

**THE INFLUENCE OF ONLINE LEARNING
INTERACTIONS ON BELIEF IN THE LEARNING
OUTCOMES AND SELF-EFFICACY OF ART
COLLEGE STUDENTS WITH PERCEIVED
SATISFACTION AS THE MEDIATOR**

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UNIVERSITI SAINS MALAYSIA

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by

DENG YUQING

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TABLE OF CONTENTS

ACKNOWLEDGEMENT.....	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	ix
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xii
LIST OF APPENDICES	xiii
ABSTRAK	xiv
ABSTRACT	xvi
CHAPTER 1 INTRODUCTION	1
1.1 Introduction.....	1
1.2 Research Background	4
1.2.1 Curriculum Implementation in Music Course Using Online Learning	4
1.2.2 The Concept of Online Learning and its Interaction.....	6
1.2.3 Breaking the Tradition: Online Learning Interaction Improves Belief in the Learning Outcomes	10
1.2.4 Online Learning Interaction and Mediation Effect of Self-Efficacy to Some Extent	11
1.2.5 Student' Perceived Satisfaction Plays an Important Role in Mediating Online Learning Interactions, Belief in the Learning Outcomes and Self-Efficacy	13
1.3 Problem Statement	14
1.4 Research Objective	19
1.5 Research Question	20
1.6 Research Hypothesis	21
1.7 Research Significance	22
1.7.1 Theoretical Significance	22

1.7.2	Practical Significance.....	23
1.8	Research Limitation	24
1.9	Operational Definitions.....	25
1.9.1	Online Learning	25
1.9.2	Online Learning Interaction	26
1.9.2(a)	Instructor-Learner Interaction.....	26
1.9.2(b)	Learner-Learner Interaction.....	27
1.9.2(c)	Learner-Content Interaction.....	28
1.9.3	Belief in the Learning Outcomes	28
1.9.4	Self-efficacy	29
1.9.5	Perceived Satisfaction	30
1.10	Summary	31
CHAPTER 2 LITERATURE REVIEW		33
2.1	Introduction.....	33
2.2	Chinese Education System.....	33
2.3	Overview of Arts Vocational College.....	37
2.4	Online Learning	40
2.4.1	Definition and Origin of Online Learning	40
2.4.2	Empirical studies on online learning.....	43
2.5	Online Learning Interactions	46
2.5.1	Definition and Origin of Online Learning Interactions	46
2.5.2	Empirical Studies on Online Learning Interactions.....	47
2.6	Belief in the Learning Outcomes	50
2.6.1	Exploring the Urgency of Belief in the Learning Outcomes	50
2.6.2	Relationship of Online Learning Interactions and Belief in the Learning Outcomes	52
2.7	Self-efficacy.....	53
2.7.1	Definition and Origin of Self-efficacy	53

2.7.2	Relationship of Online Learning Interactions and Self Efficacy	56
2.8	Perceived Satisfaction	57
2.8.1	Definition and Origin of Perceived Satisfaction	57
2.8.2	Relationship of Online Learning Interactions and Perceived Satisfaction.....	59
2.8.3	Relationship of Perceived Satisfaction and Belief in the Learning Outcomes	60
2.8.4	Relationship of Perceived Satisfaction and Self Efficacy.....	61
2.8.5	Perceived Satisfaction as Mediator	62
2.9	Theoretical Framework	64
2.9.1	Moore’s Online Learning Interactions Model	64
2.9.2	Sociocultural Constructivism Learning Theory	68
2.9.3	Attribution Theory	74
2.9.4	Proposed Theoretical Framework	76
2.10	Conceptual Framework	78
2.11	Summary	80
	CHAPTER 3 METHODOLOGY	81
3.1	Introduction.....	81
3.2	Research Design.....	81
3.2.1	Quantitative Research Design.....	83
3.3	Population and Sample	85
3.3.1	Population	85
3.3.2	Sampling for Quantitative Study	86
3.4	Research Variables.....	90
3.5	Instrumentation	91
3.5.1	Questionnaire	91
3.5.1(a)	Demographic Profile.....	93
3.5.1(b)	Measurement of Variables	94

3.6	Validity	97
3.6.1	Language validity.....	97
3.6.2	Content Validity.....	97
3.6.3	Threats to Validity	100
3.7	Pilot Study.....	101
3.8	Reliability.....	102
3.9	Research Procedures	104
3.10	Quantitative Data Analysis	106
3.11	Summary	108
CHAPTER 4 DATA ANALYSIS.....		109
4.1	Introduction.....	109
4.2	Data Analysis	109
4.2.1	Data Preparation.....	109
4.2.1(a)	Creating Structure	109
4.2.1(b)	Data Cleaning and Data Screening	110
4.2.2	Descriptive Statistics Analysis.....	111
4.2.2(a)	Descriptive Statistics on Online Learning Platform Usage Behavior.....	111
4.2.2(b)	Descriptive Analysis of Instrument	112
4.2.3	Normality Test	113
4.2.4	Common Method Variance (CMV)	114
4.2.5	Measurement Model Assessment.....	116
4.2.5(a)	Internal Consistency Reliability	117
4.2.5(b)	Indicator Reliability (Outer Loadings)	120
4.2.5(c)	Convergent Validity.....	120
4.2.5(d)	Discriminant Validity	121
4.2.6	Structural Model Assessment	127

