to their learning and teaching, which means accomplishing their educational goals. It is the responsibility and desire for successful knowledge and communication about education (Mahfud et al., 2022). This demonstrates the value placed on education and learning. Improvements in student performance, engagement, and participation in learning activities are associated with educational commitment. Furthermore, they are more likely to effectively utilize and adapt instructional technology and materials. The effect of academic dedication on college students' use of educational technology was examined by Ahad, Mustafa, Mohamad, Abdullah, & Nordin (2021). Tang, Wang, Guo, & Salmela-Aro (2019) looked at visitor learning outcomes in China in connection to museum digital communication tools. The study discovered that the association between these technologies and visitor learning outcomes was mediated by museum digital communication awareness. Manafe and Setyorini (2019) discovered that visitor commitment to education mediated the association between knowledge of museum digital communication and visitor learning outcomes, indicating that this commitment may be necessary for the efficient use and adaptation of museum digital communication tools. Highly committed individuals may be more inclined to explore and make effective use of digital resources provided by museums. Their commitment might drive them to seek out adaptable technology options that align with their learning preferences (Mahfud et al., 2022). Conversely, individuals with lower educational commitment might not fully utilize these resources or may struggle to adapt to different technological tools. The association between Chinese students' use of mobile learning technologies and their commitment to their studies was examined by Asheim et al. (2020). Ng and Lo (2022) found a significant relationship between students learning technology and educational commitment, which suggested that students who are more dedicated to their studies may achieve more and adapt to educational technology successfully (Raygan & Moradkhani, 2020). Digital tools are used for online exhibitions and virtual tours for a better understanding of students with cultural knowledge. The ability of a person to use and adapt to educational technology in their academic and learning endeavors is referred to as technological adaptability. This requires the ability to successfully incorporate new technology into one's educational activities as well as the motivation to learn about and experiment with them. According to Ahad et al (2021), the adaptation of educational technology and museum knowledge of digital communication are related. People who are more familiar with the digital communication resources and technologies used in museums may be better able to use and adapt to educational

technology in their learning activities. People who are more dedicated to their academic goals are more likely to employ technology for learning well. In this relationship, devotion to education may also have a moderating influence (Ahad et al., 2021; Ng & Lo, 2022; Tang et al., 2019). A growing body of research suggests a significant impact of museum digital communication awareness on the adaptability of educational technology. When learners are exposed to digital communication strategies employed by museums, they become accustomed to interactive and multimedia-rich content (Raygan & Moradkhani, 2020).

Hypothesis Development and Conceptual Framework

H1: Museum digital communication awareness mediates the significant relationship between educational informativeness and adaptability of educational technology.

H2: Museum digital communication awareness mediates the significant relationship between the effectiveness and adaptability of educational technology.

H3: Museum digital communication awareness mediates the significant relationship between a shared understanding of education and the adaptability of educational technology.

H4: Educational commitment moderates the significant relationship between museum digital communication awareness and the adaptability of educational technology.

H5: Museum digital communication awareness has a significant impact on the adaptability of educational technology.

