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Hybrid learners' intention on B-station: A case study of Art primary students at A University in the People's Republic of China

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Abstract

Background and Aim: Information technology skills are crucial for teachers and students. Strengthening the support of technology in the history of art or the history of design courses can enhance teaching quality, foster students' comprehensive artistic literacy and innovation ability, and advance the development and progress of art education. With the continuous progress and development of technology, it is increasingly important in the education of art and design history, providing students with a broader understanding of the subject. This research not only investigates students' intention to use B-station, a video website, to learn the history of art or the history of design but also provides practical insights into the role of technology integration in learning art and design history, which can be applied in the classroom setting.

Materials and Methods: To ensure the reliability of the study, a questionnaire was distributed to College of Fine Arts students at a university in China, resulting in 506 valid responses. The quantitative data were then analyzed using JAMOVI2.4.6. To measure the internal consistency of the questionnaire, Cronbach's α and McDonald's ω were used. Factor analysis was performed using EFA and CFA, and hypothesis testing was conducted using SEM, further enhancing the robustness of the study's findings.

Results: The research proposed ten alternative hypotheses. The results indicated that eight hypotheses were accepted, and two were rejected. It was found that ACL, as a mediator variable, cannot enhance the impact of LII on ILB. Similarly, PBC, as a mediating variable, cannot enhance the impact of AL on ILB.

Conclusion: The survey questionnaire employed in this study was adapted from willingness scales used in other countries. Unlike previous studies, the findings imply that ACL and PBC did not have a significant mediating effect. This may be attributed to differences in research subjects and environments. This study helps study Chinese students' learning habits, preferences, and teaching styles.

Keywords: Art History; Design History; Art Primary Students; Intention on B-station

Introduction

Education is gradually transforming under the new technological revolution (UNESCO, 2021). Today's college students are a generation that grew up in a digitally rich environment, surrounded by various learning platforms supported by information and communication technologies (ICT) (Rashid& Asghar, 2016). ICT allows learners to access vast resources conveniently, reducing the cost of time and widening the range of benefits. This allows more people to participate in learning (UNESCO, 2021). According to the United Nations (2021), countries are dedicated to enhancing online learning environments and providing more assistance to learners and instructors. With the rapid development of ICT, students should adapt to the trends of the times and use ICT to promote learning knowledge (UNESCO, 2018). According to the United Nations (2015), ICT is crucial in achieving inclusive and fair quality education and lifelong learning opportunities for all individuals. Numerous studies have shown that digital technology can significantly enhance learning (Beetham& Sharpe, 2013; Fonseca et al., 2014; Fisher et al., 2018).

Studying the history of art and design can be challenging for art students, but it is a mandatory course for art majors. It is a crucial component of humanistic literacy and forms the foundation of their artistic practice (Hong, 2016). In universities, students majoring in art are primarily responsible for these roles. They will become future art teachers in primary education and social art educators, playing a crucial role in cultural inheritance, cultural exchange, and improving quality (Zhu, 2019). By utilizing information tools

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to master core competencies, such as information technology, image interpretation, aesthetics, and critical thinking, students can better prepare themselves to become excellent art educators and engage in related professional work(World Economic Forum, 2016). Additionally, learners should cultivate deep learning abilities and communication and collaboration skills. Technology integration can accelerate acquiring these skills (O'Flaherty& Phillips, 2015; Yarbro et al., 2014). The achievement of learning outcomes in this field directly or indirectly impacts the quality of cultural inheritance and communication and determines the level of popular artistic taste. Therefore, it is evident that ICT plays a crucial role in this area.

For art history instructors, it is essential to follow the chronological order of the history of art and the history of design based on the learning laws and writing logic. This will help transform art history's teaching mode, reform curriculum design, promote cooperative learning among learners, and improve the quality of education, teaching, and talent cultivation. Technology can be used to solve problems in teaching while also rediscovering the value of art history(Zhu, 2019). This can enhance learners' learning interest and intrinsic efficiency (Fisheret al., 2018). Following the requirements of technical and professional core literacy that learners should possess during the new technological transformation, it has become an unavoidable proposition of our time to gradually clarify the future development direction and effectively promote the teaching and learning of art history and design history (Jaskot, 2019).

Objectives of Research

Preliminary research was conducted at the College of Fine Arts of a university in China, which found that learners have limited access to high-quality resources, exhibit weak learning initiative, lack self-discipline, and have low self-evaluation when studying the history of art. The researchers identified four research objectives:

To identify learners who lack autonomy in learning, even though they recognize the importance of the history of art.

To discover functions the B-station can provide to enhance learners' interest in art history.

To identify factors affecting learners' intention to research art history with B-station.

To design a hybrid instruction to improve learner engagement.

