

# ADOPTION LEVEL OF ONLINE DOCUMENTARY PROGRAMS AS LEARNING MATERIAL AMONG STUDENTS OF A CHINESE UNIVERSITY AND ITS RELATIONSHIP TO SATISFACTION

MENGYU LI<sup>1</sup>, MEGAT AL IMRAN YASIN<sup>\*2</sup>, NORLIANA BINTI HASHIM<sup>3</sup>, LAY HOON ANG<sup>4</sup> and HONGZHE KANG<sup>5</sup>

<sup>1,2,3,5</sup>Department of Communication, Faculty of Modern Languages and Communication, Universiti Putra Malaysia, Malaysia

<sup>1</sup>School of Journalism and Communication, Zhengzhou University, China

<sup>4</sup>Department of Foreign Languages, Faculty of Modern Languages and Communication, Universiti Putra Malaysia, Malaysia  
megat@upm.edu.my<sup>2</sup>

## Abstract

The purpose of this research was to identify the significant factors impacting the continuing satisfaction of university students and instructors towards e-learning documentary programs learning material in the scope of tertiary education. To recognize the variables influencing on the continuity of e-learning documentary program in higher education institutions, this study employed a descriptive correlational research design. Data were sourced out from 125 Chinese English as a Foreign Language (EFL) learners systematically sampled from a total of 184 population of students with mobile phones enrolled in the English class of College of Foreign Languages in one university in Zhengzhou, China. This present study assessed the relationship between the adoption of online documentary programs and the satisfaction of Chinese EFL learners. The findings surfaced that the students manifest a high level of adoption and satisfaction of online documentary programs towards English course. Test of differences revealed that male respondents have higher satisfaction, appeal to usefulness, acceptability, perceive enjoyment, facilitating conditions, and behavioral intention of online documentary programs than their female. It was found out that respondents find it interesting to use online documentary programs in their English course regardless of their age. Finally, a significant relationship is found between online documentary programs adoption and students' satisfaction. The positive correlation indicates that the higher the students' adoption of online documentary programs, the higher they manifest the level of satisfaction. Implications of the study are discussed.

**Keywords:** Chinese EFL Learner, Online Documentary Programs, Technology Acceptance Model, Satisfaction

## Introduction

University learning usually happens in such a teacher-driven learning context with face-to-face contact inside a dynamic synchronous atmosphere (Al-Samarraie et al., 2018; Wu, Tennyson, & Hsia, 2010). As well as evolving information and communication technology (ICT), e-learning has begun to emerge as a creative approach to facilitating the delivery of learning in university education. The new paradigm of education in

China, which is education 4.0, requires teachers and students to be adept with the latest technology tools which can effectively deliver instruction. The utilization and integration of technology in learning have been a demand of today's modern educational system. With the rapid increase of smart-phones, laptops, desktops, communication technology has redefined the traditional mode of learning into limitless and border less learning experiences among students.

Online documentary program is a common program form, it is based on real life creation material, through the observation of the sharp things, deep feeling of life and society and carries on the artistic processing and presentation, in order to show truth to nature. They are viewed online in video, and anyone can watch, comment and communicate anytime, anywhere using the Internet. At current, the direction of modern education is the acceptance of online documentary programs in the field of university education, which stimulates academic investigators to examine its effectiveness and suitability in the learning environment (Salloum et al., 2019). Mobile-Technology allows students and educators among universities to have access to data for learning or decision making purposes (Almaiah, & Alismaiel, 2019). The features of online documentary programs are blended, ubiquitous, private, collaborative, and interactive and it provides instant information which caters learners to learn at their own pace and time to experience the joy of learning authentically (Crompton, Burke, & Gregory, 2017). In order to optimize the learning resources, it is necessary to simplify the learning resources, clarify the modules, enhance the interest of the content, and present the learning content by audio visual technology, so that learners can accept and use online documentary more easily (Fan & Sun, 2018). Multimedia computer-aided English language learning has shown obvious advantages and uniqueness, technology adoption has a positive impact on students' English language learning (Hou, 2014). In other words, the adoption of technology is a specific way and action taken by learners to make language learning easier, faster and more effective. The adoption of technology helps students become better language learners, collect learning materials more abundantly, and improve their learning effect (Xu & Zhang, 2020).

Despite the popularity and benefits of online documentary programs, if learners show hesitance and reluctance to its use in learning, its potential benefits will not be optimally achieved considering that purposive and practical learning is defined on the active participation of the learners for self-regulated learning (Bartholomew et al., 2018; Comer, 2018; Wu, 2018). With the help of online documentary programs, learners

interact with teachers or other learners to complete the English course learning (Ma, 2008). Online documentary programs provide a language environment for informal learning. They mainly provide learning materials for learners. At the same time, they also serve as a tool for learning English language. Moreover, they also supply opportunities and topics for students with common interests to exchange and share experiences of English language learning. The application of online documentary programs in English language teaching provides excellent conditions for the good effect of language learning (Feng, 2013).

Hence, in this present study, there is a need to examine further how students manifest adoption of online documentary programs and its relationship to their learning style preferences of students in English learning. This attempt seeks to shed light on the inconsistencies of Chinese EFL learners' learning behavioral intention previously presented as well as solidifies its relationship to online documentary programs adoption. Previous studies claimed that a significant driver of learning is influenced by one's behavioral disposition, inclination and preferences (Agogo & Hess, 2018; Tams, Thatcher, & Grover, 2018). With different learners having different inclinations and behavioral intentions, they also have a different level of technology adoption (Park et al., 2019; Roszkowska & Wachowicz, 2019). Differences exist between genders among college students, who are learning English language through online documentary programs (Shi, 2010). Furthermore, significant age differences were found in English majors' use of technology in their computer-assisted English language learning (Hou, 2014). This study intends to further dig into the differences between the adoptions and satisfaction of online documentary programs when grouped according to gender and age. It eventually prompted a more in-depth investigation to ascertain the association between learning style and online documentary programs' adoption in the English learning course.

