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Influential Factors of Moocs on Piano Lesson at University Level in China

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Abstract

Purpose: With growing need in on-line learning especially during the lock-down periods caused by COVID-19 pandemic, learning the piano at university level in China has faced challenges as the piano students could opt to the virtual mode. Therefore, this study aims: 1) To investigate influential factors on the piano students to use MOOCs in their piano performance lessons at university level in China. 2) To suggest the academics to handle the MOOCs method in the academics and other online learnings for music performance properly, thus being ready for the up-and-coming learning technology. **Research design, data and methodology**: Using quantitative approach via an online survey held from July to October 2023, this study conducted surveyed 402 students who attend on-line piano-performance classes at 295 universities in China. Descriptive and Inferential Analyses are used to analyze the data collected via the questionnaire. **Results**: With Multiple and Simple Linear Regression Analyses, the results show that all independent and mediating variables exhibit their significant influences on the dependent variable—MOOCs Use Intention. **Conclusions**: MOOCs for piano-performance learning shows a strong likelihood to be popular among university students. Improvement of piano teachers' skills, their readiness for virtual interaction, and university preparation for MOOCs using are suggested.

Keywords: Perceived Ease of Use, Perceived Usefulness, Perceived Autonomy, Social Influence, Learner Instructor Interaction Quality, Learning Engagement, Satisfaction, MOOCs Use Intention

JEL Classification Code: I23, M31, O39

1. Introduction

With the rapid development of the globalized knowledge economy, the advancement of information and communication technology has transformed educational models. The concept of Massive Open Online Courses (MOOCs) was first proposed by Canadian scholars in 2008 (Cheng et al., 2022). MOOCs are courses that offer open registration through an online platform. In addition to their cost-[5]effectiveness, flexibility, and scalability, MOOCs provide an opportunity for a large number of learners worldwide to access online courses, regardless of their educational background, physical location, and time constraints (Cheng, 2022).

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Numerous global MOOCs platforms have been established, with a small number of the world's top universities taking a proactive approach by developing their own MOOCs platforms to provide online courses. Various universities and MOOCs providers, including Coursera, edX, Udacity, and Udemy, have adopted an international partnership approach (Khalid et al., 2021). In some cases, MOOCs platforms are jointly launched by governments and universities (Khalid et al., 2021). Certain universities utilize MOOCs as a strategic direction to develop new online learning products, catering to specific skills and knowledge domains, while others employ MOOCs to extend their international positioning and meet the needs of overseas students (Guerrero et al., 2021). Chinese universities have also actively embraced the development and promotion of MOOCs (Zheng et al., 2018).

Since 2012, renowned universities in China have joined the MOOCs movement, offering a plethora of online course resources on five well-known platforms, including Coursera, edX, Chinese MOOCs, China University MOOC, and Xuetang Online (Zheng et al., 2018). As a result, over 110 million learners from more than 900 universities worldwide have registered for learning on these platforms (De Notaris, 2021). In China, MOOCs have played a pivotal role in advancing distance learning within higher education (Zhang et al., 2019).

The advantages of MOOCs over traditional music education are evident (Wan, 2022). Taking piano learning as an example, in traditional piano classrooms, the teacher takes the leading role, deciding the class content, adopting a single teaching method, and providing limited course materials, resulting in low student motivation. Piano performance encompasses a unique artistic quality, requiring students in piano majors not only to master piano playing techniques but also to grasp intricately the style of piano works and exhibit an exceptional stage performance ability. In comparison to traditional classrooms, piano lesson via MOOCs enriches the course content through videos and images, stimulating students' interest in learning and improving overall learning efficiency. MOOCs provides a convenient, time-saving, and effective approach for piano students to engage in online learning, breaking the constraints of exclusively relying on face-to-face instruction for knowledge acquisition in piano education (Yang, 2021).

MOOCs offer comprehensive and content-rich piano courses. The piano courses on MOOCs not only cover piano playing techniques, grasping the style of piano works, and stage performance abilities, but they also incorporate video presentations of performances by pianists from various countries. These performances are contextualized with the historical and artistic backgrounds, enabling students to gain a better understanding of the stylistic evolution of piano compositions across different periods. Piano performance majors can benefit from MOOCs by accessing exceptional courses recorded by world-renowned piano performers and top universities, an opportunity that may be challenging to attain through the traditional offline means.

During the COVID-19 pandemic, some piano teachers opted for using WeChat or TenCent platforms to conduct online live-streaming piano lessons, aiming to replicate the traditional face-to-face or one-on-one teaching format through online channels. However, during these live-streaming sessions, they often encountered issues such as network delays, unclear video quality, and distorted piano sound. Students were unable to discern the subtle differences between their teacher's demonstrations and their own performances, and in some cases, both the teacher and students were forced to exit the live session due to network latency, resulting in wasted class time. As a consequence, this mode of instruction was quickly abandoned by piano educators and students. Unlike live-streaming lessons, MOOCs piano courses do not suffer from interruptions

caused by network congestion. Students can smoothly follow the course schedule without being affected by network issues and can review their teacher's instructional videos repeatedly. Additionally, teachers can monitor students' learning progress through the platform, ensuring the smooth progression of the teaching process.