Literature review

ICAP framework

Chi's (2009) Interactive-Constructive-Active-Passive (ICAP) framework for interactive learning research categorizes learning activities into interaction, construction, participation, and passivity, with decreasing effectiveness in that order. Learners benefit most from interactive activities that involve discourse. This study examines communication and interaction within the ICAP framework between peers and instructors. Passive participation describes cognitive engagement and includes four learning behaviors. ICAP theory classifies learner engagement levels based on behaviors. Interactive learning is more effective than constructive, which is more effective than active. The text maintains a formal, transparent, objective, and neutral tone, with consistent research supporting the superiority of interactive learning. Chi's research (2021) outlines the learning progression within ICAP as I > C > A > P, emphasizing the importance of dialogue in generating new knowledge in interactive activities.

Social Constructivism Theory

Social constructivism posits that cognitive development is a social rather than an individual process. Atwater (1996), Lemke (2001), Palincsar (1998), and Barbara (1998) support this theory and emphasize learning with peers and expert partners. Collaborative learning improves outcomes by promoting social interaction and higher-order thinking. Social constructivism incorporates sociocultural theory (Vygotsky, 1978) and sociocognitive conflict theory (Piaget et al., 1985), emphasizing interactive and collaborative learning. Vygotsky's sociocultural theory emphasizes learning as a social, dialogical process that relies on language for cognitive progress. Interaction with peers fosters internal developmental processes, expanding the concept of human-environment interaction to include symbols and tools. Piaget's socio-cognitive conflict theory suggests that intellectual development results from cognitive conflicts in social interactions. When individuals encounter opposing viewpoints, they reorganize cognition and generate new ideas.

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Communication among learners and peers can enhance cognitive development and foster personal growth and transformation.

Self-Determination Theory (SDT)

Self-Determination Theory (Deci& Ryan, 2000) explains learning autonomy, where learners develop plans based on goals and adjust strategies independently for optimal results. Skilled learners can modify learning processes autonomously, while less skilled learners may struggle with autonomy and exhibit passivity. They understand motivation's "what" and "why" involve three critical needs. Autonomous behavior reflects personal volition, which occurs when individuals find tasks exciting or essential. This theory is commonly used in research on learning motivation. Learners' autonomy is enhanced by choice, instruction control, and instructor and peer support. High initial levels of motivation correlate with positive perceptions and increased interest. Learners with higher levels of autonomy tend to persist, adapt to challenges, and achieve higher grades. SDT posits that levels of autonomy influence motivation in the learning environment, which involves multiple forms of causality. Teachers should take a student-centered approach by providing resources and respecting individual problem-solving methods to foster autonomy. Emphasizing autonomy in learning allows learners to explore topics and enhance their educational experience freely.

The Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is a widely used framework for understanding human behavior that focuses on the challenges of specific behaviors and how intentions are formed or abandoned. Developed by Ajzen in the 1980s from the Theory of Rational Action (TRA), TPB incorporates perceptual behavioral control. TPB has become a fundamental tool in psychological and social science research. According to TPB, perceived behavioral control (PBC) is crucial in predicting behavioral intention. PBC reflects the perceived difficulty of performing a behavior and influences actual behavior. Individuals with high perceived behavioral control are likelier to have solid intentions and persist toward goals. Positive attitudes toward controllable behaviors increase intention and control, increasing the likelihood of goal attainment. External factors such as time, weather, and transportation influence behavioral implementation. Individuals act on intentions when opportunities arise, underscoring the importance of managing resources for successful behavior execution. Having the necessary resources and opportunities is critical to successful behavior.

Interaction with Peers (IWP)

Peer interaction involves interpersonal activities between learners to facilitate discourse. Effective turn-taking in conversations is crucial for interactive behavior, as emphasized by Chi and Wylie (2014). Genuine interaction goes beyond the completion of tasks to include ongoing discourse and ideological debate, leading to increased knowledge. Participants benefit from such interactions, which are supported by research. Dialogue characterized by high turn-taking and equal participation is essential for effective peer interaction, as described by Chi and Wylie (2014), Damon (1984), and Rafal (1996). Learners' verbal expression of knowledge improves learning outcomes, according to Bransford and Cheche Konnen (Sawyer, 2021; Marrett, 2021). Gathering curriculum resources now involves collaborative efforts between instructors and learners. Dialogue is an interaction in which both parties seek to learn from each other, highlighting the importance of interaction and learning communities in the literature.

Learner–instructor interaction (LII)

Learner-instructor interaction involves exchanging questions, opinions, and discussions to facilitate timely feedback, emotional support, and engagement in learning activities to enhance learning performance. Abrantes et al. (2007) and Roorda et al. (2011) emphasize the importance of this interaction for effective learning environments, both in the classroom and on social platforms. In these interactions, instructors contribute more academically due to their broader perspective and knowledge. This dynamic is similar to a one-on-one dialogue where learners integrate information and instructor resources into new knowledge, an essential part of the learning process. The accuracy and completeness of learners' explanations are essential, and instructional strategies can increase the depth of their thinking (Webb et al., 2009). Effective communication involves guiding learners to think and act independently, which supports the scaffolding theory. Scaffolding theory suggests providing clues and hints to help learners solve problems rather than directly telling them what to do (Sawyer, 2021).

Active Collaborative Learning (ACL)

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In collaborative learning, learners are divided into small groups to complete tasks in a pipeline fashion, similar to pipeline operations. In contrast, cooperative learning involves group members working independently before coming together to form a whole (Marrett, 2021). Collaborative learning allows learners to work together, learn from each other, resolve differences, and build new knowledge from different perspectives. Explaining ideas to peers helps reconstruct knowledge in new ways and improves problem-solving, critical thinking, and explanation skills. The "pair check" procedure can be used to provide more opportunities for learners to solve problems. Collaborative learning encourages interpretation, constructive activities, and knowledge generation (Webb et al., 1995). Teachers must be confident in implementing collaborative learning and adapt their teaching methods accordingly (Chi et al., 2014). Sharing teaching materials online can improve access to learning and create a positive learning atmosphere by encouraging sharing experiences.

Perceived Self-efficacy (PSE)

Self-efficacy refers to an individual's belief in their abilities (Bandura, 1997) and directly impacts academic achievement (Stajkovic et al., 2018). Bandura (2022) suggests that learners can increase their self-efficacy by using a broader range of learning strategies, emphasizing clear language, objective assessments, and effective time management. High academic efficacy is associated with cognitive strategies, effective time management, and self-regulation. Effective teachers provide guidance and devote more class time to academic activities. Struggling students can improve with effort and appropriate techniques, while low teacher self-efficacy can hinder teaching effectiveness. Classroom discipline, educational resources, and parental support influence teachers' self-efficacy. Teachers should analyze the reasons for learners' low self-esteem in art history learning and enhance their self-affirmation and initiative. ICT self-efficacy expands the concept of self-efficacy by emphasizing digital literacy and the use of technology in online learning. Research shows a positive correlation between learners' ICT competence and ability to complete tasks effectively.

Autonomous Learning (AL)

Autonomous learning involves taking responsibility for planning, mastering, managing, and completing one's learning, also known as self-learning, self-directed learning, autodidactic learning, or learner autonomy. This approach is becoming increasingly important in online learning due to information and communication technology (ICT) advances. Learning resources include traditional materials and those provided by contemporary instructional technologies (Benson, 2001). The development of technology and the expansion of ICT-based educational tools have emphasized the importance of learning autonomy (Blin, 2004; Groß& Wolff, 2001; Kaltenbock, 2001). Studies have shown a positive correlation between learning autonomy and technology use (Rashid& Asghar, 2016). Learners' motivation and autonomy may change as they age, affecting their learning goals and competencies. Learners may align their learning strategies with future career plans and adapt their processes and strategies to meet future needs (Marrett, 2021).

Perceived Behavioral Control (PBC)

Perceived behavior control, as defined by Ajzen (2002), refers to an individual's perception of their ability to perform a task and its perceived difficulty. PBC reflects the subjective control over task performance rather than guaranteeing a specific outcome. When applied to intentions to perform a task, PBC has both strengths and limitations. Learners' control over their study of art history refers to planning when, what, how, and how much they study rather than controlling the expected learning outcomes. Ajzen (1985) suggests that an individual's confidence and motivation directly influence behavioral control, impacting intentions and subsequent actions. Teachers play a crucial role in fostering learners' confidence to enhance learning outcomes in art history. By instilling confidence, learners can develop effective learning plans and take action to study art history. Utilizing various learning strategies, such as collaboration and sharing, can improve learning effectiveness as learners become more accustomed to the technological environment (Cheon et al., 2012). To achieve high scores or pursue career goals like teaching art history, learners must set goals and take action, such as enrolling in online courses, researching resources, and completing assignments. While effort and determination are essential, cognitive control alone may not be sufficient due to the complexity of art history and various factors that influence the desire to learn it.

Intention to Learn with the B-station (ILB)

Two models were referenced to explore learners' intention to use B-station: the intention to use online learning communities (Liu et al., 2010) and the intention to adopt m-learning (Cheon et al., 2012). Liu et al. (2010) found that intention, a subjective factor, is directly influenced by perceived interaction. This

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highlights the importance of establishing a learner-centered classroom, empowering learners to take the lead in their learning process. Encouraging learners to take responsibility for their learning can enhance critical thinking skills and self-motivation (Cheon et al., 2012). Additionally, learners' ability to manage their perceptual behavior is closely tied to task completion. Confidence in task completion significantly enhances behavior control and vice versa. Technology has revolutionized professional development and information acquisition in online learning. Instructors can use Information and Communication Technologies (ICT) to create courses that promote learners' knowledge and critical thinking abilities. These technologies provide access to vast information, enabling continuous and reflective learning and nurturing knowledge communities (UNESCO, 2011). Teachers should choose appropriate technology tools to support their teaching, such as mobile technology and social software for real-time communication. These tools help design a curriculum that integrates technology and develops learning activities supported by technology.

Conceptual Framework

This research model (Fig.1) is based on the ICAP framework, Social Constructivism Theory, the Theory of Planned Behavior (TPB), and Self-Determination Theory (SDT). The variables used in the model are from the previous research of Liu et al. (2010), Cheon et al. (2012), and Qureshi et al. (2021). The research examines the factors that influence learners' intention to choose B-station for learning the history of art or the history of design. The research identifies four independent variables (Interaction with peers, Learner-instructor Interaction, Perceived Self-efficacy, and Autonomous Learning) and two mediating variables (Active collaborative learning and Perceived Behavioral Control) that may affect this intention. The research examined how independent variables affect the mediating and dependent variables and the mediating effect. The conceptual model research hypothesis is as the following:

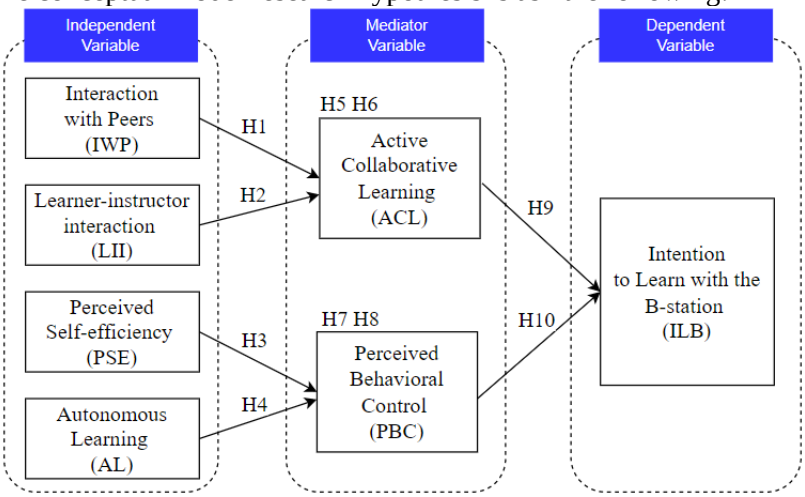

Fig.1.Conceptual model.

H_a1: Interaction with peers has a statistically significant effect on active collaborative learning.
H_a2: Learner-instructor interaction has a statistically significant effect on active collaborative learning.
H_a3: Perceived self-efficacy has a statistically significant effect on perceived behavioral control.
H_a4: Autonomous learning has a statistically significant effect on perceived behavioral control.
H_a5: Active collaborative learning can strengthen the impact of interaction with peers on the intention to learn with the B-station.
H_a6: Active collaborative learning can strengthen the impact of learner-instructor interaction on the intention to learn with the B-station.
H_a7: Perceived behavioral control can strengthen the impact of perceived self-efficacy on the intention to learn with the B-station.

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H_a8: Perceived behavioral control can strengthen the impact of autonomous learning on the intention to learn with the B-station.
H_a9: Active collaborative learning has a statistically significant effect on the intention to learn with the B-station.
H_a10: Perceived behavioral control has a statistically significant effect on the intention to learn with the B-station.

Methodology

Instrument: *Quantitative research methods were employed in this study. A 5-point Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The hypothesis was tested using a questionnaire of 25 questions designed to measure the seven constructs of the research model. The study examines various aspects of learning, including test interaction with peers (3 items), learner-instructor interaction (4 items), collaborative learning (4 items), perceived self-efficacy (4 items), autonomous learning (4 items), perceived behavioral control (3 items), and intention to learn with the B-station (3 items). Some of the items include reverse questions. The items used in this research were adapted from previous studies and modified to fit the current subjects. Data was analyzed using JAMOVI2.4.6 software.*

Data Collection: This research takes learners from the College of Fine Arts of a university in China as the sample objects. The college has a total of 1333 undergraduate and graduate learners. Electronic questionnaires were distributed to 218 graduate learners using WenJuanXing, but only 42 were submitted. To improve the response rate, paper questionnaires were distributed to undergraduate learners during breaks, resulting in the collection of 699 questionnaires. A total of 741 electronic and paper questionnaires were collected. After removing invalid questionnaires, 506 valid questionnaires were obtained.

Results

Descriptive Statistics of Variables

A statistical description of the 25 items revealed that the data exhibits typical distribution characteristics such as mean, standard deviation, skewness, and kurtosis. Mean describes the central tendency of the sample, while the standard deviation (SD) describes the variability. SD represents the difference between a numerical value and the mean value. The larger the value, the more significant the difference. These two indicators are also used to describe the normal distribution of variables. In this research, the Mean ranges from 3.33 to 3.86, and the SD ranges from 0.745 to 0.908. Therefore, the data is considered to have a normal distribution within an acceptable range. Generally, skewness between -2 and +2 and kurtosis between -7 and +7 can be accepted (Hair et al., 2010). The skewness of this research ranges from -0.63 to 0.116, and the kurtosis values range from -0.779 to 0.642. Both skewness and kurtosis fall within the recommended threshold range.

Model Reliability

Cronbach's α and McDonald's ω are methods for measuring the internal consistency of a model. Usually, Cronbach's α above 0.7 indicates acceptable consistency, above 0.8 indicates good consistency, and above 0.9 indicates good consistency. McDonald's ω coefficient of less than 0.6 indicates poor reliability, between 0.6 and 0.7 indicates acceptable reliability, between 0.7 and 0.8 indicates good reliability, and above 0.8 indicates high reliability. After calculation, the research found that Cronbach's α was 0.929 and McDonald's ω coefficient was 0.930, indicating high internal consistency and good model reliability.

Convergent Validity and Discriminant Validity

The validity of scaling tools is related to the effectiveness of the measurement, which generally includes convergent and discriminant validity. Convergent validity measures the structural validity of the model by assessing the correlation between items in the same dimension and calculates the average variance extraction (AVE) using standard loadings. When the Stand. The estimate is more significant than 0.5, the average variance extraction (AVE) is more significant than 0.50, and the composite reliability (CR) is more significant than 0.7, which indicates that the measurement model has good convergent validity (Hair et al.,

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2006). Table 1 shows that the Stand. Estimate values for the variables (25 items) in the measurement model range from 0.626 to 0.897, all greater than 0.5. The AVE values range from 0.55 to 0.676, which is also more significant than 0.5, and the CR values range from 0.829 to 0.86, which are all greater than 0.7. These results indicate that the measurement model has good convergent validity. To test the correlation between different variables, discriminant validity is assessed using the square root value of AVE. If the square root of the diagonal AVE is greater than the correlation coefficient of the horizontal or vertical column, it indicates discriminant validity. In Table 2, after measuring the correlation coefficient, the square root of the diagonal AVE is greater than the correlation coefficient of the horizontal or vertical column, indicating that the scale has good discriminant validity.

Table 1 Factor Loading

Factor	Indicator	Estimate	SE	Z	p	Stand. Estimate	AVE >0.5	CR >0.7
Interaction with Peers	IWP1	0.573	0.031	18.4	< .001	0.740	0.639	0.841
	IWP2	0.630	0.030	21.3	< .001	0.823		
	IWP3	0.630	0.029	21.7	< .001	0.832		
Leaner–instructor Interaction	LII1	0.575	0.033	17.6	< .001	0.728	0.564	0.838
	LII2	0.561	0.030	18.5	< .001	0.754		
	LII3	0.670	0.037	18.3	< .001	0.749		
	LII4	0.619	0.032	19.1	< .001	0.773		
Active Collaborative Learning	ACL1	0.632	0.029	22.1	< .001	0.838	0.604	0.858
	ACL2	0.581	0.029	19.8	< .001	0.777		
	ACL3	0.554	0.031	17.7	< .001	0.718		
	ACL4	0.629	0.032	19.6	< .001	0.772		
Perceived Self-Efficacy	PSE1	0.703	0.030	23.4	< .001	0.866	0.593	0.852
	PSE2	0.480	0.032	14.9	< .001	0.626		
	PSE3	0.583	0.033	17.8	< .001	0.722		
	PSE4	0.738	0.033	22.4	< .001	0.842		
Autonomous Learning	AL1	0.652	0.031	21.0	< .001	0.818	0.550	0.829
	AL2	0.562	0.031	18.0	< .001	0.734		
	AL3	0.558	0.036	15.6	< .001	0.659		
	AL4	0.617	0.033	18.5	< .001	0.746		
Perceived Behavioral Control	PBC1	0.791	0.033	24.1	< .001	0.897	0.676	0.860
	PBC2	0.576	0.034	17.0	< .001	0.695		
	PBC4	0.782	0.034	22.8	< .001	0.861		
Intention to Learn with the B-station	ILB2	0.702	0.029	24.0	< .001	0.896	0.645	0.842
	ILB3	0.644	0.030	21.2	< .001	0.820		
	ILB4	0.561	0.034	16.3	< .001	0.678		

AVE: Average Variance Extracted; CR: Composite Reliability

Table 2 Discriminant Validity

	IWP	LII	ACL	PSE	AL	PBC	ILB
IWP	**0.799**						
LII	0.543	**0.751**					
ACL	0.582	0.493	**0.777**				
PSE	0.453	0.344	0.506	**0.770**			

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	IWP	LII	ACL	PSE	AL	PBC	ILB
AL	0.526	0.412	0.562	0.587	**0.741**		
PBC	0.315	0.186	0.394	0.392	0.353	**0.822**	
ILB	0.474	0.306	0.485	0.472	0.457	0.403	**0.803**

Note: IWP: Interaction with Peers; LII: Learner Instructor Interaction; PSE: Perceived Self-Efficiency; AL: Autonomous Learning; ACL: Active Collaborative Learning; PBC: Perceived Behavioral Control; ILB: Intention to Learn with the B-station.

Model Fit

Model fitting tests the degree of fit between the conceptual model data and the actual sample data. Commonly used criteria are RMSEA in the range of 0.05 to 0.08 (Navarro&Foxcroft, 2022), CFI>0.93 (Hair et al., 2006), and TLI>0.95 (Sharma et al., 2005). The CFA fit data for this study were RMSEA=0.045, CFI=0.962, and TLI=0.955, indicating excellent fit (Table 3).

Table 3 CFA Model Fit Indices and Adjustments

Fit Index	Acceptable Criteria	Source	Statistical Values
RMSEA	≤ 0.08	Navarro & Foxcroft (2022)	0.045
CFI	≥ 0.93	Hair et al. (2006)	0.962
TLI	≥ 0.95	Sharma et al. (2005)	0.955
Model Summary		In harmony with empirical data	

Note: RMSEA stands for Root Mean Square Error of Approximation, CFI for Comparative Fit Index, and TLI for Tucker-Lewis Index.

Structural Equation Model (SEM)

The conceptual model was tested using the structural equation method (SEM) using JAMOVI2.4.6.Parameter estimation is performed using the maximum likelihood method. The model exhibits a strong fit based on the measurement results (Fig.2). Usually, the criteria of x^2/df is less than 3, CFI≥ 0.80(Hooper et al., 2008), TLI≥ 0.80 (Sharma et al., 2005), GFI≥ 0.90 (Cho et al., 2020), SRMR≤ 0.08 (Cho et al., 2020), RMSEA≤ 0.10 (Hooper et al., 2008) to be considered acceptable. After running SEM, the results are shown in Table 4, x^2/df=2.422, CFI=0.944, TLI=0.937, GFI=0.985, SRMR=0.070, RMSEA=0.053. The model fitting results are excellent.

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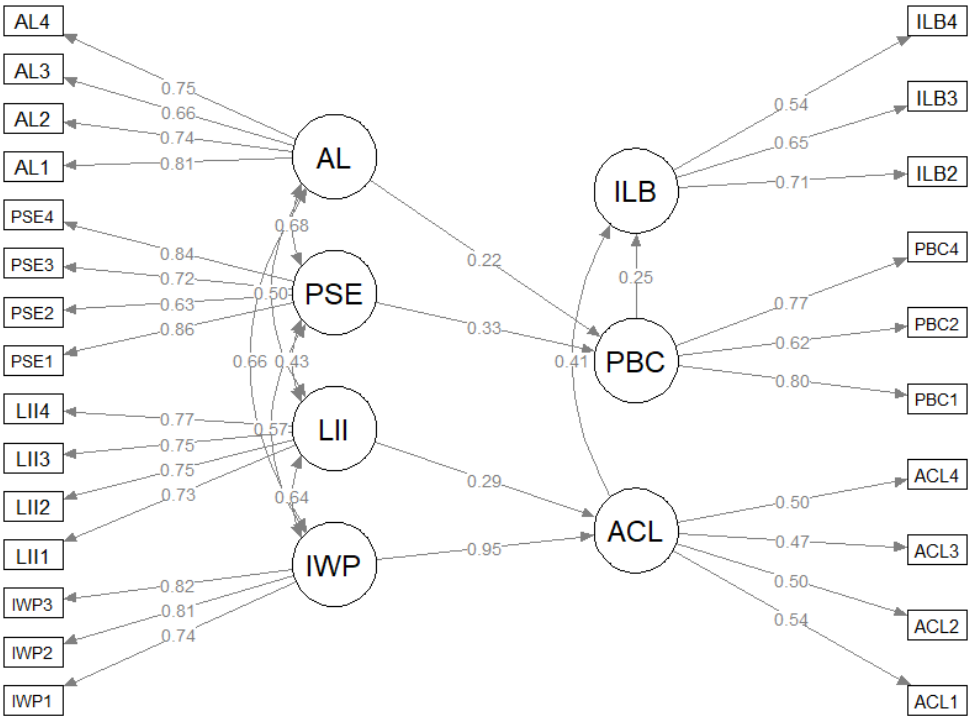

Fig.2. Structural Equation Mode

Table 4 Fit Indices Results of the Structural Equation Model

Fit Index	Acceptable Criteria	Source	Statistical Values	Interpretation
x^2/df	≤3.00		2.422	excellent
CFI	≥ 0.80	Hooper et al., 2008	0.944	excellent
TLI	≥ 0.80	Sharma et al., 2005	0.937	excellent
GFI	≥ 0.90	Cho et.al., 2020	0.985	excellent
SRMR	≤ 0.08	Cho et.al., 2020	0.070	excellent
RMSEA	≤ 0.10	Hooper et al., 2008	0.053	excellent
Model Summary			In harmony with empirical data	

Note:x^2/df: the ratio of chi-square to the degree of freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; GFI: Goodness of Fit Index; SRMR: RMSEA: Root Mean Square Error of Approximation,

Hypothesis Testing

The study presents the standardization coefficients (β) in Table 5. These coefficients determine the validity of the hypothesis. A path coefficient (β) less than 0.1 indicates a relatively small impact, around 0.3 is considered a moderate effect, and more significant than 0.5 is a significant impact. The standardization coefficient (β) of H1 is 0.623, and H9 is 0.503, indicating that IWP has a significant impact on ACL, and ACL has a significant impact on ILB. The standardization coefficient (β) of H3 is 0.294, indicating that PSE moderately impacts PBC. The standardization coefficients for H2, H4, and H10 are 0.187, 0.198, and 0.221, respectively. This indicates that LII impacts ACL, AL impacts PBC, and PBC impacts ILB, but the impact is relatively small. Overall, both H1 to H4 and H9 to H10 are supported.

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Table 5 SEM Parameter Estimates

Hypothesis	Estimate	SE	Lower	Upper	β	z	p	Result
H1	0.682	0.0709	0.5427	0.821	0.623	9.61	< .001***	Supported
H2	0.203	0.0631	0.0792	0.326	0.187	3.22	0.001**	Supported
H3	0.331	0.0792	0.1754	0.486	0.294	4.17	< .001***	Supported
H4	0.243	0.0872	0.0719	0.414	0.198	2.78	0.005**	Supported
H9	0.556	0.0534	0.4512	0.661	0.503	10.41	< .001***	Supported
H10	0.193	0.0394	0.1161	0.271	0.221	4.9	< .001***	Supported

Note:***p < .001, **p < .01, *p < .05; N = 506.

The researcher performed percentile bootstrapping with 1000 bootstrap samples at a 95% confidence interval. Additionally, the researcher calculated the confidence intervals for the lower and upper bounds and checked if they included zero. Generally, if the 95% confidence intervals of the lower and upper bounds are 0, indicating that the mediating effect is not significant. Table 6 lists the mediating effects, Ha5 (β=0.313, p<.001), which was supported. Ha6 (β=0.094, p=0.041), the 95% confidence intervals of the lower and upper bounds -0.011 to 0.226, 0 was included, so it was not supported. Ha7 (β=0.065, p=0.01) was supported, and Ha8 (β=0.044, p=0.058) was rejected due to no significance.

Table 6 Mediating Effects of ACL and PBC

				95% Confidence Intervals					
Hypothesis	Description	Estimate	SE	Lower	Upper	β	z	p	Result
H5	IWP ⇒ ACL ⇒ ILB	0.389	0.081	0.248	0.570	0.313	4.795	<.001***	Supported
H6	LII ⇒ ACL ⇒ ILB	0.117	0.057	-0.011	0.226	0.094	2.042	0.041*	Not Supported
H7	PSE ⇒ PBC ⇒ ILB	0.081	0.031	0.029	0.153	0.065	2.568	0.01*	Supported
H8	AL ⇒ PBC ⇒ ILB	0.054	0.029	0.006	0.122	0.044	1.894	0.058	Not Supported

Note. The bootstrapping sample of estimation is 1000. *** = P<.001, **p < .01, * = P<.05

Discussion

The research results answered four research questions.

1: Traditional teaching methods can no longer meet learners' needs for learning the history of art or the history of design. The lack of extracurricular knowledge, limited quality resources, and inadequate hardware facilities severely limit learners' perspectives. Faced with a vast sea of knowledge points in the history of art or the history of design, they feel that the challenge is too great. Without a personal interest or passion for the course, learners may struggle to learn well and invest the time and energy required for independent exploration.

2: Online teaching must utilize digital resources and online platforms to compensate for the limitations of offline teaching. Hybrid teaching enhances individual learning styles and preferences through diverse resources and activities, integrating practical applications of the history of art or the history of design to promote understanding and relevance. It facilitates collaborative learning through online forums, group projects, and peer feedback. Online forums transcend spatial and temporal barriers, allowing interaction with peers and experts to share knowledge. This approach creates a dynamic learning environment that increases interest in art or design history by improving the accessibility, relevance, and appeal of the content.

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3: Positive peer relationships promote active participation, interest in learning, and cooperative learning. LII may not influence ACL. Self-efficacy directly influences learners' intention and confidence in learning the history of art or the history of design via B-station. Confidence in mastering art history via B-station influences learning intention. Autonomous learning increases the depth and breadth of learning by enabling personalized and in-depth activities based on individual interests and needs. Learners' behavioral control and execution skills while learning art history on B-station can increase their learning intention.

4: Use technology to illustrate knowledge challenges. Enhance art and design history presentations with engaging visuals such as images, video, and animation to reinforce key points and clarify complex concepts. Encourage active participation in interactive activities that promote peer interaction, collaboration, and knowledge sharing through group projects, peer reviews, and online discussions. Personalize online content delivery to meet learners' needs, providing tailored feedback and adaptive learning paths to increase engagement. Establish clear learning objectives to guide learners throughout the course and cultivate self-directed learning skills by enabling content selection, progress tracking, and course selection based on individual preferences. By incorporating these strategies into online art history or design history instructional design, instructors can create a more engaging and interactive learning environment that motivates learners to actively participate, explore new concepts, and achieve learning goals.

This research investigates learners' willingness to use Bilibili as a platform for learning art or design history. The ICAP framework (Chi, 2009), social constructivism theory, self-determination theory, and planned behavior theory constructed by previous researchers have become the theoretical basis for this study. Variables for this research are provided by models constructed in previous studies by Qureshiet al. (2021), Cheon et al. (2012), and Liu et al. (2010). The ICAP framework and social constructivist theory can explain the relationship between IWP, LII, and ACL. The self-determination theory explains the impact of AL on PBC and PSE using self-efficacy theory, and the behavioral triggering mechanism of ILB is explained by the planned behavior theory. The data was analyzed using Jamovi 2.4.6 software, including descriptive statistics, reliability and validity tests, factor analysis, and structural equation modeling. The research findings indicate that IWP significantly impacts ACL, significantly affecting ILB. PSE significantly impacts PBC, which in turn significantly affects ILB. Additionally, LII has a weaker impact on ACL. AL has a relatively minor impact on PBC, which also affects ILB. The mediating effect of ACL between IWP and ILB is significant, while the mediating effect between LII and ILB is not significant (confidence interval includes 0). The mediating effect of PBC between PSE and ILB is significant, while the mediating effect between AL and ILB is not significant ($p>0.05$). The hypothesis that ACL can enhance the impact of LII on ILB has been refuted, while the hypothesis that PBC can enhance the impact of AL on ILB has been rejected. All other assumptions are accepted. In summary, the impact of teacher-student interaction on cooperative learning is relatively small, while AL has little effect on PBC. The IWP has a significant impact on ACL, and PSE has a significant impact on PBC. Additionally, ACL did not enhance the impact of LII on ILB. PBC does not enhance the impact of AL on ILB, but it can enhance the impact of PSE on ILB. Our research findings contribute to investigating the current willingness of learners to use learning platforms.

Recommendation

Future research will explore the impact and challenges of the digital era on art and design history education.

Educators must conduct in-depth research on integrating digital technology into teaching. To improve learning efficiency and teaching effectiveness, teachers should aim to enhance their digital literacy levels and actively explore the application of digital technology in teaching. Digital technology should be integrated into teaching. Continuous exploration and practice will help to identify the best approach.

Secondly, to promote comprehensive learning ability and interdisciplinary thinking, it is essential to fully utilize digital resources and explore the effectiveness of interdisciplinary teaching methods in teaching art history and design history. Professional knowledge should also be deeply explored to promote in-depth

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research and learning. Learners should participate in applying digital technology during the learning process and integrate their knowledge with real-life situations.

Additionally, it is essential to explore how to cultivate learners' artistic judgment, critical thinking, creative problem-solving abilities, and visual literacy while continuously integrating digital technology into the fields of art history and design history. The popularisation of digital technology should not diminish learners' artistic perception and aesthetic ability. Instead, it should be a powerful tool for cultivating comprehensive literacy. Learners must possess the ability to think independently and make judgments to cope with the challenges and opportunities of the digital age.

The education of art and design history in the future will encounter digital challenges, but it will also present opportunities for innovation and development. By continuously exploring and practicing, we can better meet the educational needs of the digital age and cultivate more creative and comprehensive learners.

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