This study is grounded in the Technology Acceptance Model (TAM). This theory in the field of information system explains how users accept and adopt technology based on its usefulness, ease of use, facilitating condition, and behavioral conditions (Davis, Bagozzi, & Warshaw, 1989; Dwivedi et al., 2019). Because of the soundness, simplicity, and adaptability of TAM, it is considered as one of the standard models to measure information system adoption and acceptance in the context of online documentary programs (Dwivedi et al., 2019; Hansen, Saridakis, & Benson, 2018; King & He, 2006). In the context of the present study, the use of online documentary programs in the English course of Chinese EFL has been explored, guided with the dimensions of TAM. In such a way, better implementation of online documentary programs in language classes will improve students' learning performance. It will also provide necessary

interventions for language educators on how to properly integrate the use of online documentary programs in the classroom with optimum students' participation. The way how Chinese EFL learners perceived the usefulness and ease of technology would define their level of computer and technological literacies gearing towards life-long skills and global competence.

Accordingly, higher education institutions are tap to produce highly skilled and capable human resource have a role in understanding what affects students' technological acceptance and literacies before implementing interventions of setting up technological systems. The need for universities to have an analysis of the proper use of online documentary programs will let them identify the determinants which will leverage its implementation and utilization for students' development(Jabeen, Khan, & Ahmad, 2018).Most of the students surveyed like to learn English by downloading materials, real-time online videos and learning content on mobile devices (He & Zhang, 2019). In terms of the most commonly used English learning technologies, there are online learning videos and through a variety of mobile applications. Through the analysis of all the variables contained in the mobile English learning acceptance model based on the technology acceptance model, the result is that it has a direct or indirect impact on college students'mobile English learning behavioral intention (Ji, He, & Qin, 2019).

Plethora of latest studies shown that the acceptance of mobile-learning across countries and nationalities emphasizingits advantages in the modern-day college classrooms of various learning fields such as language, science, medicine, and social sciences (Bernacki, Greene, & Crompton, 2019; Lin et al., 2019; Zydney & Warner, 2016). In the latest synthesis study of Crompton and Burke (2018), they found out from 72 research articles published in reputable internal journals from 21 countries of the world that the majority focused on the effect of online documentary programs on student achievement and performance. They also highlighted that language teaching and learning is the most common research topicinvestigated with the use of online documentary programs utilizing diverse teaching modalities. In addition, there is a significantdifferencein Chinese students' genderand the use ofonline documentary program resources when they learn English(Cui, 2019), and the learning effect of boys is higher than girls(Guo, 2019).Meanwhile, he also proposed that there is a correlation between the learning English language effect of online resources and the age of Chinese college students (Guo, 2019). English learning is a complex acquisition process. In the process of learning English with technology, boys and girls show different gender roles to a certain

extent (Zhang, 2020). Lei, Chao and Zhang (2014) found that students showed more obvious technology orientation, learning tendency and learning behavior, and there were differences in gender, age and education level in technology adoption level. Some scholars claimed that male students spend more time using educational apps than female students. However, there is no significant difference in age groups (Wei, 2016). Despite the appeal of online documentary programs to student academic achievement, the research gap relating to online documentary programs and student satisfaction is still not deeply explored. It inspired the present study to add to the existing body of knowledge on how these two variables relate to the context of English learning. The present study looked at how students' satisfaction may relate to the adoption of online documentary programs. The level of student satisfaction with the classes has played a significant role in determining the efficacy and effectiveness of online documentary programs (Richardson, Maeda, & Caskurlu, 2017; Tang & Hew, 2017; Wang & Antonenko, 2017). This result may mean that students view mobile-learning as being as effective as other conventional learning methods. It is important to analyse more closely if there are factors that cause dissatisfaction, frustration or anxiety among students at online documentary programs method.

In fact, online documentary programs in the Chinese context had been previously studied. Huang (2017) reported that teachers are still hesitant to adopt online documentary programs in classroom instruction in college. Guo and Benzon (2017) found that online documentary programs provided better communication and collaboration opportunities among Chinese students when they learnt the English language. Consequently, Mei, Brown and Teo (2018) confirmed that learning a foreign language in China using e-learning is strongly related to facilitating conditions of resources and technology. Similarly, the results of a survey on learning English through mobile devices provide some recommendations for school administrators and educational professionals to carry out mobile English learning effectively and efficiently (Ji, 2016). Previous studies in China have presented the usefulness of online documentary programs to language instruction (Luo & Liu, 2019; Xu & Peng, 2017; Zhang, 2019; Zhou, 2016; Zuo, 2017).

The pressing need for language teachers to ascertain the relationship between level of adoption and the satisfaction of online documentary programs in the context of a selected university in China is considered a significant research gap of the study. This study ventures to provide an understanding of online documentary programs as

materials for English language learning as well as gain an examination of the identified difference concerning the personal learning characteristics of Chinese students. It is, therefore, fit and proper to establish an investigation of how students adopt with the use of online documentary programs in English course as well as matching their level of satisfaction to achieve their ultimate human flourishing.

This paper attempted to shed answers to the research questions as follows:

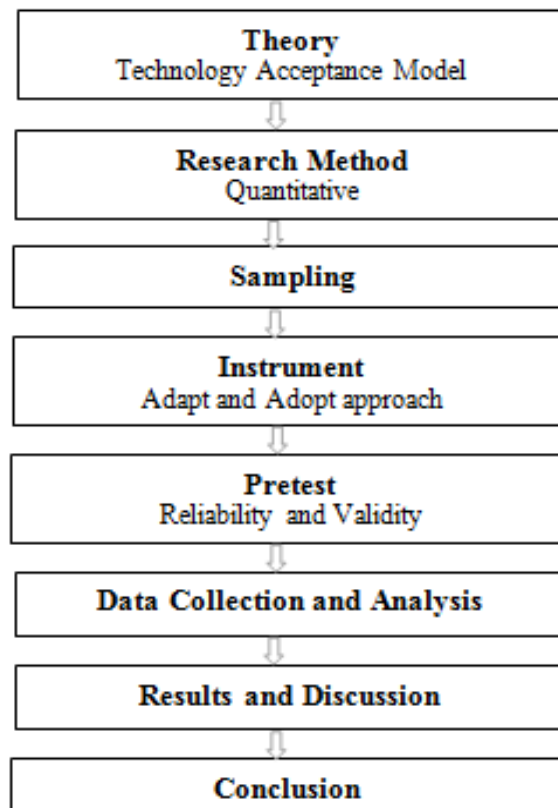
- (1) What are the patterns of Chinese EFL learners perceiving the adoptions of online documentary programs?
- (2) What is students' level of satisfaction towards online documentary programs?
- (3) What is the difference between the adoptions and satisfaction of online documentary programs when grouped according to gender and age?
- (4) What is the relationship between the adoption of online documentary programs and student satisfaction in the English language course?