In China, MOOCs have more features to offer piano performance students (Yang, 2021). Using MOOCs to learn piano courses also enables online quizzes, online communication, online assessment and other aspects, which saves the time of both teachers and students. Piano performance students studying a particular piano course on MOOCs can receive a certificate issued by the platform after completing the test. Some universities require students to study piano course on MOOCs platforms co-operated by any music institutes, and after completing the test, they can obtain credits recognized by the university without the platform certification.

The advantages of MOOCs— being open, accessible, and free from time and location constraints— have made piano performance majors more willing to utilize MOOCs for piano learning. Among the Chinese MOOCs platforms, the China University MOOCs platform stands out for having the highest number of partner universities. Taking China University MOOCs as an example, it offered 12 piano courses before December 2019. By July 2023, the platform has expanded its piano course offerings to 35, representing an increase of 23 courses (China University MOOC, 2014). Even after the COVID-19, piano courses continue to be favored by both piano teachers and students. In the regions with concentrated, high-quality higher education resources, such as Beijing, Shanghai, and Guangzhou, higher education institutions have contributed a significant portion, accounting for 61%, of the music courses offered on the China University MOOCs platform. Among all music courses, Piano fundamental courses have the highest enrollment numbers (Lv, 2020). In a survey conducted by Cheng (2020) among piano performance majors in a university in Zhejiang province, it was found that 80% of the students believed that the use of innovative digital resources made piano learning more enjoyable, while 90% of the students found that utilizing piano learning platforms and other digital resources made learning piano easier.

Currently, scholarly research studies on MOOCs primarily focus on how to construct MOOCs to meet students' personalized service needs, the instructional methods used in MOOCs, and, whether MOOCs can promote educational equity, among other related issues (Cheng et al., 2022). There is limited attention given to the behavioral intention of students to use MOOCs. However, with MOOCs becoming a significant channel for online piano learning in China, investigating the perspectives of Chinese piano performance major on MOOCs becomes particularly essential. Therefore, studying the factors that influence the Chinese students' views of MOOCs for their learning calls for a significant attention in improving the platform and administration of MOOCs for piano learning.

Traditional piano teaching and MOOCs piano teaching are different in their respective teaching methods, learning environments, and instructor-student interactivity. Traditional piano teaching typically involves an instructor and a student in a one-on-one session, where student meet with teacher at a fixed time and location. In addition to providing face-to-face feedback and guidance, teacher also discusses related stories and shares small talks about livelihood pertaining to the lesson or piece being studied. This interpersonal interaction not only allows student to earn insights about the music, but also some relevant principles of knowledge about the context of history, composers' biography and situations that shaped one composition.

In contrast, when student learns the piano through MOOCs by utilizing online video, being free from time and location constraints, the interaction between student

and teacher in MOOCs strictly relies on the service modules provided by the MOOCs platform. The online platform deprives an opportunity for teacher and student from vivid interaction and close connection. By focusing more on self-directed learning, MOOCs piano teaching may offer a wide range of learning materials, but lack the depth of interaction.

In both traditional piano teaching and MOOCs piano teaching, therefore, teacher-student interaction is a crucial component, which directly has impact upon students' learning experiences, their outcomes, and their overall satisfaction with the course.

1.1. Statement of Problem

Since MOOCs have been launched in the past 15 years, many studies on their efficacy in teaching and learning have been conducted. MOOCs show their successes in many areas of teaching and learning, both amidst the COVID-19 years and after the COVID-19 crisis. Despite MOOCs' popularity, a few research works are found on the music learning, or, piano performance lesson in particular. More evidently in China, it is likely that the population of piano performance students— both at private lessons and university levels— are showing their preference to choosing purely MOOCs over a blended learning approach or any one-on-one and face-to-face lessons.

A research to investigate piano performance students at university level is anticipated to provide information necessary in realizing the direction of music or piano teaching, as well as the likelihood for businesses or institutes related to piano performance lesson to adapt or changes themselves to respond to the music learning environment.

1.2. Research Objectives

[1]. To describe the factors for using MOOCs to conduc the learning of piano performance at the university level in China.

[2]. To identify the extent to which the factors for using MOOCs influence the Intention to Use MOOCs in piano performance lesson.

1.3. Research Questions

[1]. What describes factor for using MOOCs to conduct the learning of piano performance at the university level in China?

[2]. To what extent the factors for using MOOCs influence the students' intention to use MOOCs in their piano performance lesson?

1.4. Scope of Research

This research study is confined to the young Chinese students at the undergraduate level who are enrolled and have major in piano performance course at Chinese universities in China. Piano performance course refers to the courses offered by universities' undergraduate level, including the students from their Year One to Year Four. The courses consist of piano playing, technique of playing, and the aesthetic part of the playing.

Covering approximately 295 Chinese universities in People's Republic of China, which offer the piano performance courses at the undergraduate level, the respondents to this study must experience and be currently using MOOCs in their online learning of piano performance courses. Their experience on the MOOCs piano lessons should be equal to that of the one-on-one or face-to-face piano lessons.

The period of survey under this study started from July to October 2023, though the respondents' experiences may reflect their perception of what

happened three years earlier (2020), especially for those who are now in their fourth year in the universities. As such, the issue of COVID-19 lock-down condition may intervene and prevail some the respondents' perception.