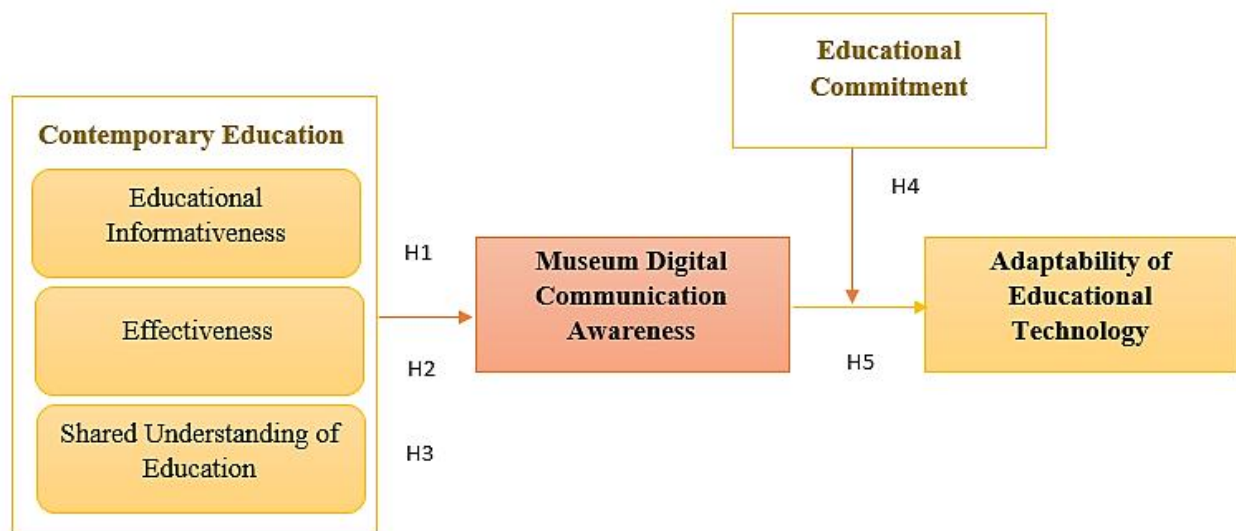


Figure 1. Conceptual Framework

Figure 1 shows the conceptual framework according to the above-given literature.

METHODOLOGY

This study measured the role of contemporary education by using its three dimensions as a composite (I.e., Educational Informativeness, Effectiveness, and Shared Understanding of Education) and it was the predicting variable in this study. Museum digital communication awareness was the mediating variable, educational commitment was the moderating variable and adaptability of educational technology was the outcome variable. Based on the proposed research model this research is quantitative, where hypotheses were tested based on deductive method and descriptive. To collect the data time horizon of the study was longitudinal by using the adapted questionnaire. Gathering data through a longitudinal process was divided into three phases, where students of public and private sector universities in China were the targeted population. The first stage usually involves the collection of demographics of the study, such as gender, age, qualification, and sector where participants study. In the second stage, the collection of data on independent variables (i.e., educational informativeness, effectiveness, and shared understanding of education) and mediating variables (museum digital communication awareness questions) involves data collection and follow-up at a later time. In the last stage of

data collection, variables such as the dependent variable adaptability of educational technology and educational commitment were the moderating variables involved in data collection and final assessment. Non-probability sampling technique was used as the population was not possible to count in terms of numbers which is why the convenience sampling method was used to collect the data from the respondents. However, it was ensured that only those students were picked and approached who were available further for the second and third phases as well.

Additionally, 5 times your predictor variables should be the minimal number of cases needed. 100 subjects would be sufficient if there were only two or three predictor factors, and 300-400 individuals would be enough to account for the maximum bias if there were nine or ten predictor variables (Nunnally, 1978). They also concluded that their sample size should be 220 respondents, and as a result, 150 respondents are needed for SPSS (Teddle & Yu, 2007; Vieira, 2011). A total of 380 students responded and those students were fully aware of this research before the collection process. They were explained by the researcher about the aim and purpose of the research, moreover, it was also ensured to them that this data will remain secret and will not be shared with anyone. All the ethical aspects were taken into consideration while collecting the data to avoid all the issues and any kind of uncertainty. After collecting the data SPSS 22 was used for recording and analyzing the data based on respondents and the proposed research model of the study. All the statistical tests were performed by using this software of IBM Company and each test was conducted according to the sequence.

Design of Questionnaire

This study includes the tools used to assess all variables; they were modified from earlier studies with necessary modifications that are acceptable for the sample. The templates for surveys are divided into many sections. The first factor included many Likert-type scale items, while the other factors included information on the population of students in this study (who answered the questionnaire) (Nunnally, 1978). As a result, the investigator has employed a “5-point Likert scale” in the present study for the problems explained, because this is the most frequently selected way of measuring mental and cognitive research for development. To ensure consistency across all parameters, the study analyzed all of the items on a 1 to 5-point scale, “with 1 indicating strongly disagree, 2 denoting disagree, 3 denoting neutral, 4 denoting agree, and 5 denoting strongly agree”.

Measurements of Study

The unit of analysis was the students of public and private sector universities in China and data was collected by using the instrument in three phases.