## **Materials and Methods**

### **Research Design**

The study is descriptive correlational research, which investigates the relationship between online documentary programs and students learning preferences in an English course. The descriptive competent explains the students' adaptability to online documentary programs as well as their satisfaction. Reviews on the merit of using descriptive cross-sectional correlational research design showed that it is one of the most common methods used to unravel the relationship between variables to establish important pattern of relationship with the use of standardized testing of correlation (Creswell & Poth, 2016; Creswell, 1998; Lune & Berg, 2016). The use of descriptive correlational research method on online documentary programs and students' satisfaction highlighting meaningful relationship among the variables being studied (Cheng, 2015; Datu et al., 2018; Ren et al., 2017; Sabah, 2016). The research design flow in this paper is shown in Figure 1.





**Figure 1.** Research Design Flow

## Research Participants, Sampling Procedure and Ethical Considerations

A total of 125 Chinese EFL students were enrolled in the English course of the College of Foreign Languages in one university in Zhengzhou, China. The selection of the class participants was based on the two following inclusion criteria: (1) must be a regular student of the English in the College of Foreign Languages and (2) have been taught and exposed in online documentary programs in the English class during the semester where the study was conducted. Table 1 presents the frequency and percentage representation of the respondents. When treated as a whole, there is an almost equal representation of males (51.2%) to that of females (48.8%). This avoided bias on the assumption when the test of difference will be made between the male and females as to their learning behavioral intentions and adoption to online documentary programs. Meanwhile, as to age of the respondents, majority (52.8%) of the respondents are 21 to 25 years old, followed by 26 to 30 years old (20%), succeeded by the respondents having less than 20 years of age (19.2%), and the least are the respondents ages 31 to 35 years old (8%).

**Table 1.** Profile of the Respondents.

Variables	Category	Frequency Distributio n (n=125)	Percentage Distribution (%)
Gender	Male	64	51.2
	Female	61	48.8
Age Bracket	Less than 20	24	19.2
	21 to 25 years	66	52.8
	26 to 30 years	25	20
	31 to 35 years	10	8

To ensure equal representation of the participants, the researcher employed stratified random sampling to the total of 184 population of students enrolled in the English class. Raosoft was used to compute the sampling size of 125 set with the margin of error of 5%, 95% level of confidence, and 50% response distribution. The use of Raosoft as sampling package provided power values to a given sample size, and alpha levels to avoid Type I and Type II errors (Omair, 2014; Wang et al., 2013; Wilson, 2016). The total list of population enrolled in the class was requested to the office of the university registrar with the approval of the university authorities. Systematic sampling technique was employed. This study was guided by the following research ethics considerations. First, data privacy and inform consent forms were approved by the university ethics committee to be signed by the respondents of the study. Second, orientation on the purposes of the study was done by the researcher prior to the administration of the instruments. Thirdly, anonymity of the respondents and the institution was observed by not mentioning names.

## Research Instruments

### Technology Adoption Questionnaire

To assess the adoption of online documentary programs to the students, the Multifactors Leadership Questionnaire (MLQ) was used, which was adopted from the previous studies of online documentary programs (Tan et al., 2011; Venkatesh et al., 2003; Yang, 2005). The instrument consisted of 24 items equally distributed to the 5 domains, namely usefulness of online documentary programs, acceptability of online documentary programs, perceive enjoyment, facilitating conditions, and behavioral intentions. Statements in the Technology Adoption Questionnaire were answered by the respondents with a five-point Likert scale with one as strongly agree and five as strongly disagree. The instrument has 0.85 Cronbach's alpha.



## Measure of Satisfaction

To assess the satisfaction of students who used online documentary programs as learning materials, ten questionnaire items were based on the satisfaction scale by Gunawardena and Zittle (1997). The instrument has been used by previous studies in assessing students' level of satisfaction on blended learning hence several modifications were conducted (Richardson, Maeda, & Caskurlu, 2017; Tang & Hew, 2017; Wang & Antonenko, 2017).

## Research Procedure

This study was conducted for a three-month timeline. In the first month, a pretest was conducted to measure the reliability and validity of the study, before the questionnaire was revised. Then the procedure in gathering research data lasted for the three-week data collection period. Before the formal gathering period, the university authority's approval and permission to conduct the study were initiated in the first week. Notice to proceed with the conduct of the research was issued during the second week. After securing the appropriate permit, researchers identified the respondents using the inclusion criteria set in this study with the help of two language instructors of the College of Foreign Languages for one week. Likewise proper and appointment with the students were conducted for the formal gathering for another week. Orientation of researchers' purposes and objectives was done to the participants. Administration of the two research instruments was done by researchers with appropriate permit and proper coordination to avoid conflict of schedule. The research ethics considerations were strictly followed by researchers. After gathering the students' responses, they were coded and subjected to data cleaning and statistical analyses for one month. Finally, results analysis, interpretation and report writing were done for another month.

## Data Analysis

The analyse the quantitative results of the study, basic descriptive statistics such as frequency count, percentage distribution, weighted mean, and standard deviation were used to interpret the gender and age profile of the respondents, level of adoption of online documentary programs, and the students' satisfaction. Descriptive statistics results of MLQ and Perceptual Learning Style Preference Questionnaire (PLSPQ) using the five-point Likert scale were interpreted with the scale range and description: Strongly Agree/ Very High a (4.20-5.00); Agree/ High b (3.40-4.19); Undecided/ Moderate c (2.60-3.39); Disagree/ Low d (1.80-2.59); strongly Disagree/ Very Low e (1.00-1.79).

Moreover, inferential statistics such as independent sample T-test and One-way Analysis of Variance (ANOVA) were used to examine the differences in the adoption of online documentary programs and satisfaction when grouped according to gender and age. Post Hoc Tukey Honest Significant Difference (HSD) test was used to assess whether the significant difference in the respondents' online documentary programs adoption and satisfaction when age is taken since it will tell exactly where the differences are found (Abdi & Williams, 2010; Brown, 2005). Finally, Pearson correlational coefficient was used to test the significant relationship between online documentary programs and students' satisfaction (Bonett & Wright, 2000; Wiedermann & Hagmann, 2016).