Theories related to Theory of Planned Behavior (TPB) are combined in this study. They are: Technology Acceptance Model (TAM); Unified Theory of Technology Acceptance and Use (UTAUT); and, Expectation Confirmation Model (ECM).

1.5. Limitations of research

This study is limited to a specific context of Chinese piano performance major students in People's Republic of China. The characteristics of the respondents' experience are limited to their university level and a certain degree of piano lessons within the realm of undergraduate study. Analyses of the study concentrate only on the respondents' responses to their experience of using MOOCs to learn, while excluding the technical or artistic part of piano lessons.

Notably, this research does not delve into discussions related to the specific teaching methods and modes employed in MOOCs piano courses. Moreover, it omits analyses of the technical and functional aspects; there is no analysis on music assignments, learning habits of students, students' performance competency or levels of their skills, and, the role of teachers in online classrooms. Therefore, the findings may not be directly applicable to the overall businesses of piano performance teaching.

Though there are numerous research works on MOOCs and their application in academic or learning community, none is found on learning piano lesson. Therefore, the literature discussed under this research study is limited to academic learning in general.

Since the respondents are Chinese students of Years One to Four, their experiences in using MOOCs may vary. Those from the fourth-year class possess a longer span of MOOCs use from 2020 to 2023. This means response from the Chinese undergraduates cover their experiences and perception over 4 years. As the study is conducted from July to October this year, the respondents' perception on the technology of MOOCs is limited to a certain period of time.

1.6. Significance of the Study

This study fills the research gap concerning the intention of Chinese higher education piano performance majors to use MOOCs. By expanding the dimensions of Chinese higher education piano performance majors' intention to use MOOCs and further investigating the extent to which these dimensions influence their intention, this research will contribute to the existing literature in this field. Additionally, the discussions and findings of this study will help MOOCs platform providers and Chinese higher education institutions gain an insightful information on the demand for piano-related MOOCs among piano performance majors. Furthermore, it will provide valuable data support for the development of piano-related MOOCs courses and the enhancement of piano-related modules on MOOCs platforms.

2. Literature Review

2.1. Theories

2.1.1. Technology Acceptance Model (TAM)

The TAM model has been proven to illustrate technology adoption in many ways, including social Web applications and health informatics. This model is also applicable to the study of MOOCs and other intelligent learning systems (Alamri, 2022). Cheng et al. (2022) found in their research that some papers studying MOOCs in the context of China used the widely used Technology Acceptance Model (TAM) as their research model. Wu and Chen (2017) proposed that a unified model be developed to investigate the continuation intention for MOOCs using a combination of the Technology Acceptance Model (TAM), the Task-Technology Fit Model (TTF), and the characteristics of MOOCs. The combined TAM and TTF concept

provides a more comprehensive understanding of MOOC usage intentions, in which perceived usefulness and attitude are critical to the continuance intention to use MOOCs. Perceived usefulness stands as a significant mediator of the effects on perceived ease of use, task technology fit, reputation, social recognition and social influence on continuance intention. Previous literature research indicates that perceived usefulness and perceived ease of use of MOOCs play a significant role in behavioral intentions when using the TAM model as a research component (Al-Rahmi et al., 2021; Pozón-López et al., 2021; Wu & Chen, 2017).

2.1.2. Unified Theory of Acceptance and Use of Technology Model (UTAUT)

The Unified Theory of Technology Acceptance and Use (UTAUT) Model has four main structures that determine the behavioral intention and ultimate behavior of technology system adoption and use. These structures include performance expectations, effort expectations, social impact, and promotion conditions. Gender, age, technical experience, and voluntary use are the four moderating variables of the UTAUT Model. Pozón-López et al. (2021) research found a behavioral model was proposed by combining the three theoretical frameworks of Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), and Unified Theory of Technology Acceptance and Use (UTAUT) Model. A behavioral model explaining the behavioral intention of using MOOCs through different structures was proposed by utilizing the different advantages of these three theoretical frameworks. The effectiveness of user perceived satisfaction and autonomous motivation as the strongest predictors of usage intention was found through validation. Course quality, entertainment value, and practicality have a positive impact on choice intention.

Khalid et al. (2021) used the UTAUT Model and added two variables: perceptual autonomy and absorptive capacity. An explanation is given for the relationship between various factors and students' intention to use MOOCs using this framework. Four variables (social influence, absorptive capacity, facilitating conditions, and perceived autonomy) significantly impact students' intention to use MOOCs.

2.1.3. Expectation-Confirmation Model (ECM)

The basic theory of the Expectation Confirmation Model (ECM) is to further develop the Technology Acceptance Model by adding satisfaction and confirmation variables. There are four variables in the basic ECM, including confirmation, perceived benefits, satisfaction, and sustained tension. The basic ECM model and the developed ECM model have been widely used in technical research by researchers. Cheng (2022) has developed a Mixed Model based on learning participation and information system successfully expanded Expectation Confirmation Model (ECM), and used this integrated model to examine whether or not quality factors that serve as antecedents of student beliefs would influence their intention to continue MOOC participation. Research shows that students' perception of knowledge quality, system quality, interface design quality, learner-instructor interaction quality and collaboration quality have a positive effect on the perceived usefulness, confirmation and learning engagement of MOOCs, which jointly explains students' satisfaction with MOOCs, and thus leads to students' willingness to continue MOOCs. Prasetya et al. (2021) found that the quality factor of using ECM Model reaffirms the determining factor for satisfactory and continuous use of e-learning.