4.2.6(a)	Structural Model for Collinearity Issues Assessment.....	127
4.2.6(b)	Significance of the Structural Model Relationships Assessment.....	128
4.2.6(c)	Coefficient of Determination (R^2).....	131
4.2.6(d)	Effect Size Assessment (f^2).....	132
4.2.6(e)	Assessment of the Predictive Relevance (Q^2).....	133
4.2.6(f)	PLS Predictive Analysis	134
4.2.6(g)	Interpretation of Direct Effects	136
4.2.6(h)	Interpretation of Mediation Effects.....	136
4.2.6(i)	Broader Implications of the Findings	137
4.2.7	Summary of Hypothesis Testing.....	138
4.3	Summary	139
CHAPTER 5 DISCUSSION AND CONCLUSION		140
5.1	Introduction.....	140
5.2	Summary of Findings.....	141
5.3	Discussion of the Findings.....	142
5.3.1	The Positive Impact of Online Learning Interactions on Students' Belief in the Learning Outcomes.....	142
5.3.2	The Significant Positive Impact of Online Learning Interactions on Students' Self-Efficacy.....	145
5.3.3	The Mediating Role of Perceived Satisfaction in the Relationship Between Online Learning Interactions and Belief in the Learning Outcomes.....	147
5.3.4	The Mediating Role of Perceived Satisfaction in the Relationship Between Online Learning Interactions and Self-Efficacy	150
5.4	Implication of the Findings	152
5.4.1	Theoretical Implications	152
5.4.1(a)	Extending the Application of Sociocultural Constructivism Learning Theory	153

5.4.1(b)	Supporting the Expansion of Attribution Theory	154
5.4.1(c)	Enriching Multidimensional Evaluation Models for Online Learning Effectiveness.....	155
5.4.2	Practical Implications.....	157
5.4.2(a)	Optimizing Online Course Design.....	157
5.4.2(b)	Enhancing Learner Satisfaction and Experience	158
5.4.2(c)	Improving Teachers' Online Teaching Skills.....	159
5.5	Recommendation for Future Study	160
5.6	Conclusions.....	162
REFERENCES.....		166
APPENDICES		

LIST OF TABLES

	Page
Table 3.1	Questionnaires Development Table..... 95
Table 3.2	The Details of Experts 98
Table 3.3	The relevance ratings on the item scale by 4 experts (the questionnaires)..... 99
Table 3.4	Pilot Test..... 102
Table 3.5	Cronbach Alpha values for All Items 103
Table 3.6	Cronbach Alpha values for All Dimensions..... 103
Table 3.7	Type of Test Used for Research Question for the Qualitative Study 108
Table 4.1	Respondents' Usage Behavior 112
Table 4.2	Descriptive Statistics of Measured Variables 113
Table 4.3	Normality Testing Using Mardia's Coefficient..... 114
Table 4.4	Comparison of Path coefficient (β) between the baseline model and marker included the model 116
Table 4.5	Comparison of R^2 value between baseline model and marker included the model..... 116
Table 4.6	Results Summary for Multi-dimensional Constructs 118
Table 4.7	Results Summary for Uni-dimensional Constructs 119
Table 4.8	Cross Loading..... 122
Table 4.9	Discriminant Validity: Heterotrait Monotrait Criterion 124
Table 4.10	Variance Inflation Factors (VIFs) Test..... 128
Table 4.11	Direct Effect Hypotheses..... 130
Table 4.12	Summary of Mediation Test Effects..... 131
Table 4.13	Model Results for R^2 132
Table 4.14	Structural Model Summary of Results: f^2 Effect Size 133
Table 4.15	Model Results for Q^2 133

Table 4.16	PLS Predict results.....	135
Table 4.17	Summary of Hypotheses Testing.....	139

LIST OF FIGURES

	Page
Figure 1.1	Hypotheses and models built for this study 21
Figure 2.1	Diagram of the Education System of China (Guo et al., 2019) 36
Figure 2.2	Map of Chongqing, China (Cheng et al., 2022) 38
Figure 2.3	Official Website of Arts Vocational College (Arts Vocational College, 2023) 39
Figure 2.4	Screenshot of Chinese Student’s Online Learning Class 41
Figure 2.5	Model of Moore’s Online Learning Interactions (Lawrie, 2021) 67
Figure 2.6	Vygotsky’s Social Constructivism Theory (Serhat 2021) 69
Figure 2.7	Theoretical Framework 78
Figure 2.8	Conceptual Framework 79
Figure 3.1	The flow chart of research design 83
Figure 3.2	Determining Sample Size 88
Figure 3.3	Sampling Technique 89
Figure 3.4	Research Procedure in the Process of Quantitative Research 105
Figure 4.1	Normality Test Using Mardia’s Coefficient 125
Figure 4.2	Marker Variable 126
Figure 4.3	Measurement Model 126
Figure 4.4	Structure Model 127

LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
BLO	Belief in the Learning Outcomes
CA	Cronbach's Alpha
CMV	Common Method Variance
CR	Composite dependability
DV	Discriminant Validity
HTMT	Heterotrait-Monotrait
ILI	Instructor-Learner Interaction
LCI	Learner-Content Interactio
LLI	Learner-Learner Interaction
OLI	Online Learning Interaction
PS	Perceived Satisfaction
SE	Self-Efficacy
VIF	Variance Inflation Factor

LIST OF APPENDICES

Appendix A	Questionnaire in Advance
Appendix B	Questionnaire on Online Learning Interactions (Independent Variables)
Appendix C	Questionnaire on Perceived Satisfaction
Appendix D	Questionnaire on Belief in the Learning Outcomes
Appendix E	Questionnaire on Self-Efficacy
Appendix F	Validation of the Questionnaires: A Content Validity Study
Appendix G	Instruments Face Validation Form
Appendix H	Instrument Validation by Expert (Lv Xiao)
Appendix I	Instrument Validation by Expert (Xiao Qianguo)
Appendix J	Instrument Validation by Expert (Luo Wenlin)
Appendix K	Normality Test Using Mardia's Coefficient
Appendix L	Marker Variable
Appendix M	Measurement Model
Appendix N	Structure Model
Appendix O	JEPeM Letter

**PENGARUH INTERAKSI PEMBELAJARAN DALAM TALIAN TERHADAP
KEPERCAYAAN PELAJAR KOLEJ SENI TERHADAP HASIL
PEMBELAJARAN DAN KEYAKINAN DIRI, DENGAN
KEPUASAN SEBAGAI MEDIATOR**