## Results and Discussion

### Research Question 1. What are the patterns of Chinese EFL learners perceive the adoptions of online documentary programs?

Table 2 presents the adoption of online documentary programs in the English language course among Chinese EFL learners. Data showed that respondents have a high level of online documentary programs adoption, as evidenced by the computed mean ( $M=3.83$ ,  $SD=0.614$ ). Likewise, it is interesting to note that in the five areas namely usefulness ( $M=3.78$ ,  $SD=0.966$ ), acceptability ( $M=3.80$ ,  $SD=1.04$ ); perceive enjoyment ( $M=3.75$ ,  $SD=0.959$ ); facilitating conditions ( $M=3.86$ ;  $SD=0.910$ ), and behavioral intentions ( $M=3.85$ ,  $SD=0.617$ ) manifested a high level of adoption of online documentary programs.

**Table 2.** Adoption of online documentary programs.

Domains	Mean (n=125)	SD	Descriptive Interpretation
Usefulnessof	3.78	.966	High
Acceptabilityof	3.80	1.04	High
Perceive	3.75	.959	High
Facilitating	3.86	.910	High
Behavioral	3.85	.617	High
<b>Grand Mean</b>	<b>3.83</b>	<b>.614</b>	<b>High</b>

*Legend: Strongly Agree/ Very High <sup>a</sup> (4.20-5.00); Agree/ High <sup>b</sup> (3.40-4.19); Undecided/ Moderate <sup>c</sup> (2.60-3.39); Disagree/ Low <sup>d</sup> (1.80-2.59); strongly Disagree/ Very Low <sup>e</sup> (1.00-1.79)*

The finding of the present study showed a favourable adoption of online documentary programs in English course among the Chinese EFL. It implies that online documentary programs provide a facilitating purposive, collaborative, and interactive learning experience to students, which helps them enhance their understanding of their course. They find the benefits of online documentary programs, which adds a new learning

dimension to their skills. Scholars have reported online documentary programs learning as a way to enrich learning among students as well as provide positive interaction between the students and the instructor to promote purpose and active learning experiences (Liu, Zhao, Chau, & Tang, 2015; Nikou & Economides, 2017a; Nikou & Economides, 2017b).

The usefulness and acceptability of online documentary programs in an English course is evidential in the high assessment given by Chinese EFL learners. This dimension shows that the respondents were able to experience the benefits of using online documentary programs to accomplish their learning tasks more efficiently. They also saw themselves productive with the use of online documentary programs in their daily work. For them, the use of online documentary programs is generally advantageous and useful in their course. This finding supports the previous literature highlighting the usefulness and acceptability of online documentary programs among university students in China, Australia, United States of America and other European countries (Crompton & Burke, 2018; Farley et al., 2015). For language learning, studies also proved that online documentary programs generated linguistic and attitudinal effects showing that online documentary programs significantly impact the acquisition and knowledge of language in the four macro skills and testing among Chinese students (Luo et al., 2015; Wu, 2014, 2015a, 2015b; Yavuz, 2016). Therefore, the utilization of online documentary programs strongly supports second language learning and acquisition (Hsu, 2013; Viberg & Grönlund, 2012).

Consequently, other factors of the TAM included in this study are the perceived enjoyment of online documentary programs and behavioral intention. Evidentially, the respondents have a high assessment of both factors showing a favorable adoption of online documentary programs in an English course. The finding implies that the use of online documentary programs made the students enjoy and establish belief and intention to use online documentary programs in future learning endeavours. Hence, this finding further supports previous studies on the attitudinal effects and control belief of online documentary programs among university students (Baylor & Kim, 2008; Salloum & Shaalan, 2018). Meanwhile, in other studies, the use of online documentary programs as an assessment tool also increases learning attitude and achievement of students through interactive learning activities in languages and sciences (Hwang, Wu, & Ke, 2011; Shen et al., 2009).

Finally, as to facilitating conditions of using online documentary programs to English courses, the respondents manifest a high rating on the facilitating terms of using online documentary programs in an English course. It implies that the Chinese respondents are equipped with resources, knowledge, and environmental support to use online documentary programs in spite of the different technical problems encountered in the

effective delivery of e-learning modalities such as internet speed, software issues, and user-friendliness of technology. Hence, a supportive e-learning environment is being provided by the institution and instructors to facilitate learning in English is shown. Literature has confirmed that facilitating conditions significantly affect the adoption of online documentary programs among universities (Briz-Ponce et al., 2017; Cheon et al., 2012; Yueh et al., 2016).

## Research Question 2. What is students' level of satisfaction towards online documentary programs?

Table 3 presents the level of satisfaction with the use of online documentary programs. Results showed that a high level of satisfaction on the use of online documentary programs is expressed among the Chinese students. Results showed that the students have a high level of satisfaction as evidenced with the mean of 4.16 (SD=.78). The result of the study agrees with previous finding that students have a very favourable level of satisfaction with the use of online documentary programs in college classroom.

**Table 3.**Satisfaction on of online documentary programs

Domain	Mean (n=125)	SD	Descriptive Interpretation
Satisfaction	4.16	0.78	High

*Legend: Strongly Agree/ Very High <sup>a</sup> (4.20-5.00); Agree/ High <sup>b</sup> (3.40-4.19); Undecided/ Moderate <sup>c</sup> (2.60-3.39); Disagree/ Low <sup>d</sup> (1.80-2.59); strongly Disagree/ Very Low <sup>e</sup> (1.00-1.79)*

The high level of satisfaction among the students shows that online documentary programs are considered to be a very important learning tool for students. This is defined how the students' value online documentary programs towards their education which drives and motivates them to learn more. The level of satisfaction among the students is a valuable tool for the university to improve the delivery and plan for better implementation of online documentary programs across the degree programs and students' experiences (Al-Samarraie, et al, 2018; Bolliger, 2004; Martin & Bolliger, 2018). Student participation improves active satisfaction, raises student enthusiasm for learning, decreases feeling of isolation, and enhances online student success (Uppal, Ali & Gilliver, 2018).

## Research Question 3. What is the difference between the adoptions and satisfaction of online documentary programs when grouped according to gender and age?