According to Appendix 1, to measure the role of contemporary education by using its three dimensions as a composite (I.e., educational informativeness, effectiveness, and shared understanding of education) where 5 items for educational informativeness from (Khan et al., 2017) and 3 items for effectiveness and shared understanding of education, by using the scale of (Khan et al., 2017) and items of understanding of education adopted by (Ng & Lo, 2022). To test the mediation effect of Museum digital communication; a scale developed by (Rivero et al., 2020) was used and a total of 3 items were adapted. For the moderation effect of awareness and educational commitment in this study total of 5 items were adapted (Manafe & Setyorini, 2019). To test the outcome variable of the study adaptability of educational technology, 4 items were adapted from the scale developed by (Zegwaard et al., 2020). After adopting all the items, reliability analysis was conducted by using the software SPSS, where the value of the Cronbach alpha was tested and it was more than 0.70 in all the cases. It provides the direction that the instrument is reliable and can be used for further data collection after the pilot study by taking a small sample of 40 respondents. The instrument was divided into three phases which it was about the study instruction and purpose, demographics, and questions regarding the variables respectively.

RESULTS

This investigation explores how knowledge transmission theory has evolved as well as how contemporary Chinese public and private university students respond to museum digital communication.

Demographics

The results of this study, which include demographic information and an analysis of the impact or function of museum digital communication in current education for Chinese public and private university students, demonstrate the influence of knowledge transmission theory. The most crucial characteristics of Chinese students were found to be their gender, age, qualification, and sector (N=380). **Figure 1** shows a demographic composition.

Table 1. Demographic Profile

Demography	Description	No. Of Responses	%
Gender	Male	220	58
	Female	160	42
Age	20-30	140	37
	30-40	180	47
	Above 40	60	16
Qualification	BS	215	57
	MS	115	30
	Ph.D.	50	13
Sector	Public	275	73
	Private	105	27

Following **Table 1**'s data, male students at Chinese institutions made up 58% of the student body while female students made up 42%. Students in Chinese colleges ranged in age from 20-30 was 37%, 30-40 were 47% and above 40 were 16%. 57% of university students in China studying for a BS, 30% studying for an MS, and 13% studying for a PhD. 73% of universities in China's public sector and 27% in the private sector.

Descriptive Statistics

By adding up each of the numbers in the data collection and dividing by the overall number of values, the mean, also known as the average, is determined. It calculates the data's central tendency (Abu-Bader & Jones, 2021). The median is the middle when a dataset is organized from smallest to greatest. It is a measure of the center tendency that is less prone to extreme values than the mean (Avotra, Chenyun, Yongmin, Lijuan, & Nawaz, 2021; Tao et al., 2021). Skewness refers to the asymmetry of the probability distribution. Kurtosis quantifies a distribution's peak intensity or smoothness (**Table 2,3**). In statistical evaluation, skewness and kurtosis are significant because they offer details about a distribution's shape beyond the mean and standard deviation (Nawaz & Guribie, 2022; Sandra Marcelline et al., 2022; Yingfei et al., 2021). They can be applied to find outliers, judge a distribution's normality, and aid in the selection of suitable statistical methods.

Table 2. Mean and Standard Deviation

	N	Mini	Maxi	Mean	SD	Skewness
Educational Informativeness	380	1.00	4.00	1.4750	.63695	1.209
Effectiveness	380	1.00	5.00	1.7816	.92800	1.583
Museum Digital Communication Awareness	380	1.00	5.00	2.1114	1.22355	.963
Adaptability of Educational Technology	380	1.00	5.00	2.6379	1.10649	.567
Shared Understanding of Education	380	1.00	4.67	2.1912	.94451	.442
Educational Commitment	380	1.00	5.00	2.1359	.90332	1.038
Valid N (listwise)	380					

Table 3. Skewness and Kurtosis

	Skewness Std. Error	Kurtosis Statistic	Kurtosis Std. Error
Educational Informativeness	.125	.393	.250
Effectiveness	.125	2.206	.250
Museum Digital Communication Awareness	.125	-.255	.250
Adaptability of Educational Technology	.125	-.553	.250
Shared Understanding of Education	.125	-.629	.250
Educational Commitment	.124	.994	.247
Valid N (listwise)			

Reliability Testing

The consistency and stability of a measure or test are evaluated using a statistical method known as a reliability test (Okagbue, Oguntunde, Obasi, & Akhmetshin, 2021). It is an essential instrument for social scientific research, especially in fields like psychology and education where measuring attitudes, views, and other

psychological constructs is common practice. Out of all the known dependability measures, Cronbach's alpha coefficient is the one that is utilized the most frequently. Greater reliability is indicated by higher values (Yang, 2013). This coefficient, which ranges from 0 to 1, evaluates the internal consistency of a set of items on a scale or questionnaire. In **Table 4**, the reliability of all items Cronbach's alpha value is .955 which means very good reliability.