ABSTRAK

Kemajuan pesat teknologi digital, terutamanya internet mudah alih, telah mengubah sistem pendidikan secara asas, menjadikan Pembelajaran Dalam Talian semakin meluas di seluruh dunia. Di China, pandemik COVID-19 telah mempercepatkan penerimaan pendidikan dalam talian, memaksa universiti beralih kepada persekitaran pembelajaran maya untuk mengekalkan kesinambungan pendidikan. Kajian ini menggunakan pemodelan persamaan struktur untuk menyiasat hubungan antara Interaksi Pembelajaran Dalam Talian (OLI), Kepuasan Dirasakan (PS), Kepercayaan terhadap Hasil Pembelajaran (BLO), dan Efikasi Kendiri (SE) dalam kalangan pelajar seni sarjana muda China. Kajian ini menggunakan pemodelan persamaan struktural untuk menyelidiki hubungan antara Interaksi Pembelajaran Online (OLI), Kepuasan yang Dirasakan (PS), Kepercayaan pada Hasil Pembelajaran (BLO), dan Efikasi Diri (SE) di kalangan mahasiswa sarjana seni Cina. Interaksi pembelajaran online—yaitu instruktur–pembelajar, pembelajar–pembelajar, dan pembelajar–konten—secara signifikan meningkatkan kepercayaan siswa pada hasil pembelajaran dan efikasi diri, dengan kepuasan yang dirasakan menjadi mediator beberapa efek ini. Secara teoritis, kajian ini memperluas teori konstruktivis sosial budaya dengan menunjukkan bagaimana interaksi virtual mendukung konstruksi pengetahuan dan meningkatkan kepercayaan diri pembelajar; ia juga memajukan teori atribusi dengan menghubungkan interaksi online positif dengan atribusi internal

keberhasilan, sehingga meningkatkan efikasi diri, dan memperkaya model evaluasi multidimensi dengan memasukkan dimensi psikologis dan emosional ke dalam penilaian efektivitas pembelajaran online. Secara praktis, temuan ini memberikan panduan untuk merancang kursus online yang memperkuat ketiga modalitas interaksi, menumbuhkan kepuasan pembelajar melalui lingkungan virtual yang mendukung, dan meningkatkan kompetensi pengajaran online instruktur untuk meningkatkan keterlibatan dan kinerja—terutama dalam konteks pendidikan seni. Kata kunci: pembelajaran online, interaksi, efikasi diri, kepuasan pembelajar, konstruktivisme sosial budaya.

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IN THE LEARNING OUTCOMES AND SELF-EFFICACY OF ART
COLLEGE STUDENTS WITH PERCEIVED SATISFACTION
AS THE MEDIATOR**

ABSTRACT

The rapid advancements in digital technology, particularly the mobile internet, have fundamentally transformed the education system, making Online Learning increasingly prevalent worldwide. In China, the COVID-19 pandemic has accelerated the adoption of online education, compelling universities to transition to virtual learning environments to maintain educational continuity. This study employs structural equation modeling to investigate relationships among Online Learning Interaction (OLI), Perceived Satisfaction (PS), Belief in Learning Outcomes (BLO), and Self-Efficacy (SE) among Chinese art undergraduates. Online learning interactions—namely instructor–learner, learner–learner, and learner–content , significantly enhance students’ belief in learning outcomes and self-efficacy, with perceived satisfaction mediating some of these effects. Theoretically, this study extends sociocultural constructivist theory by demonstrating how virtual interactions support knowledge construction and bolster learner confidence; it also advances attribution theory by linking positive online interactions to internal attributions of success, thereby increasing self-efficacy, and enriches multidimensional evaluation models by embedding psychological and emotional dimensions into assessments of online learning effectiveness. Practically, the findings offer guidance for designing online courses that strengthen all three interaction modalities, foster learner

satisfaction through supportive virtual environments, and enhance instructors' online teaching competencies to boost engagement and performance—especially in arts education contexts. Keywords: online learning, interactions, self-efficacy, learner satisfaction, sociocultural constructivism.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The swift advancements in digital technology, with particular emphasis on mobile internet, has had a great impact on the education system. It has made online learning possible. Online education describes the method through which individuals acquire professional or academic knowledge via the internet, as opposed to conventional learning approaches (Panigrahi et al., 2018). Thus, the way how human acquire knowledge changed fundamentally, which has enormous impact on human life.

Online learning has long been established as a part of educational practices. As indicated by earlier research, online learning has been existed for more than a century, spanning nearly two centuries, originating from correspondence course in Europe. This form of education enables students to join classes remotely, without the need for physical presence (Panigrahi et al., 2018). As the global population expands, the desire for learning has surged significantly. The swift advancement of ICT has transformed the administration and execution of educational processes within academic institutions. In other words, the educational landscape is changing. At present, scholars are placing more emphasis on the technological medium or environment of online learning (Aldholay et al., 2018), since it can help users gain a learning experience by using certain technologies.

Nowadays, online learning is commonly used in Chinese universities and becoming more and more popular (Chiodini, 2020). Due to its many benefits, online learning has become more popular in China. As COVID-19 explodes around the world, China is inevitably affected. Most Chinese cities are closed, and universities have been

forced to move to online teaching (Vlassopoulos et al., 2021). Thus, in China, where the epidemic has not affected students' learning progress, online learning platforms have been put into use, enabling students to maintain their studies without interruption. Information technology facilitates pupils' ongoing acquisition of knowledge. Since the onset of the pandemic, there has been a substantial growth in the use of information technology, resulting in a higher occurrence of online learning compared to the pre-pandemic era. During quarantine, information technology enables uninterrupted learning through the implementation of innovative learning management systems (Ahshan, 2021).

Online learning is common and increasingly popular in Chinese universities (Chiodini, 2020), the art courses are no exception. The adoption of new teaching techniques in art courses is exerting a substantial influence on the global education sector both during and after the COVID-19 epidemic (Dhawan, 2020; Dziuban et al., 2018). While scholars acknowledge that fully online learning may not be a sustainable long-term solution, it has nonetheless become a standard practice in higher education, leading to substantial changes in how students engage with learning and communication. Within this simulated virtual classroom, teachers and students have the ability to engage with one another and fulfill the objectives of the course from a distance (Fawazl & Samaha, 2020). Platforms such as Tencent Conference, Dingding, and QQ are all used to deliver knowledge to students, where instructors are challenged to familiarize themselves with new teaching methods (Fawazl & Samaha, 2020).