Table 4 presents the test of differences in the adoption of online documentary programs in the English language course when grouped according to gender and age. Results

revealed that when gender is taken as a whole, it spelled significant differences on the acceptability ( $p=0.000^{***}$ ), perceive enjoyment ( $p=0.000^{***}$ ), facilitating conditions ( $p=0.000^{***}$ ) and behavioral intentions ( $p=0.001^{**}$ ) associated to online documentary programs in favor of the male respondents with computed  $p$  values lower than 0.01 alpha level. At the same time, no difference is found on the level of usefulness ( $p=0.624ns$ ) of online documentary programs. The findings signify that there is a significant difference in the adoption of online documentary programs when grouped according to gender in favor of male respondents. Hence, the hypothesis stating that there is a substantial difference in the adoption of online documentary programs when grouped according to gender is accepted. Similarly, when age is taken as a grouping variable in online documentary programs adoption in the English language course, not significant differences were found, signifying that regardless of age, students were able to establish a high level of adoption of online documentary programs in English course. Hence, the hypothesis stating that there is a significant difference in the adoption of online documentary programs when grouped according to age is rejected.

**Table 4.** Test of differences on the adoption and satisfaction of online documentary programs in the English language course and students' satisfaction when grouped according to gender and age

Adoption of online documentary programs	Gender p-value	Age p-value
Usefulness of online documentary programs	0.624 ns	0.017 ns
Acceptability of online documentary programs	<b>0.000<sup>***</sup></b>	0.900 ns
Perceive enjoyment of online documentary programs	<b>0.000<sup>***</sup></b>	0.340 ns
Facilitating conditions	<b>0.000<sup>***</sup></b>	0.340 ns
Behavioral intention	<b>0.001<sup>**</sup></b>	0.779ns
Student satisfaction	<b>0.000<sup>***</sup></b>	0.766ns

Note: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ ; ns= not significant

In the context of the present study, gender and age have been considered as factors in the adoption and satisfaction of mobile-learning in the English course of Chinese EFL. Gender and age are factors for technology adoption that should be investigated when Mobile-learning is concerned as they will spell out successful implementation e-learning modality (Harrison & Rainer, 1992; He & Freeman, 2019; Tarhini, Hone, & Liu, 2014; Wang, Wu, & Wang, 2009).

Significant results showed that male respondents have a higher level of adoption and satisfaction to online documentary programs as to its acceptability, perceive enjoyment, facilitating conditions, and behavioral intentions compared to female respondents. The

finding shows that in terms of technology adoption, males are more likely to adopt than females. Men see more opportunities to try new technology than women. The finding is attributed to the gender gap of showing fewer females choose computer science and technology courses than males because of the higher level of women anxiety. Further, this finding on gender gap harmonizes with the result of previous studies showing that males have more top productivity factors in technology than females (Adegbija & Bola, 2015; Cai, Fan, & Du, 2017; Faqih, 2016). Male Chinese EFL has a higher level of online documentary programs adoption than females in the English learning course.

Correspondingly, no significant differences are found on the adoption and satisfaction of online documentary programs when age is taken as a variable. It merely explains that regardless of the respondents' age, they can discover the benefits of online documentary programs in their English course. It implies that the use of online documentary programs provided them with collaboration, personal, and informal connections towards English learning courses. Literature confirms the adoption of online documentary programs showed no difference when age is taken implying that age factor of the students does not influence technology adoption and satisfaction since they are capable of seeing the benefits of online documentary programs to the course regardless of the respondents' age brackets (Nikou & Economides, 2019; Wang, Wu, & Wang, 2009; Williams, Rana, & Dwivedi, 2015).

#### **Research Question 4. What is the relationship between the adoption of online documentary programs and student satisfaction in the English language course?**

The relationship between students' adoptions of online documentary programs and their satisfaction has been examined. Considering the limited studies investigating the interrelationship of learning techniques and online documentary programs, this present study generally aims to add knowledge to existing literature on how students' learning characteristic is associated with online documentary programs in English course particularly in the Chinese EFL context. In such a way, instructors will be given information on how they will adequately integrate the use of online documentary programs to learners' satisfaction. Table 5 shows that there is a significant relationship between learning the adoption of online documentary programs to the learners' satisfaction. Hence, the hypothesis stating that there is a meaningful relationship between gaining the approval of online documentary programs to the learners' satisfaction is accepted. This study shows that among Chinese university students, their level of online documentary programs adoption is positively related to their level of satisfaction. The higher their level of adoption to online documentary programs the better their satisfaction of using it.



**Table 5.** Relationship between students' Adaptability of online documentary programs in English language course and their satisfaction.

	Students' level of satisfaction r value
Adoption of online documentary programs to English language course	<b>0.2212</b> <b>p=0.013*</b>

Note: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ ; ns= not significant

The present finding corroborates with Al-Emran, Arpaci and Salloum (2020) on the relationship between intention of using online documentary programs to students' satisfaction. Consequently, Joo, Kim and Kim (2016) reported that students' use of online documentary programs is a factor of students' satisfaction among Korean university students. Similar finding has been reported by previous studies that a positive relationship between adoption and satisfaction is a way for universities to design and implement better implementation and process of online documentary programs on students learning experience (Joo, Kim, & Kim, 2016; Kim-Soon, et al., 2018; Nikou & Economides, 2017b).

This present study assessed the relationship between the adoption of online documentary programs and the satisfaction of Chinese EFL learners in an English course. The findings surfaced that the students manifest a high level of adoption and satisfaction of online documentary programs towards English course. Test of differences revealed that when students are grouped according to gender and age, male respondents have higher appeal to the satisfaction, usefulness, acceptability, perceive enjoyment, facilitating conditions, and behavioral intention of online documentary programs than their female counterparts. As to age, it was found out that respondents find it appealing and beneficial for them to use online documentary programs in their English course regardless of their age. Finally, a significant relationship is found between online documentary programs adoption and students' satisfaction. The positive correlation indicates that the higher the students' adoption of online documentary programs, the higher they manifest level of satisfaction. Implications of the study are discussed.

## Conclusion

The present study highlights the positive association between the adoption of online documentary programs and students satisfaction in the context of English course among Chinese EFL where features of online documentary programs on being blended, ubiquitous, private, collaborative, interactive can directly benefit the satisfaction of the

students to pursue better learning performance. That being said, TAM is the property and function of testing technology tool. For Chinese EFL learners in this study, its usefulness, acceptability, perceive enjoyment, facilitating conditions can affect the adoption and satisfaction, which is a contribution for ICT research. It also highlights gender as a factor of online documentary programs adoption and students learning techniques. This strengthens the need to understand better the TAM, which implies that individuals' perception of technology adoption is associated with learners' profile and personal characteristics towards Education 4.0.