Table 4. Reliability Test

	No of Items	Cronbach Alpha
Reliability of All Items	24	.955

Correlation

The Pearson correlation test is used to identify the nature and strength of variable relationships, which are then used to determine whether they are significant, positive, or negative. The linear link between variables is demonstrated by Pearson's correlation (Yang, 2013). If the value of correlation is 0, it means there is no correlation, if the value of correlation is +1 or -1 it means a positive and negative correlation exists (Avotra et al., 2021; Nawaz, Chen, & Su, 2023). **Table 5** displays an important and favorable association between the variables. **Table 5** shows the result of 2 tailed test which means positive or negative and the correlation is significant at the 0.01 level.

Table 5. Pearson Correlations (2-tailed)

		EI	Eff	DC	AET	SUE	EC
Educational Informativeness	Pearson Correlation	1	.615**	.331**	.405	.428**	.541**
	Sig. (2-tailed)		.0001	.0001	.0001	.0001	.0001
Effectiveness	Pearson Correlation	.615**	1	.595**	.692**	.522	.688**
	Sig. (2-tailed)	.0001		.0001	.0001	.0001	.0001
Museum Digital Communication Awareness	Pearson Correlation	.331**	.595**	1	.721**	.709**	.742
	Sig. (2-tailed)	.0001	.0001		.0001	.0001	.0001
Adaptability of Educational Technology	Pearson Correlation	.405**	.692**	.721**	1**	.744**	.673**
	Sig. (2-tailed)	.0001	.0001	.0001		.0001	.0001
Shared Understanding of Education	Pearson Correlation	.428**	.522**	.709**	.744**	1**	.639**
	Sig. (2-tailed)	.0001	.0001	.0001	.0001		.0001
Educational Commitment	Pearson Correlation	.541**	.688**	.742**	.673**	.639**	1**
	Sig. (2-tailed)	.0001	.0001	.0001	.0001	.0001	

** . The significance level for correlation is 0.01 (2-tailed).

KMO and Bartlett's Test

KMO (Kaiser-Meyer-Olkin) and Bartlett's Test are two statistical tests that are widely used to determine whether data are suitable for factor analysis. To identify the underlying dimensions or factors in a collection of observable data, a statistical technique called factor analysis is performed (Pallant, 2011). The KMO test evaluates the degree of correlation between the variables as well as the precision of the sample size selection. Returning a result between 0 and 1, values closer to 1 reflect the suitability of the data for factor analysis. The null hypothesis that the correlation matrix of each variable is a matrix with identities, suggesting that the variables are uncorrelated, is tested using Bartlett's test of sphericity. The variables are correlated and suitable for factor analysis because the correlation matrix is not an identity matrix and a significant result ($p < 0.05$) confirms this (Okagbue et al., 2021; Yang, 2013). The data in **Table 6** are suitable for factor analysis, and Bartlett's test should be significant because the Kaiser-Meyer-Olkin value of 0.821 is closer to 1.

Table 6. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.821
Bartlett's Test of Sphericity	Approx. Chi-Square	1533.708
	df	15
	Sig.	.0001

Direct Test

The regression model shows linear regression for direct tests to check the direct impact of independent variables on dependent variables or is used to determine if a set of data is normal. In this method, original data serves as the dependent variable, and a group of randomly generated variables with normal distributions serves as the independent variable. The normal scores are typically generated using the cumulative distribution function of the inverse of the normal distribution (Pallant, 2011; Yang, 2013). The original data is probably regularly distributed if the residuals are. **Table 7** shows a strong direct relationship between museum digital communication awareness and the adaptability of educational technology (Beta Value= 0.721, T-Value= 20.242, P-Value= 0.0001). Therefore, the hypothesis was accepted.