2.2. Research Variables

Perceived Ease of Use: Perceived Ease of Use is the degree to which someone has trust in using a particular system with little effort (Davis et al., 1989). In the use of MOOCs, Perceived Ease of Use can be understood as students using MOOCs systems not having to spend a lot of time learning operational methods. For example, the ease of acquiring skills through MOOCs. Numerable empirical evidence suggests a significant relationship between perceived usability and intention (Pozón-López et al., 2020). Perceived Ease of Use also positively

impacts the behavioral intentions of MOOCs users. Wu and Chen (2017) believe that Perceived Ease of Use can directly or indirectly effect the intention to use MOOCs through Perceived Usefulness.

Learner Instructor Interaction Quality: Essentially, collaboration between learners and other learners is conceptualized as the quality of interactions between learners and other learners in the communication process via using the e- learning system (Kuo et al., 2014; Cheng, 2022). The quality of communication and interaction between students and teachers in the online classroom learning process can affect the use of online learning systems. Taghizadeh and Hajhosseini (2021) found that both interaction and teaching quality have a positive impact on satisfaction when studying the contribution of interaction and teaching quality to satisfaction.

Learning Engagement: Learning engagement, which is the continuous initiative that a learner expends in the learning process to achieve learning goals, is the most widely used metric to assess learning outcomes in MOOCs (Alamri, 2022). The sense of immersion experienced by students while learning in a virtual world can positively impact their satisfaction within the virtual environment (Goel et al., 2013). The sense of immersion triggered by the mobile learning system can actively enhance their satisfaction with the system (Reychav & Wu, 2015). Learning Engagement is often described as students actively participating in learning activities and performing well. Alamri (2022) contends that learning engagement is a continuous effort by learners to achieve learning goals during the learning process and is the most widely used indicator for evaluating learning outcomes in MOOCs. During the COVID-19 pandemic, the learning engagement of students using MOOCs systems had a positive impact on their willingness to continue using them. Cheng (2022) confirmed that learning engagement positively effects students' satisfaction and willingness to continue using MOOCs.

Perceived Usefulness: Perceived Usefulness is the degree to which someone believes that implementing a particular scheme can enhance work performance (Davis et al., 1989). Perceived Usefulness in this study can be understood as the use of MOOCs systems by students to learn online courses, which can help them better learn the courses and achieve the expected learning outcomes. Wu and Chen (2017) pointed out in their study that, relative advantages, complexity, trialability, observability, compatibility, and have a positive impact on Perceived Usefulness. Perceived Usefulness has a substantial impact on the usage intention of MOOCs users.

Perceived Autonomy: Khalid (2021) defined Perceived Autonomy as an individual's sense of their ability to exercise a degree of freedom in making choices within modular learning. Khalid et al. (2021) added the variable of perceptual autonomy to the study based on the Unified Theory of Technology Acceptance and Use (UTAUT) model. It was determined that Perceived Autonomy has a positive and significant impact on behavioral intention to use MOOCs. The findings of the study indicated that the factors that influence students' adoption of online discussion and the resultant use of MOOCs include perceived process, perceived autonomy, perceived competence, and perceived relatedness.

Social Influence: Social Influence is one's conviction that people who are in one's social circle and are important to them think that the use of a particular technology will be beneficial (Venkatesh et al., 2003). In previous studies, Social Influence has been strongly demonstrated as a driving factor for user behavior. When a person perceives the benefits of using MOOCs by others, the observer is more likely to accept MOOCs and is more willing to use MOOCs (Wu & Chen, 2017). Khalid et al. (2021) to find that Social Influence has a positive impact on Thailand's behavioral intention to use MOOCs.

Satisfaction: Placing Satisfaction within the context of MOOCs environment refers to learners' perception of joy and accomplishment within the learning environment (Zhou, 2017). Learners who find MOOCs satisfactory are more likely to have a stronger intention to continue learning. Pozón-López et al. (2021) validated the effectiveness of user- perceived satisfaction and

autonomous motivation as the strongest predictors of usage intention. Students' satisfaction with using MOOCs has a positive impact on their willingness to use them, further leading to their willingness to continue MOOCs (Cheng, 2022; Wan et al., 2020; Alyoussef, 2021).

MOOCs Use Intention: Use Intention refers to the willingness to use and continue using technology, as well as the factors that determine the use of a particular technology (Al-Rahmi et al., 2021). In this study, MOOCs Use Intention is defined as the attitude of Chinese piano major students towards using the MOOCs platform and their willingness to engage in piano course learning through MOOCs.

2.3. Conceptual Framework

Figure 1 is the study's conceptual framework is built upon the similar research dimensions found in the previous three models (TAM, UTAUT, and ECM).

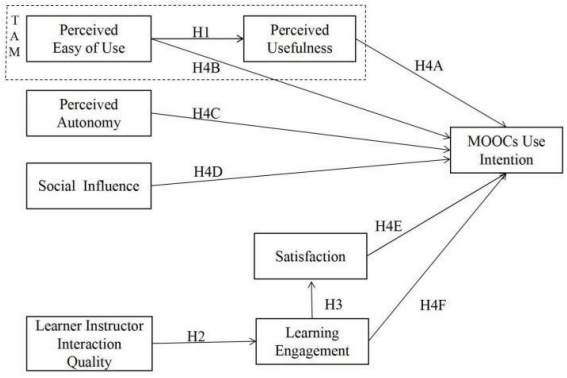


Figure 1: Conceptual Framework of this Study

2.4. Research Hypotheses

[H1] Perceived Ease of Use of Chinese undergraduates enrolled in piano performance major significantly influences their Perceived Usefulness of music learning via MOOCs provided by Chinese University.

[H2] Learner Instructor Interaction Quality of Chinese undergraduates enrolled in piano performance major significantly influences their Learning Engagement of music learning via MOOCs provided by Chinese University.

[H3] Learning Engagement of Chinese undergraduates enrolled in piano performance major significantly influences their Satisfaction of music learning via MOOCs provided by Chinese University.

[H4A] Perceived Usefulness of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

[H4B] Perceived Ease of Use of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

[H4C] Perceived Autonomy of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

[H4D] Social Influence of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

[H4E] Satisfaction of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

[H4F] Learning Engagement of Chinese undergraduates enrolled in piano performance major significantly influences their Use Intention of music learning via MOOCs provided by Chinese University.

3. Research Methods and Materials

3.1. Methods of Research Used

In this study, a descriptive research approach is employed to determine the willingness of undergraduate piano performance majors in Chinese universities to use MOOCs for online piano courses and to describe the factors that influenced their intention to use MOOCs. The primary data collection method chosen for this study is a questionnaire survey, which is also one of the commonly used methods in descriptive research (Zikmund et al., 2013). Online questionnaire data were collected from undergraduate students whose major is in piano performance at Chinese universities, using non-probability sampling methods. The results of the study help identify the factors that influence the intention to use MOOCs and then determined the degree to which these factors influence the intention to use MOOCs for learning online piano courses.

The research questionnaire consists of three parts, using a 5-point Likert scale to evaluate the differences in opinions of each respondent in different aspects. The use of the Likert scale helps assess the respondents' level of agreement with the questions and is suitable for measuring the intention to use MOOCs. This study utilizes Descriptive Analysis, Reliability Analysis, and Inferential Analysis to analyze the data collected through the survey instrument.

3.2. Respondents and Sampling Procedures

3.2.1. Target Population

As the respondents must be students who take their major study in piano performance in Chinese higher education, investigation should be conducted with 295 current academies in China who offer piano performance majors. These institutes' piano performance curricula include four- years undergraduate program. The average numbers of students enrolling in each year for the piano performance class is 30. Therefore, the total four-year-program in each institute should have 120 students. This comes to an approximate target population of 35,400 students over China.

3.2.2. Sampling Unit and Procedures

These participants must meet both the criteria of being university piano performance majors and using MOOCs for piano course study.

In designing empirical research, a crucial step is determining the necessary sample size. The key purpose of sample size is to elucidate how the collected data is expected to provide valuable information based on the researcher's hypothesis objectives (Lakens, 2022). A convenience sampling method is hence applied on this study. Based on the expected accuracy of 95% confidence level, the population size ranged from 25,000 to 50,000 requires a sample size of 381 (Taherdoost, 2017). As the targeted population of this study is 35,400, the acquired sample size of 402 respondents is hence justified for the current study.

A cross-sectional questionnaire survey is employed to test this study's research hypotheses, and all data are collected at one point in time. Distribution of the questionnaires to the piano performance students in higher education institutes in China via an online survey was administered. Screening questions are applied to target the right respondents, who actually experienced the use of MOOCs for their respective university's piano lessons.

3.3. Research Instruments/ Questionnaire/Data Collection

This study collected data from respondents by using questionnaires. The questionnaire is based on a conceptual framework and divided into three sections. This study employs survey method to collect primary data from Chinese undergraduate piano performance majors who used to engage in online piano learning through MOOCs for over six months. An online survey was administered to furnish the variables proposed in the research framework. Distribution of this survey was conducted via WeChat over a three-week period.

3.4. Statistical Treatment of Data

After obtaining 402 valid data, statistical treatment of data underwent three phases. The study first used Cronbach's Alpha for reliability test, of which the results show the reliable levels from 0.725 to 0.886, thereby all variables are acceptable. Descriptive analysis was then used to explain the demographic and general data of the participants.

For the data related to scale items, this study finally employed Simple Linear Regression Analysis and Multiple Linear Regression Analysis within Inferential Analyses.