This research is fundamentally grounded in the perspective that the curriculum encompassing its pedagogical design, content sequencing, structure of learning activities, and alignment of assessments serves as the primary driver for creating meaningful and effective online learning interactions (instructor-learner, learner-

learner, learner-content). While technology provides the medium, it is the curricular framework that strategically shapes these interactions to foster deep engagement, perceived satisfaction, and ultimately, belief in learning outcomes and self-efficacy. The study, therefore, investigates how curriculum-mediated interactions influence these key variables within the context of online art education.

This research uses theoretical analysis to develop a model that demonstrates how online learning interactions affect the belief in the learning outcomes and self-efficacy of art college students. The objective of this research is to examine the relationship between online learning interactions, learners' reported pleasure, belief in the learning outcomes, and self-efficacy. The research focuses on undergraduate students in Chongqing, China. It hypothesizes that online learning interactions will influence learners' perceived satisfaction during the college online learning process, consequently leading to a beneficial impact on their confidence in achieving educational goals and their conviction in their own ability to succeed. The findings of this study may serve as a foundation for enhancing the online learning experiences of university students and can be further expanded upon in the future to improve online learning services.

Chapter 1 serves as the introduction to this study, outlining the research background and problem statement. Additionally, it outlines the study goals, inquiries, and suppositions. Furthermore, the chapter offers a concise synopsis of the significance and limitations of the research. Finally, the operational definition of each variable is briefly described.

1.2 Research Background

1.2.1 Curriculum Implementation in Music Course Using Online Learning

The traditional method of teaching music, often referred to as the offline class, has its roots deep in history. Prior to the advent of digital technology, music education relied mostly regarding the direct relationship between instructors and students. In this context, teachers had the chance to provide direct interactive instruction, evaluate subtle variations in performance immediately, and cultivate a cohesive classroom atmosphere. The immediate feedback and the tangible experience of handling musical instruments, combined with the physical presence of peers, fostered a unique learning environment.

Nevertheless, the rise of online learning platforms has significantly transformed the educational landscape in recent years (Atenas et al., 2014). The way students interact with educational content has been revolutionized by these platforms, creating new opportunities for the implementation of curricula in a variety of disciplines (Adam Stefanile, 2020). Art courses, such as music, have seen significant advantages with the rise of online learning. Educators can now provide students by providing captivating and interactive educational opportunities via digital platforms (Blackburn & Hewitt, 2020).

The effective implementation of a music curriculum online extends beyond the mere use of digital tools; it requires a deliberate pedagogical design that structures content sequencing, learning activities, and assessments to maximize interaction and engagement. This involves designing a curriculum where theoretical concepts are sequentially built upon, practical skills are developed through scaffolded exercises, and assessments are aligned to measure both technical proficiency and creative

application. The curriculum must intentionally design points of interaction, such as structured peer-review sessions for compositions (learner-learner), mandatory weekly feedback cycles with the instructor on performance submissions (instructor-learner), and interactive modules that require active manipulation of musical elements (learner-content).

Online platforms and methodologies have profoundly impacted how music can be taught and learned. The implementation of a music curriculum in an online setting presents unique opportunities and challenges (Li et al., 2021). Embracing technology and virtual platforms, educators can now reach students from various geographical locations, granting unprecedented access to music education (Johnson, 2020). Many online music courses integrate innovative technology that offers instant feedback on aspects such as pitch correction, rhythm analysis, and music theory. These courses can significantly aid in the learning process and help students enhance their musicality (Alexandraki et al., 2022).

Furthermore, online platforms offer features like recording lessons, allowing students to review their lessons and practice at their own pace, fostering retention and skill development. However, it's essential to recognize that online music education does have challenges like the need for reliable internet access, potential lack of hands-on guidance, and difficulties in assessing performance nuances (Li et al., 2021). With careful planning and the right tools, online learning can provide an enriching way to explore and express creativity through music (Karşal et al., 2021).

Music educators have several effective strategies and approaches at their disposal. These methods harness the benefits of online platforms to deliver engaging, interactive, and comprehensive music education experiences (Marshall & Kostka,

2020). For synchronous music courses, technology enables real-time interaction using video conferencing software, screen sharing, virtual whiteboards, and interactive music notation tools (Alexandraki et al., 2022, Blackburn & Hewitt, 2020). Instructors can also encourage collaborative projects, virtual duets, or peer critiques (Li et al., 2021). Digital music creation tools and software, such as digital audio workstations and synthesizers, add another layer of depth to online music courses (Karşal et al., 2021).

Online learning, combined with the traditional teaching approach, has reshaped the realm of music education. While offline classes offer direct interactions and tangible experiences, online courses provide flexibility, convenience, and a plethora of tools that cater to diverse learning styles. The belief in the learning outcomes of online synchronous music courses, just like their traditional counterparts, focus on applying theoretical knowledge (Biasutti et al., 2022). Through online platforms, students can actively apply concepts like rhythm, scales, and chords in real-time scenarios such as playing an instrument or composing. This immersive experience fosters creativity, enabling students to experiment with various genres, tools, and even compose their pieces (Nsairat et al., 2022, Ng et al., 2022). Therefore, whether offline or online, the goal remains the same: to nurture well-rounded musicians ready for the modern world.

1.2.2 The Concept of Online Learning and its Interaction

Online learning is essential for improving the accessibility and flexibility of courses in higher education, it breaks down the time and space issues associated with traditional education, expands the scopes of learners. While online learning interaction is communication facilitated by computer networks, it plays a crucial role in online

formal education (Karkar-Esperat, 2018). In the early stages of distance learning, interaction was essentially nonexistent (Alqurashi, 2019).