This study is based on the fact that Chinese college students who learn English as a second language use online documentary programs as materials and tools during the learning process, which is the practical use of technology and web resources. The findings of this present study yield several practical and teaching implications. This study presents a relationship between the adoption of online documentary programs satisfaction among Chinese EFL learners. The following are offered: (1) Improvement and enhancement of the developed program and application in English language should be done regularly; (2) training for language teachers to use online documentary programs in the classroom should be part of the faculty development program of the college; (3) before the use of online documentary programs in English course, language teachers are encouraged to do pre-assessment the satisfaction of the students which can be the basis of initiating learning activities and tasks; (4) strengthen the provision of e-learning environment in the university to allow students achieve maximum benefits of online documentary programs; (5) assessment on the level of technology adoption and readiness of language teachers in online documentary programs should also be assessed to address their practical and strategic needs; (6) The strong support of the university administration is sought.

The present study set its limitations which can be offshoot for further investigations and validation. Foremost, data of this study was mainly based on the self-assessment report of the respondents in one college of a University in Zhengzhou, China, which is a significant limitation of the study. For further education, there is a need to increase the number of participating universities as well as the number of samples for more conclusive findings. Secondly, gender and age were the only personal variables covered in the study; there is a need to include other equality, individual, and school-related variables. Thirdly, the use of a hybrid research method and quasi-experimental research design are also encouraged for future investigations.

## Acknowledgements

This work was financially supported by Overseas Virtual Research Institute of Zhengzhou University and Associate Professor Jinglei Li (working in School of Journalism and Communication, Zhengzhou University).

## REFERENCES

1. Abdi, H., & Williams, L. J. (2010). Tukey's honestly significant difference (HSD) test. *Encyclopedia of Research Design*. Thousand Oaks, CA: Sage, 1-5.
2. Adegbiya, M. V., & Bola, O. O. (2015). Perception of undergraduates on the adoption of mobile technologies for learning in selected universities in Kwara state, Nigeria. *Procedia-social and behavioral sciences*, 176, 352-356.
3. Agogo, D., & Hess, T. J. (2018). "How does tech make you feel?" a review and examination of negative affective responses to technology use. *European Journal of Information Systems*, 27(5), 570-599.
4. Al-Emran, M., Arpaci, I., & Salloum, S. A. (2020). An empirical examination of continuous intention to use online documentary programs: An integrated model. *Education and Information Technologies*, 1-20.
5. Almaiah, M. A., & Alismaiel, O. A. (2019). Examination of factors influencing the use of online documentary programs system: An empirical study. *Education and Information Technologies*, 24(1), 885-909.
6. Al-Samarraie, H., Teng, B. K., Alzahrani, A. I., & Alalwan, N. (2018). E-learning continuance satisfaction in higher education: a unified perspective from instructors and students. *Studies in Higher Education*, 43(11), 2003-2019.
7. Bartholomew, J. B., Golaszewski, N. M., Jowers, E., Korinek, E., Roberts, G., Fall, A., & Vaughn, S. (2018). Active learning improves on-task behaviors in 4th grade children. *Preventive medicine*, 111, 49-54.
8. Baylor, A. L., & Kim, S. (2008, September). The effects of agent nonverbal communication on procedural and attitudinal learning outcomes. *International Workshop on Intelligent Virtual Agents* (pp. 208-214). Springer, Berlin, Heidelberg.
9. Bernacki, M. L., Greene, J. A., & Crompton, H. (2019). Mobile Technology, Learning, and Achievement: Advances in Understanding and Measuring the Role of Mobile Technology in Education. *Contemporary Educational Psychology*, 60, 101827.
10. Bolliger, D. U. (2004). Key factors for determining student satisfaction in online courses. *International Journal on E-learning*, 3(1), 61-67.
11. Bonett, D. G., & Wright, T. A. (2000). Sample size requirements for estimating Pearson, Kendall and Spearman correlations. *Psychometrika*, 65(1), 23-28.
12. Briz-Ponce, L., Pereira, A., Carvalho, L., Juanes-Méndez, J. A., & García-Peñalvo, F. J. (2017). Learning with mobile technologies- students' behavior. *Computers in Human Behavior*, 72, 612-620.
13. Brown, A. M. (2005). A new software for carrying out one-way ANOVA post hoc tests. *Computer methods and programs in biomedicine*, 79(1), 89-95.
14. Cai, Z., Fan, X., & Du, J. (2017). Gender and attitudes toward technology use: A meta-analysis. *Computers & Education*, 105, 1-13.
15. Cheng, Y. M. (2015). Towards an understanding of the factors affecting online documentary programs acceptance: Roles of technological characteristics and compatibility. *Asia Pacific Management Review*, 20(3), 109-119.

16. Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of online documentary programs readiness in higher education based on the theory of planned behavior. *Computers & Education*, 59(3), 1054-1064.
17. Comer, C. H. (2018). Passport to Academic Success: An Engaging, Active-Learning Library Orientation for New Students. *Planning Library Orientations* (pp. 313-323). Chandos Publishing.
18. Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: SAGE Publications.
19. Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
20. Crompton, H., & Burke, D. (2018). The use of online documentary programs in higher education: A systematic review. *Computers & Education*, 123, 53-64.
21. Crompton, H., Burke, D., & Gregory, K. H. (2017). The use of online documentary programs in PK-12 education: A systematic review. *Computers & Education*, 110, 51-63.
22. Cui, S. (2019). Research on the Self-Directed Learning of English Majors in the Web-Based Learning Context (Doctoral dissertation). Xi'an International Studies University.
23. Datu, J. A. D., Yang, W., Valdez, J. P. M., & Chu, S. K. W. (2018). Is facebook involvement associated with academic engagement among Filipino university students? A cross-sectional study. *Computers & Education*, 125, 246-253.
24. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, 35(8), 982-1003.
25. Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21(3), 719-734.
26. Fan, Y. Y. & Sun, Z. N. (2018). Research on the influencing factors of College Students' English learning intention through online documentary programs-Based on the technology acceptance model. *Overseas English*, (01), 84-86.
27. Faqih, K. M. (2016). An empirical analysis of factors predicting the behavioral intention to adopt Internet shopping technology among non-shoppers in a developing country context: Does gender matter?. *Journal of Retailing and Consumer Services*, 30, 140-164.
28. Farley, H., Murphy, A., Johnson, C., Carter, B., Lane, M., Midgley, W., & Koronios, A. (2015). How do students use their mobile devices to support learning? A case study from an Australian regional university. *Journal of Interactive Media in Education*, (1), 2-13.
29. Feng, L. X. (2013). A Study on the English Language Learning Effectiveness of online documentary programs in a Web-based and Multimedia Learning Environment. *Modern Educational Technology*, (01), 61-65.
30. Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American journal of distance education*, 11(3), 8-26.
31. Guo, Y. (2019). Research on the current situation and promotion path of College Students' ubiquitous learning based on online resources (Doctoral dissertation). Qufu Normal University.
32. Guo, Z., & Benson, A. D. (2017). Exploring Chinese international students' acceptance of online documentary programs. *Culture, Learning, and Technology* (pp. 180-195). Routledge.
33. Hansen, J. M., Saridakis, G., & Benson, V. (2018). Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions. *Computers in Human Behavior*, 80, 197-206.
34. Harrison, A. W., & Rainer Jr, R. K. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*, 9(1), 93-111.
35. He, H. M. & Zhang, H. (2019). A Study of the Influencing Factors of College Students' English Mobile Learning Behavior Based on Unified Theory of Acceptance and Use of Technology. *Journal*

- of Southwest University of Science and Technology(Philosophy and Social Science Edition), (05), 73-79.
36. He, J., & Freeman, L. A. (2019). Are men more technology-oriented than women? The role of gender on the development of general computer self-efficacy of college students. *Journal of Information Systems Education*, 21(2), 203-212.
  37. Hou, Y. F. (2014). Autonomous learning of English Majors under MCALL Environment-A Study on Students' Gender, Language Learning Strategies, and Learning Outcomes(Doctoral dissertation). Yantai University.
  38. Hsu, L. (2013). English as a foreign language learners' perception of mobile assisted language learning: a cross-national study. *Computer assisted language learning*, 26(3), 197-213.
  39. Hwang, G. J., Wu, P. H., & Ke, H. R. (2011). An interactive concept map approach to supporting online documentary programs activities for natural science courses. *Computers & education*, 57(4), 2272-2280.
  40. Jabeen, F., Khan, M., & Ahmad, S. Z. (2018). Understanding the Technology Receptivity in Higher Education: Evidence From the UAE. *International Journal of Technology and Human Interaction (IJTHI)*, 14(3), 39-52.
  41. Ji, L. (2016). An Empirical Study of University Students' Behavioral Intention in Mobile English Learning on the Basis of Technology Acceptance Model (Doctoral dissertation). Chongqing University.
  42. Ji, L., He, X. Y., & Qin, M. Q. (2019). An analysis of the factors of College Students' Mobile English Learning Behavior Intention-Based on Davis technology acceptance model. *Asia-Pacific Education*, 19(01), 69-70.
  43. Joo, Y. J., Kim, N., & Kim, N. H. (2016). Factors predicting online university students' use of a online documentary programs management system (m-LMS). *Educational Technology Research and Development*, 64(4), 611-630.
  44. Kim-Soon, N., Ibrahim, M. A., Ahmad, A. R., & Sirisa, N. M. X. (2018). Factors influencing behavioral Intention to use online documentary programs and the mediation role of user satisfaction. *Advanced Science Letters*, 24(5), 3013-3017.
  45. King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information and Management*, 43(6), 740-755. <https://doi.org/10.1016/j.im.2006.05.003>.
  46. Lei, D., Chao, Q. H., & Zhang, J. J. (2014). Investigation and research on technology oriented language learning of college students. *Adult education in China*, (3), 109-112.
  47. Liu, F., Zhao, X., Chau, P. Y., & Tang, Q. (2015). Roles of perceived value and individual differences in the acceptance of mobile coupon applications. *Internet Research*, 25(3), 471-495.
  48. Lune, H., & Berg, B. L. (2016). *Qualitative research methods for the social sciences*. Pearson Higher Ed.
  49. Luo, B. R., Lin, Y. L., Chen, N. S., & Fang, W. C. (2015). Using smartphone to facilitate English communication and willingness to communicate in a communicative language teaching classroom. *2015 IEEE 15th International Conference on Advanced Learning Technologies (pp. 320-322)*. IEEE.
  50. Luo, Y., & Liu, C. (2019). The Application of FiF Oral Training APP to College Students' Extracurricular Oral English Learning. *2nd International Seminar on Education Research and Social Science (ISERSS 2019, June)*. Atlantis Press.
  51. Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, 22(1), 205-222.
  52. Ma, F. J. (2008). Language learning model construction of online documentary programs under Internet Environment(Doctoral dissertation). Shandong Normal University.