Table 7. Direct Relation

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
		B	Std. Error			
1	(Constant)	1.261	.079		16.041	.0001
	Museum Digital Communication Awareness	.652	.032	.721	20.242	.0001

Mediating Effect

A statistical method known as mediation analysis is used to look at how an independent variable could indirectly affect a dependent variable through one or more mediators. The mediation approach is a statistical method for analyzing how an independent variable may have indirect effects on a dependent variable through one or more mediating factors (Okagbue et al., 2021; Sarstedt, Hair Jr, Nitzl, Ringle, & Howard, 2020). The fundamental tenet of mediation is that the dependent variable is influenced by both the independent and mediator variables. **Table 8** shows that the relationship between educational informativeness on the adaptability of educational technology is significantly mediated by educational commitment (T-Value= 5.126, P-Value= 0.0001). **Table 8** shows that the relationship between effectiveness on the adaptability of educational technology is significantly mediated by educational commitment (T-Value= 10.387, P-Value= 0.0001). **Table 8** shows that the relationship between shared understandings of education on the adaptability of educational technology is significantly mediated by educational commitment (T-Value= 10.514, P-Value= 0.0001). According to the results, all hypothesis was accepted.

Table 8. Mediating Effect

Model 4	Coefficient	T Value	P Value	LLCI	ULCI
Educational Informativeness	0.325	5.126	0.00001	0.2007	0.450
Effectiveness	0.484	10.387	0.00001	0.393	0.576
Shared Understanding of Education	0.5478	10.514	0.00001	0.445	0.650

Moderating Effect

A statistical method called moderation analysis is used to determine whether the relationship between two variables changes depending on the value of a third variable. The moderator is the name given to the third variable. The fundamental tenet of moderation is that the degree to which one variable influences another can influence the direction or strength of a relationship between two variables. Researchers can use moderation analysis to find out if the strength of the moderator variable affects how one variable affects another (Okagbue et al., 2021; Sarstedt et al., 2020). This method is frequently employed in social science research to assist in identifying the circumstances in which a relationship between two variables is more or less significant. **Table 9** shows that educational commitment strongly moderates the associations between museum digital communication

awareness and adaptability of educational technology, with an r-square value of 0.5715. Therefore, the premise was accepted.

Table 9. Moderating Effect

Model 1	Coefficient	T Value	P Value	Decision
Museum Digital Communication Awareness	0.2037	2.097	0.0003	Supported
Educational Commitment	0.1336	1.214	0.0002	Supported
R-square		0.5715		

Figure 2 shows the graphical diagram of educational commitment moderation results.