Computer-mediated communication technologies enable synchronous and asynchronous dialogue and collaboration between spatially separated learners. Synchronous online learning refers to online learning activities where instructors and students engage in real-time interactions (Mairing et al., 2021a). These interactions can take place through live sessions such as webinars, video conferences, or virtual classrooms (Yamagata-Lynch, 2014). In synchronous learning, students and instructors are online and active simultaneously. This facilitates prompt feedback, live debates, and fosters a feeling of camaraderie among participants (Cahyani et al., 2021). Synchronous online learning courses are at the vanguard of the digital education development. They use real-time connection to closely replicate the experience of a conventional classroom environment (Yamagata-Lynch, 2014). Such classes harness the advancements in technology to bridge geographical divides, enabling instructors and learners to come together in a virtual space, irrespective of their physical locations. The unique strength of synchronous online classes lies in their ability to foster instant communication and active participation (Mairing et al., 2021b). Through features like live chat, video conferencing, and real-time quizzes, learners not only absorb content but also engage dynamically in collaboration with their lecturers and classmates. The promptness of engagement, coupled with the structured schedule akin to traditional classrooms, ensures that students remain motivated, engaged, and accountable for their learning. Moreover, the real-time nature of synchronous classes offers a palpable sense of community, often alleviating feelings of isolation that can sometimes accompany online education (Mairing et al., 2021a). It's in this context that synchronous online

learning becomes an essential tool in the modern educational arsenal, offering a blend of tradition and innovation to cater to diverse learning needs.

While asynchronous learning involves activities that don't require participants to be online simultaneously (Cahyani et al., 2021). In this methodology, educators provide instructional materials, tasks, and resources that learners may access and interact with at their own preferred speed and convenience. The flexibility of online learning is particularly beneficial for students with diverse schedules or residing in various time zones (Mairing et al., 2021c). Students can access course content, watch pre-recorded lectures, read materials, and complete assignments whenever it suits them. Communication and discussions can still happen, but with a time lag, as participants post messages, questions, and responses on discussion boards or forums (Lowenthal et al., 2017).

Interaction acts as a social and psychological connection that can promotes learning and solves problem with capable peers collaboratively. Numerous universities in China have increased the adoption of online platforms to offer students a virtual interactive learning environment, allowing students to exchange information, gain knowledge and diverse experiences. Both of the synchronous and asynchronous online learning method are used. Previous research has shown that students with inadequate language abilities are more likely to remain quiet in traditional classroom settings and are more inclined to actively engage in online conversations, while synchronous online learning discussion groups help students support each other, build interaction, and exchange experiences and ideas (Kuo et al., 2014a), in other words, synchronous online learning promotes interaction better than asynchronous online learning (Banna et al., 2015). This study focus on synchronous online learning only.

Online learning interactions may be classified into three separate categories: instructor-learner interaction, learner-learner interaction, and engagement with the content. The instructor-learner interaction encompasses bidirectional communication and manifests a desire for a certain learning style, as shown by the active involvement of students and instructors. The instructor's immediate actions and the presence of peers are crucial factors for students engaged in online education (Alqurashi, 2019). Learner-learner interaction refers to the exchange of information or ideas between students, including a two-way conversation, about the course topic. This encounter may occur either with or without the aid of a facilitator. The concept of learner-content interaction encompasses two key elements: the student and the course material (Xiao, 2017). It refers to the exchange that occurs between students and the course material. This is a customized procedure led by the teacher, in which they analyze both course-specific information and task-relevant, but non-content-specific information. The instructor facilitates this individualized process by addressing material related to the course and tasks. Learner-content interaction is mostly discussed within the framework of asynchronous conferencing. Textual environments that prioritize learning place emphasis on the connection between learners and material. This is achieved via the engagement with relevant texts and the expression of thoughts and ideas in writing form by participants.

Thus, online learning interaction encompasses the engagement between students, instructors, and the course materials. Although many scholars enriched Moore's interaction model in the later period, they all developed and extended he proposed. To date, many studies have connected online learning interactions with student satisfaction, self-efficacy, and academic outcomes (Katsarou &

Chatzipanagiotou, 2021; Mehall, 2020; Oyarzun & Stefaniak et al., 2018; Kuo et al., 2014).

1.2.3 Breaking the Tradition: Online Learning Interaction Improves Belief in the Learning Outcomes

A comprehensive examination of 45 case studies conducted by the US Department of Education on online and blended learning shown that students in online learning environments had somewhat better outcomes compared to those in traditional face-to-face settings. Online learners tend to exhibit a higher degree of reflective thinking and are more inclined to embrace abstract conceptions. The perception of students about the educational achievements they gained from taking mathematics courses at community colleges throughout their middle developmental stage. The research examined three different instructional venues for course delivery: face-to-face, blended, and online. The results showed that online learning had the highest student scores, followed by blended and traditional learning. Many researchers suggest that the difference in the learning environment itself may explain why online learning students have higher belief in the learning outcomes than traditional students.

Furthermore, a prior research has shown that the level of interaction in a course might have an impact on how the learning results are viewed (Sebastianelli et al., 2015). Online learning, in contrast to conventional learning, is hindered by spatial constraints, resulting in restricted teacher control over students and less contact. In most cases, instructors actively output teaching content while students passively input learning, lacking the interaction of teachers in on-site teaching and the support of peers, students usually report feeling isolated (Karkar-Esperat, 2018). This results in online learning

not maximizing its potential benefits. In this case, it is also assumed that the student cannot achieve the expected learning outcomes.

Regarding online art classes, creating a digital learning resource platform can enhance accessibility and promote functional diversity in the educational environment. Additionally, leveraging information technology can support learners in achieving academic success in their online arts education. The study conducted by Soffer and Cohen (2018) analyzed the engagement qualities of learners in an asynchronous art online learning course and investigated how these variables influenced their belief in the learning results. Hart et al. (2019) used fixed effects models to evaluate the difference between learner's belief in the learning outcomes in attending art online courses and offline courses, the results showed the online courses can provide learners with effective belief in the learning outcomes. Recently, Simamora (2020) investigated learners' learning of online art courses during COVID-19, learners shared their opinions on online learning of art courses through WhatsApp and found that online art courses could provide opportunities for interaction and discussion between learners and instructors, it improved learners' creativity and learning ability. Thus, researchers and practitioners should focus on developing more inclusive authoring tools, offering a variety of functions, to enable educators to create accessible digital learning resources (Huang et al., 2020).