53. Mei, B., Brown, G. T., & Teo, T. (2018). Toward an understanding of preservice English as a Foreign Language teachers' acceptance of computer-assisted language learning 2.0 in the People's Republic of China. *Journal of Educational Computing Research*, 56(1), 74-104.
54. Nikou, S. A., & Economides, A. A. (2017a). Mobile-Based Assessment: Integrating acceptance and motivational factors into a combined model of Self-Determination Theory and Technology Acceptance. *Computers in Human Behavior*, 68, 83-95
55. Nikou, S. A., & Economides, A. A. (2017b). Mobile-based assessment: Investigating the factors that influence behavioral intention to use. *Computers & Education*, 109, 56-73.
56. Nikou, S. A., & Economides, A. A. (2019). Factors that influence behavioral intention to use mobile-based assessment: A STEM teachers' perspective. *British Journal of Educational Technology*, 50(2), 587-600.
57. Omair, A. (2014). Sample size estimation and sampling techniques for selecting a representative sample. *Journal of Health specialties*, 2(4), 142.
58. Park, C., Kim, D. G., Cho, S., & Han, H. J. (2019). Adoption of multimedia technology for learning and gender difference. *Computers in Human Behavior*, 92, 288-296.
59. Ren, Y., Dai, Z. X., Zhao, X. H., Fei, M. M., & Gan, W. T. (2017). Exploring an on-line course applicability assessment to assist learners in course selection and learning effectiveness improving in e-learning. *Learning and Individual Differences*, 60, 56-62.
60. Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, 71, 402-417.
61. Roszkowska, E., & Wachowicz, T. (2019). Cognitive Style and the Expectations Towards the Preference Representation in Decision Support Systems. *International Conference on Group Decision and Negotiation* (pp. 163-177). Springer, Cham.
62. Sabah, N. M. (2016). Exploring students' awareness and perceptions: Influencing factors and individual differences driving online documentary programs adoption. *Computers in Human Behavior*, 65, 522-533.
63. Salloum, S. A. S., & Shaalan, K. (2018). *Investigating students' acceptance of E-learning system in Higher Educational Environments in the UAE: Applying the Extended Technology Acceptance Model (TAM)*. The British University in Dubai.
64. Salloum, S. A., Al-Emran, M., Shaalan, K., & Tarhini, A. (2019). Factors affecting the E-learning acceptance: A case study from UAE. *Education and Information Technologies*, 24(1), 509-530.
65. Shen, R., Wang, M., Gao, W., Novak, D., & Tang, L. (2009). online documentary programs in a large blended computer science classroom: System function, pedagogies, and their impact on learning. *IEEE Transactions on Education*, 52(4), 538-546.
66. Shi, X. Y. (2010). Empirical research of influencing learning self-efficacy for college students by online documentary programs-for the example of English language study (*Doctoral dissertation*). Southwest University.
67. Tams, S., Thatcher, J. B., & Grover, V. (2018). Concentration, competence, confidence, and capture: An experimental study of age, interruption-based techno-stress, and task performance. *Journal of the Association for Information Systems*, 19(9), 857-908.
68. Tan, G. W. H., Ooi, K. B., Sim, J. J., & Phusavat, K. (2011). Determinants of online documentary programs adoption: An empirical analysis. *Journal of Computer Information Systems*, 52(3), 82-91.
69. Tang, Y., & Hew, K. F. (2017). Is mobile instant messaging (MIM) useful in education? Examining its technological, pedagogical, and social affordances. *Educational Research Review*, 21, 85-104.
70. Tarhini, A., Hone, K., & Liu, X. (2014). Measuring the moderating effect of gender and age on e-learning acceptance in England: A structural equation modeling approach for an extended technology acceptance model. *Journal of Educational Computing Research*, 51(2), 163-184.



71. Uppal, M. A., Ali, S., & Gulliver, S. R. (2018). Factors determining e-learning service quality. *British Journal of Educational Technology*, 49(3), 412-426.
72. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 27(3), 425-478.
73. Viberg, O., & Grönlund, Å. (2012). Mobile assisted language learning: A literature review. *11th World Conference on Mobile and Contextual Learning*, Helsinki, Finland.
74. Wang, J. F., Jiang, C. S., Hu, M. G., Cao, Z. D., Guo, Y. S., Li, L. F., & Meng, B. (2013). Design-based spatial sampling: Theory and implementation. *Environmental modelling & software*, 40, 280-288.
75. Wang, J., & Antonenko, P. D. (2017). Instructor presence in instructional video: Effects on visual attention, recall, and perceived learning. *Computers in human behavior*, 71, 79-89.
76. Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of online documentary programs. *British journal of educational technology*, 40(1), 92-118.
77. Wei, Y. (2016). Investigation and study on the using of educational application in the language learning of college students (*Doctoral dissertation*). Guangxi Normal University.
78. Wiedermann, W., & Hagmann, M. (2016). Asymmetric properties of the Pearson correlation coefficient: Correlation as the negative association between linear regression residuals. *Communications in Statistics-Theory and Methods*, 45(21), 6263-6283.
79. Williams, M. D., Rana, N. P., & Dwivedi, Y. K. (2015). The unified theory of acceptance and use of technology (UTAUT): a literature review. *Journal of Enterprise Information Management*, 28(3), 443-488.
80. Wilson, V. (2016). Research methods: sampling. *Evidence Based Library and Information Practice*, 11(1), 69-71.
81. Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155-164.
82. Wu, Q. (2014). Learning ESL vocabulary with smart phones. *Procedia-Social and Behavioral Sciences*, 143, 302-307.
83. Wu, Q. (2015). Designing a smart phone app to teach English (L2) vocabulary. *Computers & Education*, 85, 170-179.
84. Wu, Q. (2015). Pulling mobile assisted language learning (MALL) into the mainstream: MALL in broad practice. *PloS one*, 10(5), e0128762.
85. Wu, T. T. (2018). Improving the effectiveness of English vocabulary review by integrating ARCS with mobile game-based learning. *Journal of Computer Assisted Learning*, 34(3), 315-323.
86. Xu, Q., & Peng, H. (2017). Investigating mobile-assisted oral feedback in teaching Chinese as a second language. *Computer Assisted Language Learning*, 30(3-4), 173-182.
87. Xu, X. Q., & Zhang, Y. W. (2020). Research on the influencing factors of mobile learning platform users' willingness to use-a technology acceptance model based on mobile context and heart flow experience. *e-Education Research*, 41(03), 69-76.
88. Yang, K. C. (2005). Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics and informatics*, 22(3), 257-277.
89. Yavuz, F. (2016). Do smartphones spur or deter learning: A WhatsApp case study. *International Journal of Educational Sciences*, 15(3), 408-415.
90. Yueh, H. P., Lu, M. H., & Lin, W. (2016). Employees' acceptance of mobile technology in a workplace: An empirical study using SEM and fsQCA. *Journal of Business Research*, 69(6), 2318-2324.
91. Zhang, X. Y. (2020). Pay attention to "teaching according to nature" and guide male students to learn English well. *Learning Weekly*, (21), 93-94.

92. Zhang, Y. (2019). A Survey on the Causes of Non-English Majors College English Learning Burnout in a Local University in China-A Case Study of Anhui University of Science and Technology. *Journal of Language Teaching and Research*, 10(4), 872-878.
93. Zhou, M. (2016). Chinese university students' acceptance of MOOCs: A self-determination perspective. *Computers & Education*, 92, 194-203.
94. Zuo, Y. (2017). Online English Education for Teenagers in China. 5<sup>th</sup> *DEStech Transactions on Social Science, Education and Human Science* (pp.77-80), Pennsylvania, USA.
95. Zydney, J. M., & Warner, Z. (2016). Mobile apps for science learning: Review of research. *Computers & Education*, 94, 1-17