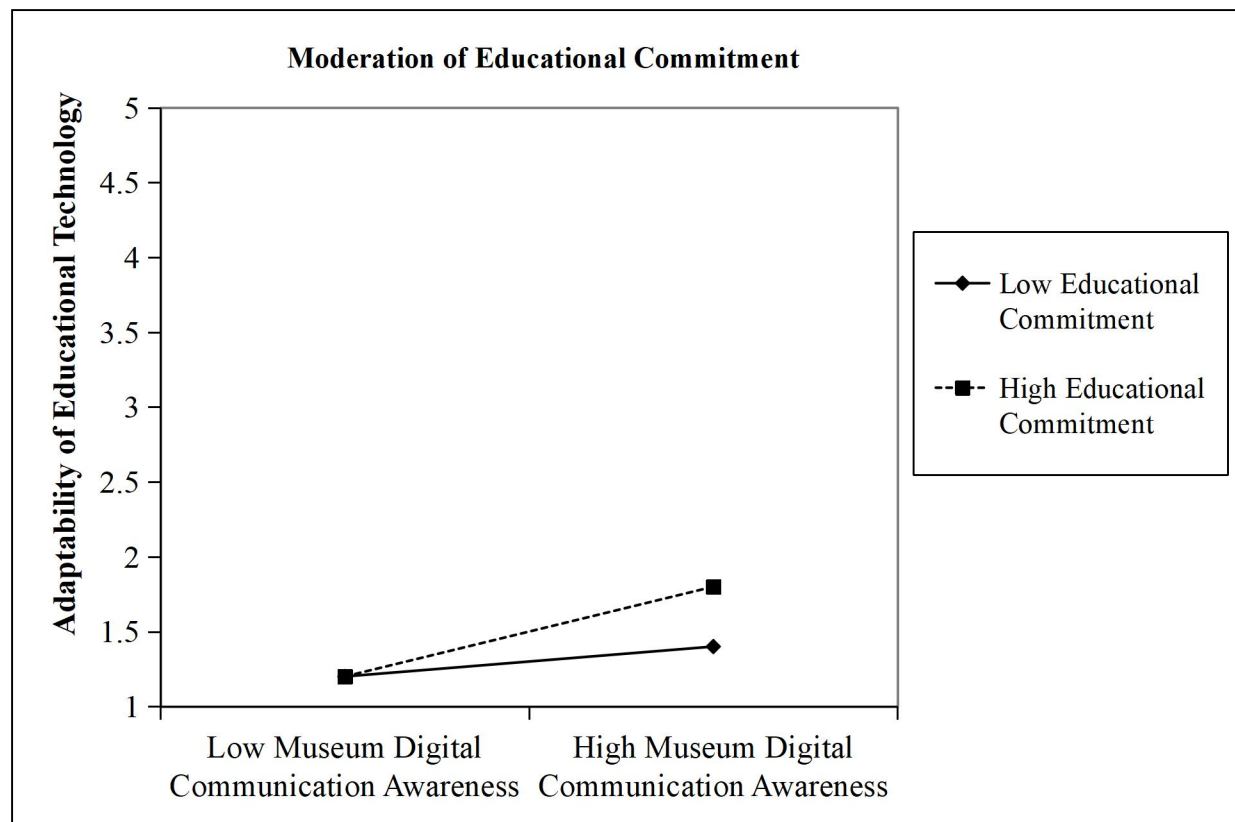


Figure 2. Moderation of Educational Commitment

DISCUSSION

This study examines the development of knowledge transmission theory as well as the reactions of modern Chinese public and private university students to digital museum communication. The present study shows the relationship between educational informativeness, effectiveness, and shared understanding of education on the adaptability of educational technology, the mediating role of museum digital communication awareness and the moderating role of educational commitment. All hypotheses were accepted which are tested by SPSS Process Macros (Okagbue et al., 2021; Sarstedt et al., 2020).

Museum digital communication awareness mediates the significant relationship between educational informativeness, effectiveness, shared understanding of education, and adaptability of educational technology. The importance of museums in the protection, interpretation, and transmission of cultural material has long been acknowledged (Agostino et al., 2020). As technology has advanced, museums are adopting digital platforms more frequently to improve their educational and outreach initiatives. A wider audience may be reached by museums, new learning opportunities can be created, and visitors can have engaging experiences thanks to the smart use of digital technologies. However, some elements, such as the acceptance of museum digital communication, educational informativeness, and efficacy, common understanding of education, and flexibility of educational technology, are crucial to the success of these projects. This knowledge may have an impact on how museums plan and carry out digital activities, how much they spend on technology, and how they measure their performance. Effective instructional materials can enhance learning, stimulate interest, and encourage interaction with museum exhibits and collections (Thornber et al., 2020). Virtual tours, multimedia lectures, and interactive exhibitions are just a few of the educational benefits that digital technologies may offer when used correctly. This knowledge can make it easier to make sure that digital technologies are used in a way that promotes the museum's broader educational objective. It can also assist museums in assessing the success of digital projects and informing future technological investment decisions. Staying current and responsive to evolving educational needs and expectations can be made possible by museums' ability to adapt to new technology. Additionally, it can support the long-term sustainability and scalability of digital activities.

Educational commitment moderates the significant relationship between museum digital communication awareness and the adaptability of educational technology. Among other factors, the school's resources, faculty support, and technical infrastructure can all affect adaptability. To succeed in any academic endeavor, you must have a strong commitment to learning. Permatasari et al (2020), found a positive correlation between educational dedication and knowledge of museum digital communication and students' ability to use educational technology in China. A dedication to education is necessary for the success of digital initiatives because it creates the foundation for adopting new technology into educational programs. Because it affects the development, application, and evaluation of these activities, awareness is crucial to their success. Digital technologies have great promise, and museums that recognize this are more inclined to invest in them and employ them in their teaching initiatives