1.2.4 Online Learning Interaction and Mediation Effect of Self-Efficacy to Some Extent

According to Ulfatun et al. (2021), self-efficacy plays a crucial role in determining the success of online learning. The impact of self-efficacy on student engagement, well-being, attitude (Patricia Aguilera-Hermida, 2020), and academic

achievement has been shown (Yokoyama, 2019). Some studies have directly linked online learning interactions to self-efficacy (Kozan, 2016). However, these interactions are most effective in building self-efficacy when they are systematically designed into the curriculum. A well-sequenced curriculum provides students with early and frequent opportunities for mastery experiences a primary source of self-efficacy . For example, a curriculum that breaks down complex musical techniques into a series of achievable, scaffolded tasks allows students to experience success incrementally, thereby building their confidence (mastery experiences). Furthermore, curricularly-structured collaborative activities, such as peer-review exercises or small group projects, provide vicarious experiences where students can observe and learn from the successes of their peers. Finally, a curriculum that mandates regular, formative feedback from instructors integrates a key source of verbal persuasion, directly encouraging students and affirming their capabilities. Therefore, the curriculum acts as the essential framework that intentionally orchestrates interactions to build self-efficacy systematically, rather than leaving it to chance. Students with stronger self-efficacy often perceive their online peers as more sociable. Students' self-efficacy is characterized as a composite of five aspects: (1) confidence in completing the course, (2) confidence in browsing the course media and content, (3) confidence in social interaction with peers, (4) confidence in academic interaction with peers, and (5) confidence in interaction with tutors. Moreover, these five components are positively correlated with students' perceived satisfaction.

1.2.5 Student' Perceived Satisfaction Plays an Important Role in Mediating Online Learning Interactions, Belief in the Learning Outcomes and Self-Efficacy

Academics and professionals widely acknowledge that student happiness pertains to how learners view their educational experience, and communication is a vital factor in determining satisfaction with online learning (Alqurashi, 2019). Additionally, it is an essential measure for evaluating the efficiency of online courses. However, effective interaction can only occur with good learning and instructional design. It is more about quality interactions, not quantity.

Educators can adapt online learning interactions to enhance the belief in the learning outcomes by understanding the key factors that influence college students' perceived satisfaction. Several researchers have explored how online learning interactions influence college students' perceived satisfaction. Both the interactions between learners and instructors, as well as the relationships among learners themselves, had a noteworthy influence on students' satisfaction and their confidence in the learning results.

The importance and positive effects of online learning interactions as an adjunct to offline teaching have been proven. Traditional education is limited by time and space, but online learning equipped with multimedia technology, mobile information technology are easily to conquer the cross-time and cross-region teaching barriers, which make up for the shortcomings of school education (Zheng et al., 2020). Online education has shown to be very beneficial in the field of academics and has produced positive results. Online learning situations may enhance the implementation of online interactive teaching. Online learning interaction allows students to enhance their confidence in attaining learning outcomes and their self-efficacy in an online

setting. The aim of this study is to examine how the interaction in online learning affects students' confidence in accomplishing learning goals and their belief in their own talents, with student satisfaction acting as a mediator. The objective of this research is to examine the online learning encounters of art students in Chongqing, China.

1.3 Problem Statement

The growth of online learning has revealed several challenges in the online teaching environment, including the expense of educator training, feelings of isolation, and the digital divide. The challenge of sustaining student engagement and motivation within virtual learning environments primarily manifests in students' experiences of isolation, absence of feedback mechanisms, and inadequate technical assistance. Online learning has been more popular in university education in recent years. Nevertheless, there is a notable apprehension about the imperative to bolster the assurance in the educational achievements and the self-assurance of students in online learning (Mushtaque et al., 2022, Zheng et al., 2020).

Initially, previous research conducted a comparative analysis of online learning and conventional classroom settings and found that students tend to achieve better academic results through online learning (Lockman & Schirmer, 2020; Pei & Wu, 2019). Simultaneously, evidence indicates that online learning is as effective as traditional in-person instruction when considering factors such as belief in the learning outcomes, student happiness, and learning efficiency. However, certain issues, such as low student engagement, limited academic achievement, and ambiguous learning outcomes, still lead some instructors to oppose online learning (Lederman, 2018). Furthermore, there is research that presents worrisome findings on the efficacy of

online learning (Zapata-Cuervo et al., 2021). Therefore, previous studies have conflicts, leading to the need for new research to confirm online belief in the learning outcomes.

Within the realm of music education, online instruction has become a focal point of academic inquiry. Notably, Li (2020) found that students engaged in online music courses displayed commendable academic performance, at times surpassing their counterparts in traditional settings. Simultaneously, evaluations contrasting online and traditional formats in relation to improved belief in the learning outcomes, satisfaction, and efficiency in music education indicate that the digital modality can be commensurate using traditional in-person teaching methods. However, concerns persist in the musical academy. The unique nuances of music pedagogy, such as real-time auditory feedback and ensemble coordination, give rise to challenges in digital settings. Some educators express apprehensions about attenuated student engagement, questionable academic success, and ambiguous belief in the learning outcomes specific to online music courses (Nsairat et al., 2022). Further exacerbating this debate are findings by Rucsanda et al. (2021), which underscore potential shortcomings in online music instruction. Considering the conflicting results, there is an obvious and pressing need to conduct comprehensive research to ascertain the efficacy and limitations of online music instruction.

Secondly, in China, online art education during the pandemic was adopted as an emergency management strategy compared to traditional training methods. Nevertheless, it has resulted in a decline in collaborative learning, diminished instructor-student engagement, and constrained two-way debates (Rayan et al., 2016). In addition, despite the increase in online learning during the COVID-19 pandemic, its effectiveness and rates of completion have remained insufficient (Yang et al., 2021).

Given the circumstances of the COVID-19 epidemic, the need for immediate action in Chinese education led to a transition towards online teaching approaches for music training. This digital transition, although essential from a public health perspective, introduced multifaceted challenges specific to the domain of music education. Digital platforms, while versatile, often grapple with technical constraints such as audio latency and compromised audio fidelity parameters of critical importance in music (Ng et al., 2022). The absence of real-time, high-fidelity auditory feedback impedes the synchronous collaborative exercises intrinsic to music pedagogy.

Moreover, the reduction in direct instructor-student interaction diminishes the capacity for instructors to provide granular feedback on intricate technical facets, including finger articulation or diaphragmatic control. The ensemble practice a cornerstone of comprehensive musical training faces disruption, given the logistical challenges posed by online coordination (Neal, 2018). Diverse home environments further introduce variables such as inconsistent acoustics and potential lack of access to requisite musical instruments. A salient concern in this shift to digital instruction is the impingement on students' self-assessment capabilities, a foundational element in musical growth (Nsairat et al., 2022). This is particularly significant in the absence of regular, in-person evaluative feedback and the experiential learning derived from live recitals. This underscores the challenges associated with remote education within the pandemic (Karşal et al., 2021). Enhancing students' capacity to acclimate to online learning and improving their accurate assessment of their own abilities (i.e., self-efficacy) are crucial elements for enhancing their confidence in achieving learning goals.

In addition to the technical challenges, the content design of online art courses plays a crucial role in maintaining educational quality. For instance, online music courses often include structured modules covering music theory (Nsairat et al., 2022), instrument-specific techniques, and performance practice (Li et al., 2021), complemented by interactive quizzes (Pilař et al., 2024) and peer-review exercises (Singal, 2023). These curricular elements ensure that students not only acquire theoretical knowledge but also apply practical skills in a guided manner. Incorporating project-based learning and virtual ensemble collaborations can further simulate the collaborative and experiential aspects of traditional classrooms, mitigating some of the pedagogical limitations inherent in remote instruction.

Moreover, the study uncovered a discrepancy in prior research about the correlation between self-efficacy and subjective pleasure. The self-efficacy is a critical variable to influence and predict student's academic performance (Alegre, 2014). People usually think that learning experience will change with the change of learning satisfaction (Wei & Chou, 2020a). Alzahrani and Seth (2021) examined the relationship between self-efficacy and student happiness in an online learning environment. Their study revealed that self-efficacy, as a preceding factor, might have a favorable influence on student satisfaction. Subsequently, Yang et al. (2022) and Prifti (2022) corroborated this discovery. However, Aldhahi et al. (2022) found an interesting results that student's satisfaction among online learning experience can also influence learning-related self-efficacy. Hence, it is essential to reevaluate the correlation between self-efficacy and felt pleasure to enhance one's understanding of the online learning milieu.

In addition, the learning results are ambiguous and may not align with expectations or might even be inferior to those achieved via conventional learning methods. Critics argue that the abrupt shift to online education, without adequate instruction and readiness, may result in worse results (Wang, 2020). Prior studies have shown that, despite the increasing popularity of online learning, students continue to prefer in-person teaching owing to obstacles such as restricted availability of course materials, less connection with instructors, and a sense of isolation (Alawamleh et al., 2020).

Furthermore, the case studies on belief in the learning outcomes are rich, but mostly focus on populations not associated with college courses (such as K-12 students) (Figlio & Rush, 2020), in other words, online learning for Chinese undergraduates majoring in Art were ignored. Due to the outbreak of COVID-19, not only K-12 students need to use online learning platforms to complete learning tasks, but also many colleges and universities have been compelled to transition from traditional in-person education to remote online learning, which has a huge scale (Jin et al., 2021).

In addition, the previous studies carried out by Mushtaque et al. (2022), Ulfatun et al. (2021), and Yokoyama (2019) examined the idea of self-efficacy. However, there has been a lack of research on self-efficacy in online learning environments, particularly in the context of online art courses. According to Mushtaque et al. (2022), self-efficacy plays a crucial role in online education. The lack of evidence about students' beliefs in learning outcomes and self-efficacy may lower instructors' or leaders' expectations regarding the effectiveness of online learning. Basith et al. (2020) found that self-efficacy is a significant predictor of academic accomplishment and is positively associated with academic performance. In addition, a stronger sense of self-efficacy is linked to improved academic achievement. The positive effects of self-

efficacy such as engagement (Pellas, 2014), satisfaction (Baherimoghadam et al., 2021), academic success (Abdullah & Mustafa, 2019) have been demonstrated, but the process of how self-efficacy is formed remains to be seen, and how to improve the self-efficacy of online learning learners needs further research.

With the increasing prevalence of online learning, it is essential to acknowledge the considerable advantages and possible difficulties it brings. This research employs the idea of social constructivism and Moore's framework of three forms of interaction to develop a model that elucidates the correlation between students' online learning interactions, belief in the learning outcomes, and self-efficacy. The technique offers educators, policymakers, and stakeholders a means to evaluate the influence of instructional technology on learning outcomes and student accomplishment (Schmid et al., 2014).

1.4 Research Objective

The problem description led to the formulation of six goals to lead this study.

- 1.4.1 Examine the significant influence of online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content, on the belief in the learning outcomes of college students.
- 1.4.2 Examine the significant influence of online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content, on the self- efficacy of college students.
- 1.4.3 Examine if perceived satisfaction acts as a mediator in the connection between online learning interactions (interactions between instructors

and learners, interactions between learners and learners, and interactions between learners and content) and the belief in the learning outcomes among college students.

- 1.4.4 Examine if perceived satisfaction acts as a mediator between online learning interactions (interactions between instructors and learners, interactions between learners and learners, and interactions between learners and content) and the self-efficacy of college students.

1.5 Research Question

The research inquiries are formed from the objectives of the investigation.

- 1.5.1 Is online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content is a significance influence on the learning outcomes of college students?
- 1.5.2 Is online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content is significance influence on the self- efficacy of college student?
- 1.5.3 Is perceived satisfaction acts as a mediator in the connection between online learning interactions (interactions between instructors and learners, interactions between learners and learners, and interactions between learners and content) and the belief in the learning outcomes among college students?
- 1.5.4 Is perceived satisfaction acts as a mediator between online learning interactions (interactions between instructors and learners, interactions between learners and learners, and interactions between learners and content) and the self-efficacy of college students?

