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Determinants of the Attitude Towards Rain Class Online Platform of University Chinese Language and Literature Education Students in Kunming Region of China

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Abstract

The aim of this study is to explore the online learning attitude of Chinese language and literature majors in a Kunming-based university toward the Rain Class platform, as well as the core factors affecting these attitudes, measuring System Quality (SYQ), Information Quality (INQ), Interactivity (INT), Perceived Usefulness (PU), Confirmation (CONF), Satisfaction (SAT), and Attitude (ATT) to clarify whether and how these factors shape the attitudes of the target student group. A quantitative survey was conducted among Chinese language and literature students at the target university, yielding 500 valid samples through quota sampling. Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA) were applied to examine the causal relationships between the studied factors. Statistical findings confirmed all proposed hypotheses, with Information Quality showing the strongest direct influence on students' attitudes. All hypotheses have been validated, and the research objectives have been accomplished, thus recommending that university academic affairs and student affairs departments analyze the key contributions of existing online learning implementation strategies to further enhance the learning attitudes of Chinese language and literature majors.

Keywords **:** Online learning, Rain Class, Online Learning, Attitude

Introduction

E-learning is described as a broad range of training and learning-related programs and procedures such as learning via computers, online instruction, simulated classrooms, and technological interaction (Gunasegaram, 2002). Singh and Thurman (2019) define e-learning as a combination of asynchronous and synchronous learning experiences that make use of a range of devices that are connected to the internet, including laptops and cellphones. E-learning is described as a broad range of training and learning-related programs and procedures such as

learning via computers, online instruction, simulated classrooms, and technological interaction (Gunasegaram, 2002).

Consequently, e-learning has been widely used in Chinese classrooms by educators and learners. Most Chinese educators and learners view e-learning as a useful tool for their educational process; nonetheless, there are still a lot of challenges that they must overcome while employing e-learning, such as internet access, e-learning fluency as well as, encouraging students, online instruction promotion, online instruction structure, overabundance of data, or dependability. These consist of implementing e-learning with instruction, using networked-based instructional strategies, using ICT to support a student-focused strategy and utilizing working together, scientific inquiry, dependent upon resources methods of education. China's online education market has grown even larger in the post-epidemic era thanks to favorable policy support and the advancement of 5G, AI, and other technologies. It is anticipated that 351 million Chinese students will be using online education by 2020, and the market will be valued at 485.8 billion yuan, with significant room for growth.

In 2016, Tsinghua University's Online Education Office introduced Rain Classroom. To facilitate the use of Rain Classroom by English speakers outside of China, an English version was released in February 2018. Utilizing constructivist learning theory, Rain Classroom is a smart teaching tool that can be accessed through websites and smartphones. It is an opportunity for instructors and pupils to interact before, during, and after class. Examples of interactions include sending view responsibilities, homework, live commentary (also known as "bulletin screen" in Chinese), and more. It is not just an online tool, but it helps teachers with teaching steps like monitoring attendance at school, administering multiple-choice tests, automatic scoring, data analysis, and so on.

In this regard, an attitude can be defined as an acquired tendency to react consistently in a positive or negative manner toward a specific object or stimulus (Allport, 1935; Fishbein & Ajzen, 1975). Our goal is to carry out a quantitative investigation into the attitudes of Kunming University of Arts and Sciences Chinese language and literature majors on the six fundamental potential variables of e-learning using Rain Class software.

Literature Review

Expectation-Confirmation Model (ECM)

As noted by Bhattacherjee (2001), four key elements of the Expectation-Confirmation Model (ECM)—confirmation, perceived value, enjoyment, and continuance intention—are commonly employed to predict the sustained use of a system. Within the framework of ECM, learners first form initial expectations when engaging with an e-learning platform and subsequently verify whether these expectations are met. Once they exhibit genuine good performance, students with lower baseline expectations will receive greater. Since Bhattacherjee (2001) initially proposed the idea, ECM (Expectation-Confirmation Model) has

developed into a thorough theory, as it is more frequently utilized to explain consumers' incentive to continue using IS/IT (information systems/information technology) (Kang et al., 2009; Lee, 2010; Thong et al., 2006).

For this quantitative research four latent variables from ECM matrix were chosen to construct the conceptual framework, which include interactivity, perceived usefulness, confirmation, attitude.

Interactivity

A person's response to their environment when they meet it is referred to as interaction (Steuer, 1992). As a result, human response might be regarded as interactive when it involves other people, technology, media, or other people. One of the features of website content aspects is interactivity, which is the level of response that users generate when they browse or use websites in a hypermedia CMC environment (WWW) (Hoffman & Novak, 1996). Enjoyment is increased by interaction (Ha et al., 2015). Similarly, using a smartphone promotes people to concentrate on the app they are using because MIM apps make conversation easier (Hoffman & Novak, 1996; Kaur et al., 2016). A study on online buying discovered that environmental characteristics like virtual presence and engagement also have an impact on CA (Consumer Attachment), in addition to personal aspects like expertise, difficulty, and emotional experience state. The word "interaction" refers to a person's response to their environment when they are in it (Steuer, 1992).

Perceived Usefulness

Studies examining the performance of e-learning systems (Al-Sabawy et al., 2011; Islam, 2013) indicate that perceived usefulness exerts a direct and notable influence on users' satisfaction. Davis (1989) defines perceived usefulness as the degree to which an individual thinks that utilizing technology could boost their work efficiency. Additionally, Al-Fraihat et al. (2020) have pointed out that usefulness, as a key variable in the Technology Acceptance Model (TAM), serves as a direct predictor of the behavioral intention to adopt the chosen technology. The current investigation's results did not support H25 in comparison to similar prior studies (Al-Sabawy et al., 2011), which indicated a favorable association between felt contentment and perceived usefulness. Social, political, cultural, and outside factors all affect how easy and beneficial something is seen to be (Surendran, 2012). In the context of teaching and learning, information is crucial to meeting learning objectives (Al-Sabawy, 2013). Extended and re-specified by Seddon (1997), the Delone and McLean (2003) model demonstrated a significant relationship between perceived usefulness and user satisfaction in addition to information quality.

Confirmation

Bhattacherjee (2001) expounded extensively on the concept of "confirmation," which has garnered increased importance. Using the chronology of the advance purchase to post-consumption process, the author demonstrates confirmation. Based on prior research (Bhattacherjee, 2001; Thong et al., 2006; Tsai et al., 2014; Venkatesh et al., 2011), the confirmation of expectations has a significant impact on both subjective satisfaction and perceived utility. The ECM technique and relevant research (Bhattacherjee, 2001; Hsu & Lin, 2015) indicate that contentment has a major influence on post-adoption behavior. As Lee (2010) points out, several factors play a role in shaping a user's choice to continue using a product or service, such as the degree to which their expectations are fulfilled, the level of enjoyment they derive, their sense of validation, and their perception of the product's value. According to ECM, learners' satisfaction and perceived usefulness are positively impacted by perceived confirmation, and there may even be a direct relationship between the two (Bhattacherjee, 2001).

Attitude

Nevertheless, all of these studies define "attitude" in a much wider sense than "attitude to behavior" (Lobb et al., 2007). In this sense, an attitude can be described as a deeply rooted inclination to respond consistently in either a favorable or unfavorable way to a given stimulus or object (Allport, 1935; Fishbein & Ajzen, 1975). Furthermore, some existing research in the tourism literature indicates that visitors' attitudes act as a mediating factor in the connection between their behavioral intentions and their perceptions of service quality (Suh & Pedersen, 2010; Shahijan et al., 2015). Moreover, scholars like Johnson et al. (2006), who focus on consumer behavior and tourism research, have explored how satisfaction and image affect consumers' attitudes. A key determinant of people's attitudes toward making purchases lies in their evaluation of service quality—when customers form a positive attitude, it tends to be accompanied by a strong behavioral intention (Lee et al., 2010; Pan & Truong, 2018).

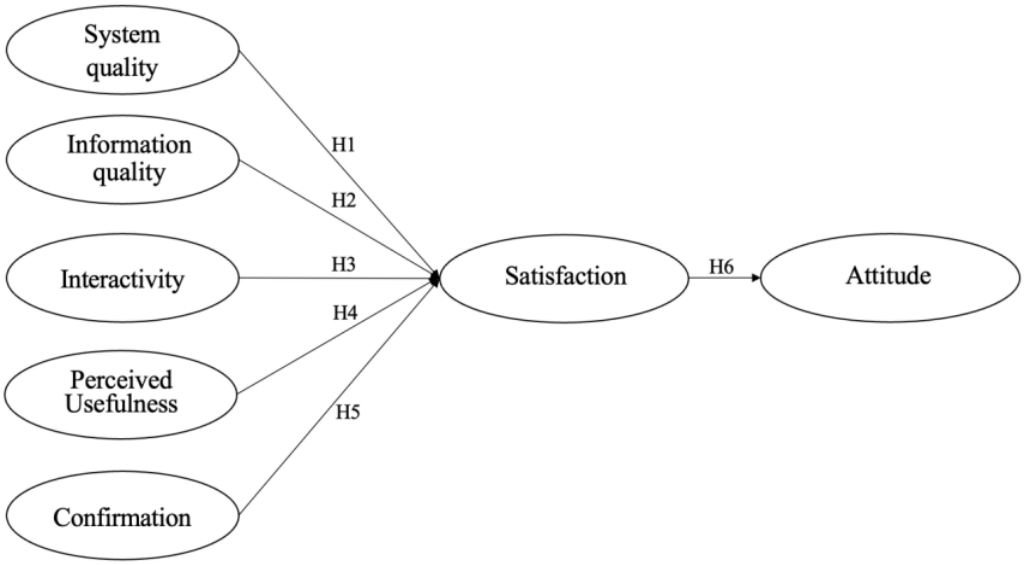
Research Methodology

Research Framework

Chang (2012) was the first to identify the link between information quality, satisfaction, and system quality. Additionally, Al-Fraihat et al. (2020) demonstrated an association between perceived usefulness and interaction. Meanwhile, Xu (2021) revealed the connection between Confirmation and Attitude. Figure 1 presents the conceptual framework that underpins this study.

Figure 1

Conceptual framework



Note: Created by the author.

Leveraging seven latent variables derived from the conceptual framework—specifically, five independent variables (system quality, information quality, interactivity, perceived usefulness, and confirmation), one mediating variable (satisfaction), and one dependent variable (attitude)—this research aimed to explore the core factors that shape the e-learning attitudes of students from the target Kunming university when using the Rain Class System. Additionally, to gauge the extent of the influence, this study looked at the causal relationships between each latent variable. Various presumptions were established based on the structure of the conceptual framework:

H1: System quality has a significant influence on satisfaction of the target student.
H2: Information quality has a significant influence on satisfaction of the target student.
H3: Interactivity has a significant influence on satisfaction of the target student.
H4: Perceived Usefulness has a significant influence on Satisfaction of the target student.
H5: Confirmation has a significant influence on Satisfaction of the target student.
H6: Satisfaction has a significant influence on Attitude of the target student.

Research Methodology

Adopting the quota sampling method, the research team carried out a quantitative on-site questionnaire survey targeting Chinese language and literature majors. Since the students at Kunming University of Arts and Sciences had used the Rain Classroom platform for e-learning as part of their academic coursework, the research team further collected and analyzed the survey data to identify the key factors that had a significant impact on the participants' attitudes toward e-learning. A five-point Likert scale was used to score each observed item.

To verify the appropriate design of the research instrument for this study, three experts holding doctoral degrees in education and possessing sufficient e-learning expertise were tasked with conducting item-objective congruence (IOC) assessments to ensure content validity. Following the completion of the content validity evaluation, a pilot test was administered to a total of 30 students, and the internal consistency reliability of the scale items was measured using Cronbach's Alpha coefficients.

To ensure the reliability and validity of the proposed research methodology, a panel consisting of three researchers with doctoral-level expertise was formed in accordance with the guidelines set forth by the American Educational Research Association. This panel was responsible for evaluating and providing feedback to ensure the questionnaire accurately measures the relevant variables, and the experts independently assessed the questionnaire items to ensure unbiased analysis. Furthermore, to further verify the scale’s internal consistency before the formal survey, a pilot test was administered to a total of 30 Chinese language and literature majors from Kunming University of Arts and Sciences (the same target population as the formal study), and the reliability of all latent variables included in the study was assessed through the application of Cronbach's Alpha coefficients.

To verify that the research instrument was appropriately designed by its developers for this study, three experts holding doctoral degrees in education and equipped with sufficient e-le arning proficiency were appointed to conduct item-objective congruence (IOC) analyses to eva luate content validity. After finalizing the content validity assessment, a pilot test was administ ered to 30 students, and the internal consistency reliability of the scale items was assessed via Cronbach's Alpha coefficients.

Population and Sample Size

The survey targets Chinese language and literature majors at Kunming University of Arts and Sciences. Regarding the advanced analytical framework of structural equation modeling, a minimum sample size of 425 is recommended, which is determined based on the total number of latent and observed variables involved. Through screening, filtering, and non-probabilistic selection, 590 samples from 2,880 population were chosen as the final sample for the quantitative study carried out at Kunming University of Arts and Sciences.

Sampling Strategy

Employing the quota sampling method, a total of 590 Chinese language and literature majors from Kunming University of Arts and Sciences were chosen to participate in this study. In the past, they had taken part in a semester of online instruction using the Rain Classroom platform. Table 1 displays the sampling units' details together with the proportionate number of subsamples that correspond to them:

Table 1

The Quota Sampling to Liberal Arts Students

Target Group	Grade	Population	Sample Units and Sub-Sample Size
Chinese Language and Literature Education Students	Freshman	720	170 (720*500/2880)
	Sophomore	720	125 (720*500/2880)
	Junior	720	125 (720*500/2880)
	Senior	720	170 (720*500/2880)
Total		2880	590

Note: Created by the Author

Results and Discussion

Demographic Information

590 valid questionnaires were gathered after filtering the non-valid questionnaire after the data collection Table 2 summarized the information on the 590 respondents' overall demographic data. Males represented 15.08% of all participants, while females comprised up 84.91%. According to the individuals' academic years, 67.96% were 1-2nd years students and 32.03% were 3-4th year students.

Table 2

Demographic Information

Demographic Profile (n=590)		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Gender	Male	89	15.08%	15.08%	15.08%

Demographic Profile (n=590)		Frequency	Percentage	Valid Percentage	Cumulative Percentage
	Female	501	84.91%	84.91%	100.00%
Grade	1-2nd Years	401	67.96%	67.96%	67.96%
	3-4nd Years	189	32.03%	32.03%	100.00%

Note: Created by the Author

Confirmatory Factor Analysis (CFA)

To assess the structure and factor loadings of the scale items, Confirmatory Factor Analysis (CFA) was employed, with the aim of checking whether these elements matched the projections based on the study's hypotheses and theoretical premises. The outcomes of the factor loadings, combined with satisfactory scores for each observed variable, served as evidence for the strong fit of the research matrix. Moreover, as outlined in Table 3, all benchmarks were met by the corresponding standards for both incremental fit indices (including CFI, NFI, and TLI) and absolute fit measures (such as CMIN/DF, GFI, AGFI, and RMSEA). Ultimately, every goodness-of-fit statistic used in the CFA evaluation turned out to be suitable for the study.

Table 3

GoF for CFA

Index	Criterion	Source	Practical Values
CMIN/DF	<3	(Hair et al., 2013)	1.547
GFI	>0.9	(Hair et al., 2013)	0.942
AGFI	>0.9	(Hair et al., 2013)	0.928
CFI	>0.9	(Bentler, 1990)	0.982
NFI	>0.9	(Bentler & Bonett, 1980)	0.952
TLI	>0.9	(Bentler & Bonett, 1980)	0.980
RMSEA	<0.08	(Pedroso et al., 2016)	0.030

Note: Created by the Author

Table 4

CFA Result, Composite Reliability, and Average Variance Extracted

Variables	Source of Questionnaire (Measurement Indicator)	Items Amount	Cronbach's Alpha	Factors Loading	CR	AVE
SYQ	DeLone and McLean (2003)	5	0.906	0.748 to 0.896	0.911	0.673
INQ	Albelbisi and Yusop, 2019	4	0.908	0.771 to 0.845	0.881	0.649
INT	Steuer,1992	3	0.876	0.735 to 0.755	0.789	0.555
PEU	Islam, 2013	4	0.871	0.783 to 0.823	0.891	0.671
CONF	Bhattacherjee's, 2001	3	0.794	0.728 to	0.564	0.564

Variables	Source of Questionnaire (Measurement Indicator)	Items Amount	Cronbach's Alpha	Factors Loading	CR	AVE
				0.770		
SAT	Doll et al.,1998	5	0.898	0.717 to 0.858	0.908	0.666
ATT	Lobb et al.,2007	4	0.882	0.837 to 0.867	0.914	0.726

Note: Created by the Author

As presented in Table 4, the average extracted variance (AVE) values for all constructs exceeded 0.50, which aligns with the criterion proposed by Fornell and Larcker (1981). Additionally, the composite reliability (CR) scores for each variable were above 0.70, meeting the standard suggested by Nunnally and Bernstein (1994), and all factor loadings surpassed 0.50, in line with Hulland's (1999) recommendation. Moreover, the findings regarding discriminant validity are detailed in Table 5. The diagonal values in the table represent the square root of the AVE for each latent variable, and none of the correlation coefficients between any two distinct latent variables exceeded 0.80, as noted by Schmitt and Stults (1986). On this basis, the discriminant validity of the measurement model in this study was confirmed

Table 5

Discriminant Validity

	SYQ	INQ	INT	PEU	CONF	SAT	ATT
SYQ	0.820						
INQ	0.245	0.805					
INT	0.222	0.178	0.744				
PEU	0.257	0.154	0.230	0.820			
CONF	0.299	0.231	0.284	0.253	0.750		
SAT	0.480	0.466	0.398	0.304	0.477	0.820	
ATT	0.338	0.319	0.250	0.146	0.277	0.576	0.852

Note: Created by the Author

Structural Equation Model (SEM)

After finalizing the Confirmatory Factor Analysis (CFA) process, the researcher proceeded to validate the results using the Structural Equation Model (SEM). As noted by Beran and Violato (2010), SEM is widely recognized as an interpretive modeling tool in research. This method explores the causal connections between variables within a matrix and accounts for evaluation biases or potential distortions in the coefficient of determination, as highlighted by Stein et al. (2012). Following adjustments made via AMOS software, all key fit indices—including CMIN/DF, GFI, AGFI, CFI, NFI, TLI, and RMSEA—met or exceeded the acceptable thresholds. The goodness-of-fit of the SEM was determined based on the data presented in Table

6.

Table 6

GoF for SEM

Index	Criterion	Source	Practical Values
CMIN/DF	<3	(Hair et al., 2013)	2.234
GFI	>0.9	(Hair et al., 2013)	0.906
AGFI	>0.8	(Hair et al., 2013)	0.890
CFI	>0.9	(Bentler, 1990)	0.046
NFI	>0.9	(Bentler & Bonett, 1980)	0.958
TLI	>0.9	(Bentler & Bonett, 1980)	0.927
RMSEA	<0.08	(Pedroso et al., 2016)	0.954

Note: Created by the Author

Hypotheses Testing Results

The results of the hypothesis test are detailed in Table 7, which confirms that satisfaction exerts a direct and significant positive effect on attitude; among all the relationships examined, satisfaction's direct impact on attitude stood out as the strongest, achieving a t-value of 12.756*** (indicating high statistical significance) and a standardized path coefficient (β) of 0.574, reflecting a substantial magnitude of influence. Among the factors affecting satisfaction, information quality ranked as the second-most impactful predictor, with a t-value of 9.216*** and a β of 0.379—signifying a strong and statistically reliable effect—while system quality followed closely, as evidenced by its t-value of 8.662*** and β of 0.341, which also confirmed a significant positive association with satisfaction. Additionally, the influence of confirmation on pleasure secured the fourth position in terms of impact strength within this study, supported by a t-value of 7.725*** and a β of 0.333, and interactivity also demonstrated a significant role in shaping satisfaction, with a t-value of 6.333*** and a β of 0.265. Finally, perceived usefulness emerged as the weakest yet still meaningful predictor of satisfaction, yielding a t-value of 2.758** (denoting moderate statistical significance) and a β of 0.103, thus maintaining a considerable influence on the outcome variable.

Table 7

Hypothesis Result of the SEM

Hypotheses	Path	Standardized Path Coefficient (β)	T-Value	Tests Result
H1	SAT ← SYQ	0.341	8.662***	Supported
H2	SAT ← INQ	0.379	9.216***	Supported
H3	SAT ← INT	0.265	6.333***	Supported
H4	SAT ← PEU	0.103	2.758**	Supported
H5	SAT ← CONF	0.333	7.725***	Supported
H6	ATT ← SAT	0.574	12.756***	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05
Note: Created by the Author

Moreover, Table 7 reveals that the structural model identifies system quality as a significant determinant of satisfaction, with the standardized path coefficient for Hypothesis H1 standing at 0.341. In their analysis of 21 prior studies, Petter et al. (2008) found a strong association between system quality and user satisfaction. Similarly, DeLone and McLean (2003) observed that both information quality and system quality influence user satisfaction and usage behavior, whether acting independently or in combination. Research in the field of information systems (IS) further supports this, as studies by DeLone and McLean (2003) and Ramírez-Correa et al. (2015) suggest that information quality and system quality collectively contribute to explaining the overall level of user satisfaction globally.

For Hypothesis H2, the analysis yielded a standardized path coefficient (β) of 0.379, confirming that information quality exerts a significant positive influence on satisfaction. Existing research consistently supports this finding: studies have indicated that the quality of information directly enhances user satisfaction with e-learning systems, especially Learning Management Systems (LMS) (Abdallah et al., 2019; Chaw & Tang, 2018; Ghazal et al., 2018; Ohliati & Abbas, 2019).

Regarding Hypothesis H3, the standardized path coefficient (β) of 0.265 indicates that interactivity exerts a significant influence on satisfaction—and among the factors in the research framework, it emerges as the most critical component. Based on previous research, Rafaeli and Sudweeks (1997) and Liu and Shrum (2002) provide concrete proof that satisfaction and interactivity are positively correlated.

With a standardized coefficient of 0.103 for H4, it was shown that perceived usefulness significantly impacted pleasure. Additionally, Humbani and Wiese (2019) suggested that perceived usefulness is a significant antecedent of user happiness and intention to continue. Studies by AL-Sabawy (2013) and Pereira et al. (2015) have shown that perceived usefulness has a direct and significant impact on user happiness.

With the effective point of β at 0.333, it was shown that there was a significant efficacy from confirmation to pleasure from the perspective of H5. Finally, building on the work of Bhattacherjee (2001), subsequent studies have consistently identified a positive association between confirmation and user satisfaction across various contexts (Bhattacherjee, 2001; Islam, 2013; Susanto et al., 2016). This body of research reinforces the idea that when users' expectations are confirmed by their actual experiences with a product or service, it tends to enhance their overall satisfaction levels, a pattern observed in diverse settings ranging from technology adoption to service utilization.

Lastly, Hypothesis H6 revealed a robust association between attitudes and satisfaction, as indicated by a standardized path coefficient of 0.574. This finding aligns with existing research in the domain of consumer satisfaction and attitudes, which has consistently demonstrated that satisfied consumers tend to develop positive brand attitudes and preferences

(Bolton, 1998; Oliver, 1980; Roest & Pieters, 1997). Such studies highlight that satisfaction, stemming from favorable experiences, serves as a key driver in shaping individuals' attitudinal orientations toward a product, service, or brand.

Direct, Indirect, and Total Effects

The conceptual framework developed for this study integrates five independent variables, one mediating variable, and one dependent variable. These components are structured to collectively illuminate the research context, with the independent variables serving as the core explanatory factors, the mediating variable acting as a bridge to clarify underlying mechanisms, and the dependent variable representing the key outcome being examined. This framework provides a systematic lens through which the relationships between variables can be analyzed and interpreted. The study revealed that the mediating variable of satisfaction exhibited an R^2 coefficient of 0.452, indicating that 45.2% of the variance in satisfaction could be collectively explained by the five independent variables: system quality, information quality, interactivity, perceived usefulness, and confirmation. Specifically, system quality exerted a significant impact on satisfaction with a standardized coefficient of 0.325***; information quality influenced satisfaction with a coefficient of 0.358; interactivity contributed to satisfaction with a coefficient of 0.240*; perceived usefulness had a marginally significant effect, with a coefficient of 0.089*; and confirmation affected satisfaction with a coefficient of 0.301***. These findings underscore the combined role of these independent variables in shaping the level of satisfaction among the participants. For the dependent variable of attitude, the R^2 value was calculated at 0.330, signifying that 33% of the variance in attitude could be accounted for by the combined direct and indirect effects of six independent variables and one mediating variable. Specifically, the variables exerting direct impacts on attitude included system quality, information quality, interactivity, perceived usefulness, confirmation, and the mediating variable satisfaction, with their respective standardized coefficients (influence thresholds) being 0.153***, 0.191***, 0.227***, 0.056**, 0.207***, and 0.635***. respectively. These results highlight the collective role of both the independent variables and the mediating variable in shaping the attitude of the participants.

Specific details regarding these relationships are presented in Table 8, while a visual breakdown of the path analyses—including the directional links and coefficient magnitudes between variables—is provided in Figure 2. Together, the table and diagram offer comprehensive insights into how the independent variables, mediating variable, and dependent variable interact within the study's framework：

Table 8

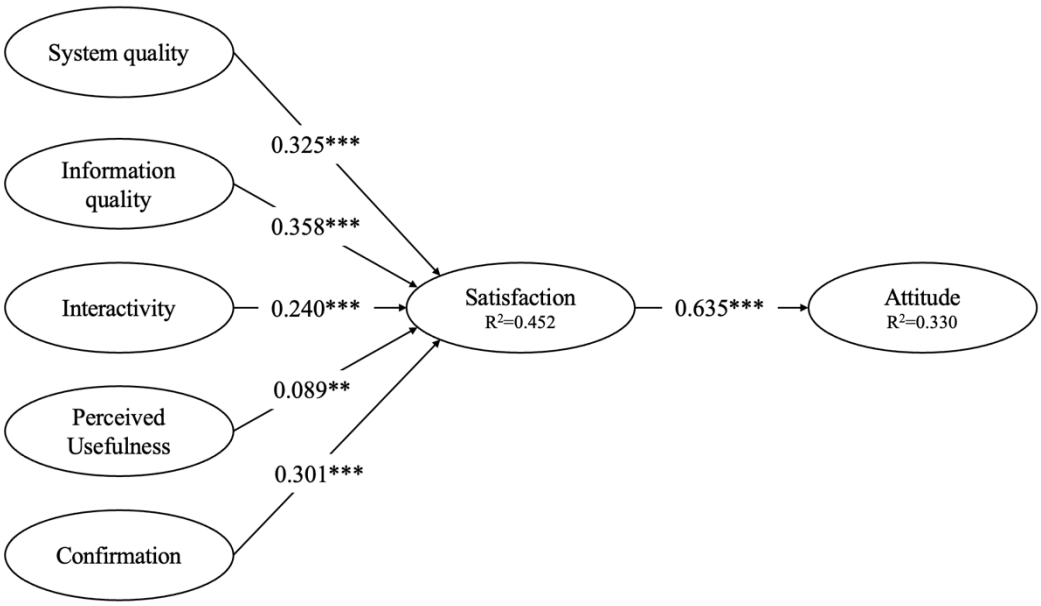
Direct, Indirect, and Total Effects

Mediator and Dependent Variables	**Independent and Mediator Variabl**							
DV	Effect	INT	CONF	INQ	PEU	SYQ	SAT	ATT
SAT	DE	0.240***	0.301***	0.358***	0.089**	0.325***	-	-
	IE	-	-	-	-	-	-	-
	TE	0.240***	0.301***	0.358***	0.089**	0.325***	-	-
	R^2	0.452						
ATT	DE	-	-	-	-	-	0.635***	-
	IE	0.153***	0.191***	0.227***	0.056**	0.207***	-	-
	TE	0.153***	0.191***	0.227***	0.056**	0.207***	0.635***	-
	R^2	0.330						

Note: *** p<0.001, ** p<0.01, * p<0.05

Figure 2

Path Diagram Analysis



Note: *** p<0.001, ** p<0.01, * p<0.05
Note: Created by the Author

Conclusions and Recommendations

Conclusions

The main objective of this study is to examine the key factors that have a significant impact on the attitudes of Chinese language and literature majors at Kunming University of Arts and Sciences; to achieve this goal, the research employs a conceptual framework that incorporates seven core variables: system quality, information quality, interactivity, perceived usefulness, confirmation, attitude, and satisfaction, which are systematically integrated into the framework to explore their interrelationships and collective impact on shaping the attitudes of the target population, and by focusing on these specific constructs, the study aims to provide a clear understanding of the mechanisms driving attitudes among the sampled students, with six hypotheses established based on the conceptual framework. 590 valid questionnaires were collected from 800 targeted students, and the Confirmatory Factor Analysis (CFA) evaluation was successfully completed—not only to validate the fit of the measurement model (as evidenced by the goodness-of-fit indices meeting acceptable criteria, such as CMIN/DF=1.547, CFI=0.982, and RMSEA=0.030) but also to assess the reliability (including composite reliability [CR] above 0.70 and Cronbach's Alpha coefficients exceeding 0.794) and validity (including average variance extracted [AVE] over 0.50 and discriminant validity confirmed by square roots of AVE exceeding inter-variable correlations) of each latent construct, thereby ensuring the consistency between the collected data and the theoretical specifications of the conceptual framework. Furthermore, Structural Equation Modeling (SEM) is employed to test the hypotheses to determine the major factors influencing attitude-related variables, and in terms of the factors directly affecting satisfaction, the findings show that five variables play a role here: Information quality ranks first as the most influential determinant of satisfaction, followed in order of impact by system quality, confirmation, and interactivity, while perceived usefulness occupies the last position with the least direct effect on satisfaction, and these results clarify the hierarchical order of influence among the variables within the study's framework, highlighting which constructs hold the most significant influence on attitude and satisfaction.

Discussion

This study verified all six hypotheses via SEM, confirming causal links among the seven core variables. Consistent with Oliver (1980), satisfaction was the strongest direct predictor of attitude (β=0.574, t=12.756***). Among satisfaction's antecedents, information quality ranked first (β=0.379, t=9.216***), supporting DeLone and McLean's (2003) IS Success Model, followed by system quality (β=0.341), confirmation (β=0.333), interactivity (β=0.265), and perceived usefulness (β=0.103, weakest but significant)—a pattern reflecting Chinese language and literature students' needs (e.g., prioritizing academic content over

functional utility). The adapted ECM (integrating SYQ, INQ, INT) fit well (CMIN/DF=2.234, CFI=0.954) and explained 33% of attitude variance, expanding ECM's applicability to liberal arts e-learning, with findings guiding subsequent practice recommendations.

Recommendations for Practice

Based on the data of this study and the verification results of Hypothesis H1, in the future, regarding the teaching system quality for preschool education majors, the corresponding teaching units should further collect issues related to system design, client operation, and data synchronization that may arise during these students' daily use of the learning platform, and feedback these issues to the technical management team of the Rain Class education system. Ensure that platform functions are in a more stable state. Simultaneously, targeted suggestions should be provided to system developers based on the unique characteristics of Chinese language and literature courses. For instance, more operational functions tailored to the needs of such courses—such as tools for text annotation, classical literature database retrieval, or interactive writing exercises—should be added to enhance practicality. Additionally, integrating cutting-edge artificial intelligence technologies, such as platforms like DeepSeek and OpenAI, can be leveraged to optimize the system quality of Rain Class, thereby improving its intelligence, interactivity, and overall user experience in supporting Chinese language and literature education.

Considering the findings from Hypothesis H2, the relevant teaching units should further enrich the Rain Class educational platform by uploading more professional and elective courses tailored to the curriculum of Chinese language and literature majors. Specifically, core and specialized courses in this discipline—including Introduction to Literature, Introduction to Linguistics, Ancient Chinese, Modern Chinese, Ancient Chinese Literature, Modern Chinese Literature, Contemporary Chinese Literature, College Writing, Ancient Literature Philology, and History of Chinese Literary Criticism—should be supplemented with comprehensive digital resources. These resources ought to encompass electronic textbooks, both practical and theoretical study materials, as well as a wealth of literary documents and references. By doing so, the platform can better meet the academic needs of students, enhance the information quality of course content, and provide robust support for their learning and research in Chinese language and literature. With the power of the Rain Class system, the amount of online learning material is likely to far exceed traditional classroom instruction. In the future, the corresponding information and materials of Chinese language and literature courses will be properly connected with the system.

According to the test results of Hypothesis H3 (Interactivity → Satisfaction, β=0.265, t=6.333***), Chinese language and literature majors in the study identify interactivity as a key influencing factor; consistent with the feedback from the target students, the following observations are research results: the Rain Class platform facilitates students' thinking processes, increases the frequency of teacher-student interaction in class, enhances students'

classroom participation and engagement in problem-thinking, and improves their writing habits—specifically, students who previously provided lengthy responses to subjective questions now tend to answer in structured segments, which helps them develop clear logical frameworks. Additionally, the platform contributes to improved teaching effectiveness: it not only promotes active student participation in answering questions but also prompts teachers to optimize lesson preparation by selecting topics more aligned with chapter content, thereby enriching the breadth of classroom content; for questions involving subjective viewpoints, voting functions on the platform can be utilized to gauge students' cognitive tendencies, with clear and interpretable results that enable efficient understanding of students' ideas. Based on these results, a practical recommendation is proposed for process assessment: the Rain Class platform can be leveraged to implement process-oriented learning evaluation, reducing the proportion of final examinations in the overall assessment system to achieve a more comprehensive evaluation of students' learning progress and knowledge mastery.

Results of the H4 test (Perceived Usefulness → Satisfaction, β=0.103, t=2.758**) showed that perceived usefulness exerts a significant, albeit relatively weaker, influence on the satisfaction of Chinese language and literature majors with the RainClass educational system. This perceived usefulness is reflected in the practical value of RainClass's functional design for the learning process of Chinese language and literature students: the platform supports independent class management and the export of data such as sign-in records and preview status, which enables teachers to accurately grasp students' pre-class preparation and in-class participation, thereby providing targeted guidance for students' academic weaknesses (e.g., focusing on students who lack preview of ancient Chinese texts). Its real-time test feedback function allows teachers to adjust teaching progress according to students' answer situations—for example, slowing down the explanation of literary theory knowledge when students perform poorly on related test questions—and its rich question types (including subjective questions supporting photo uploads) accommodate the discipline's need for submitting handwritten literary analysis drafts. The bullet-screen function realizes anonymous interaction, helping students who are reluctant to speak in public express their views on literary works (e.g., discussing the themes of modern Chinese novels) without anxiety; the synchronized PPT review function facilitates students' post-class review of key content (such as the context of ancient poetry lectures), avoiding the omission of important knowledge points. In addition, functions like marking confusion and saving key PPTs enable teachers to target post-class explanations for content that most students find confusing (e.g., difficult points in ancient Chinese grammar) through anonymous confusion marking, while the saved PPT materials provide convenient resources for students to consolidate knowledge. These functional advantages make Chinese language and literature majors perceive RainClass as useful for supporting their learning, which in turn significantly boosts their satisfaction with the platform and strengthens their positive attitudes toward it, further promoting continuous engagement in online learning activities.

H5: Confirmability is vital for Chinese language majors. Teachers confirm content understanding/skill mastery; schools should enhance confirmation/evaluation to boost effective learning and teaching quality.

H6: Results of the hypothesis test (Satisfaction → Attitude, β=0.574, t=12.756***) confirm that attitude is a key determinant of Chinese language and literature majors' engagement in RainClass-based online learning, and this attitude is shaped by students' subjective evaluations of their actual learning experiences on the platform rather than being inherent. Specifically, the RainClass platform plays a pivotal role in fostering positive attitudes among these students by linking to their discipline-specific learning needs: it stimulates academic interest through interactive functions such as bullet-screen discussions on classical literary works and anonymous voting on literary interpretation questions; clarifies learning purposes via targeted feedback (e.g., teacher comments on literary analysis assignments, post-class explanations for confusing ancient Chinese grammar points); and boosts learning motivation by helping students perceive the value of the platform for their academic development. Meanwhile, the platform facilitates effective teacher-student interaction through transparent, honest feedback mechanisms—for instance, teachers provide detailed evaluations of students' writing assignments, and students can reflect on their learning progress based on the platform's data records—which further reinforces positive attitudes. These positive attitudes, in turn, drive students to actively participate in pre-class preview of literary texts, in-class engagement with literary theme discussions, and post-class review of key knowledge, ultimately improving their learning outcomes in Chinese language and literature courses.

Limitations and Further Exploration

Although a significant number of college or higher education level learners did not participate in this quantitative study, the demographic and sampling were focused on only one university in the Kunming area of Yunnan Province, China. In addition, other technology acceptance theories are also not centralized, identifying only seven variables in the conceptual framework that fit the SEM and ECM models. The follow-up study can be divided into two parts: Expanding the scope of the study to encompass more Chinese provinces would significantly enhance the generalizability and robustness of the research findings. Currently, if the study is confined to a single region or a limited number of provinces, its conclusions may be influenced by localized factors such as regional educational policies, cultural norms, or resource allocation differences specific to that area. By including a broader range of provinces—spanning eastern, central, western, and northeastern China, for example—the research can capture the diversity of educational contexts across the country. As part of building the research framework, additional variables from other technology acceptance theories (UTAUT, ISSM, TRA, TPB, and TAM) can also be examined.

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