4. Results and Discussion

4.1. Descriptive Analysis

Table 1: Summary of Demographic Factors

Demographic factors	Characteristics	Frequency	Percentage
Gender	Female	330	82.09%
Age	Below 20 years	349	86.82%
Level at The University	1st Year (Freshmen)	328	81.59%
Years of Experience in Taking Piano Lesson	Below 3 years	325	80.85%
Extra-curricular Piano Lesson	No	300	74.63%
Type of Piano	I don't own a piano, and use the university piano room for practice	180	44.78%
Type of Piano for Piano Practice	Upright Piano	129	32.09%

Among the 402 respondents, female respondents (82.09%) are the majority. About 349 respondents are under the age of 20, accounting for 86.82% of the sample. This results in the highest numbers of respondents being the university freshman, with 328 respondents accounting for 81.59%. The survey found the majority of respondents having experience of piano learning below 3 years, from 325 respondents constituting 80.85% of the sample. Only 300 respondents (74.63%) exclusively learned piano through university piano courses. A total of 180 respondents, 44.78% or nearly half of the sample, do not own the pianos and have to use university-provided pianos for their piano studies. About 32.09% of the sample, or 129 individuals, use upright piano type at their homes. The conditions of their ownership of the piano and types of the piano—grand, upright, electronic piano— imply the respondents' likelihood for a preference of virtual learning to the traditional one-on-one learning.

4.2 Hypotheses Testing Inferential Analysis

Table 2: Summary of Simple Linear Regression Analysis for Hypotheses H1

Variables	B	SE B	β	t	Sig.
(Constant)	3.098	.172		18.033	<.001
Perceived Ease of Use	.191	.045	.209	4.268	.000

Note. R2 = .0436, Adjusted R2 = .0412, p<.01. DV=Perceived Usefulness

Table 2 explains the result of Simple Linear Regression (SLR) analysis computed on Perceived Ease of Use as the independent variable and Perceived Usefulness as the dependent variable. The model formula is as follows: Perceived Usefulness = 3.098 + 0.191*Perceived Ease of Use. The model's R-squared value is 0.0436, indicating that Perceived Ease of Use can explain 4.36% of the variance in Perceived Usefulness. Further analysis reveals that the regression coefficient for Perceived Ease of Use is 0.209 (t = 4.268, Sig = 0.000<0.01), suggesting that Perceived Ease of Use has a significantly positive effect on Perceived Usefulness. In summary, the analysis indicates that Perceived Ease of Use constantly has a significantly positive influence on Perceived Usefulness.

Table 3: Summary of Simple Linear Regression Analysis
for Hypotheses H2

Variables	B	SE B	β	t	Sig.
(Constant)	2.75	.189		14.567	<.001
Learner Instructor Interaction Quality	.347	.047	.35	7.469	.000

Note. R2 =.122, Adjusted R2 = .12, p<.01. DV=Learning Engagement

Table 3 indicates a Simple Linear Regression analysis on Learner Instructor Interaction Quality as the independent variable and Learning Engagement as the dependent variable. The model formula is as follows: Learning Engagement = 2.75 + 0.347*Learner Instructor Interaction Quality. The model's R-squared value is 0.122, which means that Learner Instructor Interaction Quality can account for 12.2% of the variation in Learning Engagement. Further specific analysis reveals that the regression coefficient for Learner Instructor Interaction Quality is 0.35 (t=7.469, Sig= 0.000<0.01), implying that Learner Instructor Interaction Quality has a significantly positive influence on Learning Engagement. In summary, the analysis indicates that Learner Instructor Interaction Quality consistently has a significant positive influence on Learning Engagement.

Table 4: Summary of Simple Linear Regression Analysis for Hypotheses H3

Variables	B	SE B	β	t	Sig.
(Constant)	2.052	.199		10.314	<.001
Learning Engagement	.474	.047	.448	10.024	.000

Note. R2 = .201, Adjusted R2 = .199, p<.01. DV=Satisfaction

Table 4 presents the result of Simple Linear Regression analysis computed on Learning Engagement as the independent variable and Satisfaction as the dependent variable. The model formula is as follows: Satisfaction = 2.052 + 0.474*Learning Engagement. The model's R-squared value is 0.201, indicating that Learning Engagement can account for 20.1% of the variation in Satisfaction. Further specific analysis reveals that the regression coefficient for Learning Engagement is 0.448 (t= 10.024, Sig= 0.000<0.01), implying that Learning Engagement has a significantly positive influence on Satisfaction. In summary, the analysis indicates that Learning Engagement consistently has a significant positive influence on Satisfaction.

Table 5: Summary of Multiple Linear Regression Analysis
for Hypotheses H4A, H4B, H4C, H4D, H4E, H4F
Note. R2 =.514, Adjusted R2 = .507, p<.01. DV=MOOCs Use Intention

Variables	B	SE B	β	t	Sig.
(Constant)	-0.401	.22		-1.819	0.07
Perceived Usefulness	.135	.039	.131	3.431	.001
Perceived Ease of Use	.143	.036	.151	4.016	.000
Perceived Autonomy	.144	.035	.179	4.139	.000
Social Influence	.152	.037	.157	4.143	.000
Satisfaction	.367	.042	.353	8.624	.000
Learning Engagement	.135	.05	.123	2.692	.007

Table 5 shows the result of Multiple Linear Regression analysis computed on Perceived Usefulness, Perceived Ease of Use, Perceived Autonomy, Social Influence, Satisfaction and Learning Engagement as independent variables, and MOOCs Use Intention as the dependent variable. The model formula is as follows: MOOCs Use Intention = -0.401 + 0.367 Satisfaction + 0.135 Learning Engagement + 0.152 Social Influence + 0.144 Perceived Autonomy + 0.135 Perceived Usefulness + 0.143 Perceived Ease of Use. It can be observed from the table above that the model's R-squared value is 0.514. The results indicate that Perceived Usefulness, Perceived Ease of Use, Perceived Autonomy, Social Influence, Satisfaction and Learning Engagement can explain 51.4% of the variance in MOOCs Use Intention. Further specific analysis reveals that:

The regression coefficient for Perceived Usefulness is 0.131 (t=3.431, p=0.001<0.01), signifying that Perceived Usefulness has a significantly positive influence on MOOCs Use Intention.

The regression coefficient for Perceived Ease of Use is 0.151 (t=4.016, p=0.000<0.01), indicating that Perceived Ease of Use has a significantly positive influence on MOOCs Use Intention.

The regression coefficient for Perceived Autonomy is 0.179 (t=4.139, p=0.000<0.01), meaning that Perceived Autonomy has a significantly positive influence on MOOCs Use Intention.

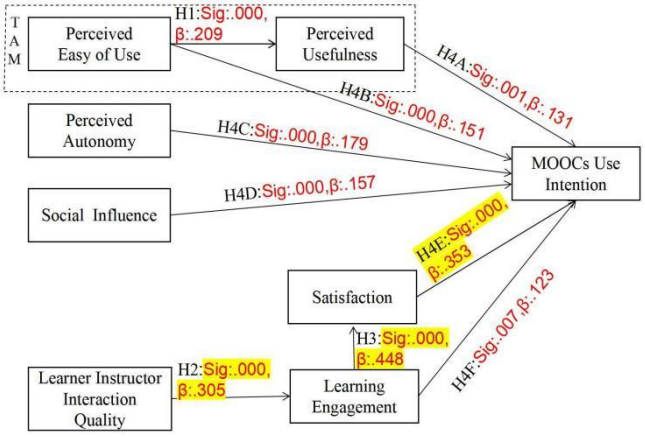
The regression coefficient for Social Influence is 0.157 (t=4.143, p=0.000<0.01), suggesting that Social Influence has a significant positive effect on MOOCs Use Intention.

The regression coefficient for Satisfaction is 0.353 (t=8.624, p=0.000<0.01), implying that Satisfaction has a significantly positive influence on MOOCs Use Intention.

The regression coefficient for Learning Engagement is 0.123 (t=2.692, p=0.007<0.01), indicating that Learning Engagement has a significantly positive influence on MOOCs Use Intention.

In summary, the analyses indicate that Perceived Usefulness, Perceived Ease of Use, Perceived Autonomy, Social Influence, Satisfaction and Learning Engagement all consistently have a significantly positive influence on MOOCs Use Intention.

Figure 2: The result of the structural model



5. Conclusions and Recommendations

5.1. Discussion and Implications

Table 6: The Coefficients of the Variables by Multiple Linear Regression

Variables	Beta
Independent Variables	
Perceived Ease of Use	.151

Perceived Autonomy	.179
Social Influence	.157
Mediating Variables	
Perceived Usefulness	.131
Learning Engagement	.123
Satisfaction	.353

As shown in Table 6, Perceived Ease of Use, as an independent variable, has a positive influence on the intention to use MOOCs. The piano major students of this study believe that simplicity of using MOOCs increases their willingness to use MOOCs for piano learning. Therefore, improving the user-friendliness of the MOOCs platform is likely to encourage more numbers of students to use MOOCs for their piano study. This result is congruent with Wu and Chen (2017), who believe that perceived ease of use can directly or indirectly effect the intention to use MOOC through perceived usefulness.

The independent variable of Perceived Autonomy has a positive influence on the piano students' Intention to Use MOOCs. Such result suggests that MOOCs platforms can provide a more autonomous learning experience to increase students' willingness to use MOOCs for learning. Similarly, Khalid et al. (2021) found a positive and significant impact of perceived autonomy on the behavioral intention to use MOOCs in their research studies.

The independent variable Social Influence has a positive influence on the intention to use MOOCs. This suggests that the positive views and encouragement from friends regarding MOOCs have likelihood to influence the willingness of piano majors to use MOOCs. In previous research study, social influence has been strongly established as a driving factor in user's behavior. When an individual perceives the benefits of others using MOOCs, observers are more likely to accept and willing to use MOOCs (Wu & Chen, 2017).

The mediating variable Perceived Usefulness plays an intermediary role in the intention to use MOOCs. When students under this study perceive that MOOCs are beneficial for their learning, this perception increases their willingness to use MOOCs for piano online courses. Wu and Chen (2017) noted in their research that relative advantage, complexity, trialability, observability, and compatibility have a positive influence on Perceived Usefulness. Under this study, Perceived Usefulness significantly influences the Usage Intention of MOOCs users. Perceived Usefulness plays a crucial role in the relationship between Perceived Ease of Use and the MOOCs Use Intention.

The mediating variable Learning Engagement plays an intermediary role in the intention to use MOOCs. When the piano students actively participate in and engage with their learning, it increases their inclination to use MOOCs for piano online courses. Stimulating students' interest in learning and enhancing their engagement in learning can boost their willingness to use MOOCs for learning. Cheng (2022) confirmed in his research study that learning engagement has a positive impact on students' satisfaction and intention to continue using MOOCs. Learning Engagement plays a crucial role in the relationship between Learner Instructor Interaction Quality and the MOOCs Use Intention.