Museum digital communication awareness has a significant impact on the adaptability of educational technology. The understanding of museum digital communication has a big impact on how easily instructional technology can be adapted in Chinese institutions. Universities are more willing to invest in and include these technologies in their curricula when they are aware of the possibilities of these technologies in museums. As institutions get better at utilizing new technologies to improve their educational offerings, educational technology becomes more adaptable. Additionally, the effect of museum digital communication understanding on the technology's flexibility is not restricted to the tool itself. It might also affect the way academic programmers are planned and carried out by institutions (Li, 2022). In the current digital era, museums are employing digital communication technologies more frequently to interact with audiences and advertise their collections. This has given students new possibilities to interact with museum materials and improve their educational experience. Students can access museum collections and other instructional resources at any time, anywhere, with the help of digital communication tools. Due to this, students can now learn more flexibly and take advantage of previously unavailable educational options. According to Saraih et al (2022), students who are more accustomed to using new technology resources and tools are more likely to have a better level of awareness of museum digital communication. This is because students are better prepared to interact with museum resources and other online educational resources when they are aware of digital communication tools and how to use them. Their academic success and performance may improve as a result.

The current study hypothesis H1, H2, and H3 has significant mediation relationships between museum digital communication awareness and educational informativeness, effectiveness, shared understanding of education, and adaptability of educational technology. The current study hypothesis H4 educational commitment

has a significant moderation relationship on museum digital communication awareness and adaptability of educational technology. The current study hypothesis H5 has a significant impact between museum digital communication awareness and adaptability of educational technology.

CONCLUSION

The present study shows the relationship between educational informativeness, effectiveness, shared understanding of education, adaptability of educational technology, the mediating role of museum digital communication awareness, and the moderating role of educational commitment among Chinese university students. The study emphasizes the significance of a shared understanding of concepts being communicated through educational technology by drawing on knowledge transmission theory. By improving information accessibility and the educational experience, museum-digital communication can buffer this relationship. Additionally, the moderating function of educational commitment highlights the significance of personal variations and motivating factors in the development and application of educational technology. The study contends that by giving students access to a larger variety of resources and encouraging participation and interaction, museum-digital communication might improve students' learning experiences. This is crucial in the context of China, where there is a rising need for access to information and high-quality education. The study also reveals the disparities in how students from public and private colleges use digital communication in museums. The investigation emphasizes how digital museum communication has the potential to improve student learning at both public and private colleges in China. According to the research, integrating these tools into learning environments can facilitate information availability and foster student involvement and interaction.

IMPLICATIONS

To lessen contributing effects that are unknown, new factors must be investigated. Students might benefit from technology to learn and comprehend. First and initial, universities must support instructional effectiveness and informativeness while fostering a common perspective of education. This can be achieved by encouraging faculty members to experiment with cutting-edge tools and instructional methods in a supportive environment. By developing a shared perspective of education, universities can ensure that all stakeholders are working towards the same goal and are aware of the potential for employing digital technology to enhance the educational experience. Universities should also work to make their teaching technology more adaptable. This can be accomplished by making investments in infrastructure and resources, offering faculty members training and assistance, and fostering an innovative culture that promotes experimentation and technological adaptation. Universities can better adjust to shifting educational demands and expectations and more successfully incorporate digital technology into their curricula by strengthening their capacity for adaptation. Thirdly, academic institutions must appreciate how crucial museum digital communication knowledge is to improve the flexibility of instructional technology. Universities may encourage the adoption of new technologies and improve the educational experience for their students by highlighting the potential of digital technology in museums. Fourth, organizations that give education a high priority are more likely to make investments in digital technologies and successfully incorporate them into their curricula. Universities should therefore prioritize their commitment to education and foster a strong sense of commitment to their educational mission. Finally, in knowledge transmission theory a shared comprehension of the concepts being communicated is necessary for efficient knowledge transmission. In this scenario, the ability of instructional technology to communicate information in a fashion that is both informative and understood by the student determines how effective it will be. Digital communication in museums can also serve as a link between educational technology and students, boosting information sharing and increasing the educational process. This demonstrates how crucial it is to take into account motivational and individual differences when developing and using educational technologies