1.6 Research Hypothesis

The hypotheses were created for research questions 1-4.

Ha₁: Online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content are a significance influence on the learning outcomes of college students.

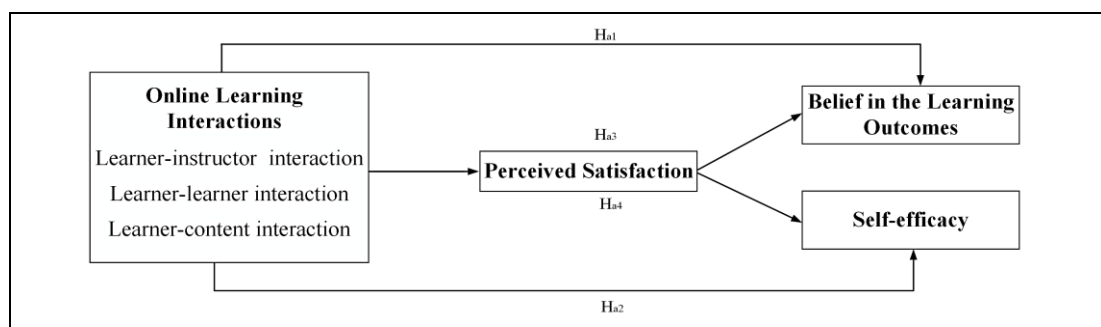
Ha₂: Online learning interactions, namely the interactions between instructors and learners, learners and learners, and learners and content are a significance influence on the self- efficacy of college student.

Ha₃: Perceived satisfaction is a significant mediator between online learning interactions (interactions between instructors and learners, interactions between learners and learners, and interactions between learners and content) and belief in the learning outcomes among college students.

Ha₄: Perceived satisfaction is a significant mediator between online learning interactions (interactions between instructors and learners, interactions between learners and learners, and interactions between learners and content) and the self-efficacy of college students.

Figure 1.1

Hypotheses and models built for this study



1.7 Research Significance

1.7.1 Theoretical Significance

This study develops a model to examine how online learning interactions impact the belief in the learning outcomes and self-efficacy of Chinese college students, therefore improving the theoretical framework of distance education.

This work is a valuable contribution to the current knowledge base on online learning, by extending research on interactions in online learning among Chinese college students. It also serves as a theoretical reference for implementing information-based instruction, particularly human-computer interaction teaching, to enhance students' engagement and efficiency in using online teaching systems. Due to the exponential increase in internet use, online learning has become a prominent and dominant trend in technical education (Bates, 2019). Interactive online platforms foster an optimal learning environment, facilitating the enhancement of user pleasure, academic achievement, and self-efficacy. By addressing the research gap in online learning, stakeholders such as online platforms, institutions, and students will be able to improve the quality of online education.

Moreover, this study expands the range of the social constructivism theory and Moore's interaction theory. Social constructivism theory provides a useful framework for examining students' learning experiences and highlights the importance of instructors in facilitating student learning, including the interpretation and confirmation of acquired knowledge. It also places significance on peer interaction. Nevertheless, the exchanges between instructors and learners, as well as between learners and material, are often disregarded. Moore's interaction theory insufficiently addresses the correlation between the learner's interaction and the content, the belief

in the learning results, and the level of pleasure. This study confirms and expands the social constructivism theory and Moor interaction theory regarding online learning. Specifically, it integrates Bandura's self-efficacy theory with curriculum theory, proposing that the development of self-efficacy in online environments is not automatic but is a direct outcome of a pedagogically sound curriculum. The study theorizes that curriculum elements (e.g., scaffolded tasks, structured peer collaboration, embedded feedback loops) are the mechanisms that create the mastery, vicarious, and persuasive experiences essential for building self-efficacy.

1.7.2 Practical Significance

Online learning is a crucial method for improving the accessibility and flexibility of courses in higher education, offering advantages from both the learners' and institutions' perspectives. This study enriched the research on “human-computer interaction” in classroom teaching interaction. Besides, it confirmed that design an intellectual teaching system can meet the needs of learners' personal and emotional, is of great significance to make learners make full use of all sorts of study resource, realize the harmonious development of the cognitive and affective.

From the instructor's perspective, this study is helpful to provide the most direct reference for teachers to make online video courses. By improving learners' learning experience, college students' belief in the learning outcomes can be improved. From the student's perspective, online education is particularly beneficial for pupils who are unable to attend school in person due to the effects of COVID-19. From an institutional viewpoint, online platforms enable universities to provide more courses or sections, expanding students' access to required subjects. Examining the relationship between student involvement in online learning, satisfaction, confidence

in accomplishing learning goals, and self-assurance may assist instructional designers and educators in creating high-quality online courses.

Hence, this research not only urges educators to acknowledge the significance of interaction in online instruction but also contributes to improving the overall caliber of institutions and fostering the multifaceted advancement of higher education. It improves the quality of teaching activities, allowing students to develop stronger beliefs in learning outcomes during online learning. The results of this study may be used for many levels of online education, including elementary, middle, and high school education levels, and can contribute to the development of more efficient implementation techniques.

1.8 Research Limitation

Due to the limitations of various subjective and objective conditions, there is still much room for progress in the research of this research. The constraints of this research are evident in several facets: First, the sample size is insufficient to carry out a large-scale survey of Chinese college students, which restricts the generalizability of the findings and recommendations. Furthermore, there are constraints when it comes to choosing themes. Participants' options for grades and majors were limited due to time, resource, and human limitations.

Several shortcomings are evident in this study, attributable to inherent subjective and objective limitations. First, the Chinese college students are a large population. Because to timing constraints, human resources and material resources, this study is only conducted among college students in Arts Vocational College (one of the universities that offer online courses in China), and students in other cities, such as Beijing and Shanghai, do not participate in this study. There are certain limitations