The mediating variable Satisfaction has the most significant influence on the intention to use MOOCs. Students' satisfaction with MOOCs learning has a crucial influence on their willingness to use MOOCs in the future. Pozón-López et al. (2021) validated the effectiveness of user-perceived satisfaction and intrinsic motivation as the most potent predictors of usage intention. Students' satisfaction with using MOOCs positively effects their intention to use, further leading to their continued usage of MOOCs. This finding aligns with the results of this study. Satisfaction plays a critical role in the relationship between Learning Engagement and the MOOCs Use Intention.

5.2. Conclusions

In an attempt to investigate the Chinese students' preference of using MOOCs to learn their piano performance at universities in China, this study finds favorable results for universities in China to develop using MOOCs on their piano performance courses among the undergraduate levels. The study shows the three independent variables—Perceived Ease of Use, Perceived Autonomy, and Social Influence— with relatively weak influences on the Chinese piano-performance students' intention to use MOOCs. While their Perceived Usefulness and Learning Engagement in relation with Intention to Use MOOCs are relatively low, their Satisfaction of using MOOCs is moderate with its beta value (β) at 0.353. When measuring the Chinese piano- performance students' Perceived Usefulness and Learner Instructor Interaction Quality, and Perceived Autonomy, this study finds statistically moderate results from SLR. The statistically positive influences—be they weakly or moderately influential between variables—imply that the Chinese university students with piano- performance major possess a favorable perception toward using MOOCs in their piano learning at the universities. It should be noted that the characteristics of the samples under this study are majorly freshmen who experience a short duration of piano learning, thus suggesting that their elementary exposure to piano performance. In a different scenario, if the respondents had appeared to be in higher levels of learning with longer duration of experiences, their behavioral intention to use MOOCs for piano learning would have become more pronounced, and the degree of influence among variables varied.

5.3. Recommendations

The achievements of MOOCs in the field of music education are widely recognized, but there has been limited research on the behavioral intentions of piano performance major students to use MOOCs. This study has added research dimensions and data to this area, providing valuable data support for future research. The researcher can build upon the foundation of this study to expand research dimensions and further investigate the factors influencing intentions to use MOOCs.

Based on the results of Hypothesis 4E, satisfaction is the most significant factor effecting the intention to use MOOCs. Higher education institutions and MOOCs platform providers should prioritize students' satisfaction, and formulate corresponding strategies. This study recommends that MOOCs platform providers collaborate with higher education institutes to offer to students a variety of online piano courses and increase the appeal of online piano courses. They should optimize the MOOCs platform user interface and simplify the operational steps.

The amount of time students need to learn how to use theMOOCs system significantly effects their intention to use it, given that the results of Hypothesis 4A support these recommendations. Piano performance majors have their unique characteristics. Based on the results of Hypothesis 4C and 4D, the study recommends that MOOC platform providers consider these characteristics by adding specialized service modules for piano performance undergraduate students and building a solid publicity for broader recognition.

Hiring well-known piano instructors and assembling professional teams to create high-quality MOOCs piano online courses are recommended in order to meet with students' demands for the course quality, given that the results of Hypothesis 4B indicate that students believe using MOOCs for online learning can help them better achieve their learning goals. Furthermore, recommendations are for the higher education institutes to provide inventive for the online piano student to continue using MOOCs.

Piano teachers should be more mindful of their interpersonal communication when interacting with students during the use of MOOCs platforms, than they are on the traditional platform. They should promptly respond to student messages and ensure that students upload performance videos after each lesson to monitor their progress. Evidently, the results of Hypothesis 2

show that the quality of interaction between teachers and students has a positive influence on the students' engagement. According to the results of Hypotheses 3 and 4F, piano teachers should also focus on the quality of students' piano learning in online courses, rather than just completion of tasks. For highly-achieved learners, teachers should introduce a reward system to maintain high engagement, while for average-quality learners, teachers should identify their issues to help them improve their learning quality and participation in online piano courses.

The recommendations proposed in this study will help drive the development of MOOCs in the field of piano education, meet the learning needs of piano performance majors, and, provide substantial data support for the improvement of MOOCs platforms.

5.4. Future Research

While achievements of MOOCs in the field of education have been widely recognized, there has been limited numbers of research on the intention to use MOOCs in music education. Though this study hopes to encourage more researchers to focus on this research area, particularly with regard to the specific group of undergraduate piano performance majors in China and their intentions to use MOOCs, researchers in the future should opt to analyze the works with larger and more diverse samples by selecting students from different academic years for more in-depth and detailed investigations.

More investigation should be placed on the students' capabilities in playing certain levels of musical exercises, such as Sonata or Etude Albums by major composers, the foundation of fingering development by Baroque composers like Bach's Preludes and Fugues and Two-Part Inventions.

This study uses only six dimensions to examine the influential factors on the MOOCs intention to use by the undergraduate piano performance majors in China. The researcher believes that the quality of MOOCs piano courses, the learning methods offered by MOOC platforms, technological updates on MOOC platforms, the addition of application modules, and, students' educational backgrounds can all furnish as factors in studying the intention to use MOOCs. Different research dimensions can be adopted to help the future research studies to address more profoundly the students' preferences and needs on their online piano lesson.

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