LIMITATIONS AND FUTURE DIRECTIONS

Limitations

A variety of restrictions apply to the research on the interactions between educational informativeness, effectiveness, shared understanding of education, the flexibility of educational technology, and the identified

mediating and moderating factors. The study's small sample size may firstly limit the application of its conclusions to situations outside of China. Future research should increase the sample size and add participants from diverse countries to enhance the study's external validity. Second, the study's longitudinal design prevented it from looking at how different factors, such as mediating and moderating factors, affect the impact of educational technology use over time. A cross-sectional study should aid in simultaneously measuring the study participants' exposures and outcomes. Third, the study ignored qualitative elements of the learning process in favor of quantitative measurements of educational technology use. To acquire a more thorough understanding of how educational technology is used and how it may be improved, future studies might include mixed-methods approaches. Future research should involve more participants, and case studies will be conducted utilizing innovative techniques in addition to employing questionnaires. In this study, focus groups, surveys, and interviews may have all been employed. Face-to-face encounters might make it possible for probing and follow-up to collect information that would be very challenging to uncover with a traditional survey. Last but not least, although the study drew on knowledge transmission theory, future research should examine additional theoretical vantage points to delve deeper into the complicated interaction between educational technology and learning outcomes. Participants might provide a range of answers on surveys about additional issues. Sometimes decisions are taken without having read the entire question or the responses. The reliability of the statistics is frequently impacted by respondents' propensity to withhold information or make snap decisions. Because of the significant limitations brought on by the study's limited sample size, it was difficult to acquire better and more reliable results. A student's education level is a free variable used across the board in all of the studies. The researcher was forced to aggregate and synthesize the data into a strategy in order to make sense of the findings. The use of a quantitative, closed-ended questionnaire had yet another disadvantage. In the current study, use educational commitment as the moderator; for better understanding and results in future studies, use educational involvement or educational engagement as the moderator.

Future Research

To enhance the generalizability of findings, future research could involve participants from various cultural backgrounds and educational institutions. Comparing the reactions of students from different regions, educational systems, and socioeconomic backgrounds would provide a more comprehensive understanding of the relationships examined. Integrating qualitative methods, such as interviews or focus groups, alongside quantitative measures would offer a more comprehensive exploration of participants' experiences and perceptions. Qualitative data could provide deeper insights into the nuances of their reactions to digital museum communication. Comparing the reactions of students from different cultural backgrounds could shed light on how cultural factors influence perceptions of educational informativeness, effectiveness, and adaptability of technology. Cross-cultural analyses would contribute to a more holistic understanding of the phenomena under investigation. Future research could extend beyond university settings to include participants from various educational levels, such as K-12 schools or adult education programs. Examining how digital museum communication awareness and educational commitment impact individuals across different educational stages could reveal valuable insights. Researchers could consider experimental designs to explore causal relationships between variables more rigorously. Manipulating levels of museum digital communication awareness or educational commitment and observing their effects on educational informativeness, effectiveness, and technology adaptability would provide stronger evidence of causal links.

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Appendix 1

Demographic Information (Please chose one option from Demographic information)

Gender

_____ Male

_____ Female

Age

_____ Between 20 to 30

_____ Between 30 to 40

_____ Above 40

Qualification

_____ BS

_____ MS

_____ Ph.Ds.

Sector

_____ Public

_____ Private

Table 10. Questionnaire Items

Contemporary Education	1	2	3	4	5
Educational Informativeness					
Digital education is informative to me.					
Digital education is resourceful to me.					
Digital education is knowledgeable for me					
Digital education is useful to me.					
Effectiveness					
The information on the education is convenient.					
The information on the education is accurate.					
The information on the education is up to date.					
The information on the education is complete.					
The information on the education is relevant.					
Shared Understanding of Education					
I understand how the other party is feeling by reading his/her facial expressions or gestures.					
I try to think how my friends would feel if I snap at them with frustration.					
During the conversation, I keep thinking how the other side would understand/interpret my comments					
Museum Digital Communication Awareness					
Digital environmental cognition about education.					
Cultural adaptive cognition about education.					
Communicator awareness about education.					
Adaptability of Educational Technology					
Platform supervision for educational trainings.					
Discuss about technology rationality.					
Educational crises awareness.					
Education and life priorities.					
Equality in digital education.					
Educational Commitment					
Learning is an excellent commitment.					

Contemporary Education	1	2	3	4	5
I enjoy being involved in activities in this universities related to education.					
This education gives me satisfaction.					
I enjoy my university work very much.					

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree