

CURRENT POTENTIAL, CHALLENGES AND COUNTERMEASURES OF ONLINE LEARNING DURING COVID-19 PANDEMIC: HIGHER EDUCATION IN CHINA

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Abstract: *Online learning and teaching are the current trend to worldwide education norm. This approach is particularly crucial since the outbreak of the COVID-19 pandemic when majority of the activities have been locked down. Online learning system requires up to date computer devices and internet access. This poses a challenge to many rural and inland locations, particularly in China. Therefore, this study aims to assess the readiness of higher education institution students on online learning during the pandemic. The quantitative approach was applied with a total 353 volunteers from higher learning institutes in Jiangxi, China. Online Learning Readiness Assessment used for data collection through online platform. There is total four aspects measured: learning favouritism; self-directive; self-efficacy; and hardware-soft skill support. Findings indicated that 74.5% of the volunteers fell under the moderate level of online learning readiness; 17.5% were categorized under the high level of online learning readiness and 8% were in the low level of online learning readiness. Student readiness in self-directive were reported with the highest mean scores while the level of favoritism indicated the lowest mean scores. Generally, this study implied students in the 21st century is well prepared for online learning. However, continuous improvement plans are crucial to warrant the effectiveness of online learning on students' academic and non-academic performance for further achievement.*

Keywords: *online learning readiness, higher education, Covid-19*

Introduction

The COVID-19 pandemic has severely affected many industries. The education sector is no exception. In order to control the spread of the pandemic, the government made a drastic decision by declaring a nation lock-down on the 5th February 2020. Following the declaration, the Ministry of Education of China had issued a Guidance on Organizing and Managing Online Teaching and Learning to the higher education institutions. The document had: (i) instructed colleges and universities must postponed the new semester nationwide; and (ii) launched “suspension of classes without suspension of learning” initiatives. Data showed more than 265 million primary and middle school students, with nearly 16 million teachers from China were involved in online teaching and learning, thus forming the largest on-line education network and scale (Feng, 2020).

On the 28th April 2020, the China Internet Network Information Center released the 45th China Statistical Report on Internet Development. The report showed by March 2020, China had 904 million internet users. The internet penetration rate reached up to 64.5 percent; and the number of mobile internet users reached 897 million. Affected by COVID-19 pandemic, the school operation was postponed and teaching and learning activities were shifted to online. The online education users suddenly scaled up to 420 million, an increase of 110.2% as compared to the statistics collected at the end of 2018. This implies that on-line teaching and learning approach is getting more accepted by the public because of its advantages breaking through the limitation of time and space, realizing the sharing of high-quality resources, and satisfying the fragmented learning and independent learning of learners. Emerging technologies such as artificial intelligence and big data are widely acquired in online education by the Chinese students. In order to meet the diverse learning needs, the Chinese Ministry of Education launched 22 online course platforms with 24,000 online courses. The Ministry of Education of China advocates that colleges and universities should make full use of the internet teaching resources and platforms during the pandemic period, such as live broadcast, recorded broadcast, on-line discussions, MOOC etc. However, owing to the COVID-19 crisis, which resulted in insufficient preparation and readiness on on-line teaching and learning approach in the early stages of the pandemic, obstacles and challenges were encountered during the process. These include, (i) network congestion in the early stage of the implementation; (ii) teachers were not well trained on acquiring the most suitable approach or Apps; (iii) teachers had not established an approach that could deliver online teaching and learning most effectively (Chen 2020; Yu 2020).

From the students’ perspective, poor self-discipline awareness and uneven academic foundation resulted in ineffective learning performance. In order to control the quality of on-line teaching and learning, universities had conducted surveys through questionnaires and interviews to keep track of the status, circumstances and situations of on-line teaching and learning activities, and to solve the problems in the teaching and learning process (Chen, 2020; Qiu, 2020). Owing to the above-mentioned notion, this study attempted to determine students’ online learning readiness during the COVID-19 in Jiangxi, China; subsequently to suggest solutions to assist the students to acquire the ability to adapt to these new challenges. Therefore, study aims to understand the situation of online-learning during the pandemic by explore the online learning readiness among the higher education students. There are four main aspects of online learning readiness namely, (1) learning favoritism, (2) self-directive, (3) self-efficacy and (4) hardware-soft skill support.

Online Learning Readiness

Information technology has been widely applied in all industries and resulted in a revolutionary shift in paradigm on life, work, and the study of the human being. The dramatic progress has influenced the education field too. On-line learning or remote learning has become an important pervasive form of learning in the education system worldwide in the recent decade owing to its advantages to cater to the individual requirements of personalized, diversified and lifelong learning (Allen & Seaman, 2017). Online learning is the product of the deep integration and development of the education industry following the advancement of the Internet technology. It is a new form of knowledge dissemination and rapid learning approach mainly through the application of “internet of things”. The advantages of on-line learning include the flexibility of teaching and learning method, with no limitations to time and space, thus improving the students’ learning ability of independent exploration and active thinking (Thoms & Eryilmaz, 2014). The outline of the National Program for Medium and Long-term Education Reform and Development (2010-2020) states, “*information technology has a revolutionary impact on the development of education and must be highly valued*”.

Li et al. (2014) argued, learning readiness is one of the key factors affecting the success of online learning. Wiley (1983) defined learning readiness as the attitude, ability and personality traits that learners need to enter the new learning process. Studies indicated that the assessment of distance learning readiness improves the retention rate of learners in many online courses. To a certain extent, it provides a strong support for educational institutions to identify potential crisis learners and provide timely targeted support (Ivan & Harrell, 2012). Du et al. (2011) showed the dropout students exhibited insufficient preparation for learning and weak time management had a negative impact on their online learning. Studies have shown that most students’ information literacy and self-discipline are not well-prepared (Yao, 2015). However, students are required to have certain online learning facilities and information literacy before entering online learning. In addition, although research shows students prefer online learning, however, nearly 30% of online learners cannot adapt to the changes in learning environment and learning style (Chen, 2003).

Zhou and Lou’s study (2013) noted that success or failure of online learning depends on the students’ online learning readiness, which include the components of psychology as well as network information literacy. Students prefer to interact and communicate with teachers or peers thus likely to study in classroom settings. The research also showed a majority of students were not self-disciplined therefore could not review the learning material or meeting the assignment deadline. Students who lacked interests and confidence in on-learning might result in negative emotions such as anxiety, depression, loneliness, among others. Physiologically, students got tired easily, experienced vision loss, dizziness, nausea and other physical discomforts during online learning process. Students with poor information literacy had problems to obtain, evaluate and make use of useful information from the Internet. Other influencing factors, such as defective accessibility platforms, teachers’ heavy workload, busy schedule and insufficient online teaching experience had negative impact on online learning.

Furthermore, students might be challenged by the digital learning environment that they lacked self-control ability. In traditional classrooms, students were under the teachers’ monitoring and supervision and well-prepared for their learning materials and learning assessment. Wu, Lin and Chen (2019) found the nature of teaching, learning and management was different from the

traditional collective face-to-face teaching. Therefore, many teachers and students might not be able to directly adapt to the transformation from the traditional model to the online education learning model.

Understanding the level of the learning readiness among college and university students is important, because the information obtained will provide insights to designing on-line teaching approaches according to the learners' needs, habits, styles and to evaluate and improve the learning efficiency and helping the students to adjust to the curriculum. Literature review indicated that there is lack of study focused on student online learning readiness during the pandemic. Findings of the present study can contribute to the research gap.

The Chinese Context

In the late 1990s, distance education began in China. Since then, the Ministry of Education in China had launched a series of distance education and online education pilot projects at colleges and universities and hence, framed the shape of the development of online education in China (Zheng, 2009). In 1999, China launched the pilot project called the "Modern Distance Education". Under this initiative, the Ministry of Education approved 68 universities and 6 open universities in acquiring the internet to assist higher education that predominantly focused on off-campus academic education. In 2012, the Ministry of Education issued the Notice on printing and distributing the Ten-year Development Plan for Educational Informatization (2011-2020), which aimed to drive the modernization of education to solve the problems hindering the development of China's education, as well as promoting the reformation and innovation of education. Under the guidance and financial support policy, China's online education developed rapidly. The Ministry of Education started to construct the National Excellent Online Courses, which intended to promote the application of modern information technology in teaching and learning and established high quality teaching resources sharing platform. Until 2013, there were more than 750 university teachers who participated in the course construction and 3090 national excellent online courses had been constructed (MOE, 2013).

Beyond that, a large number of telecommunication companies had begun to form the method of "Internet Plus Education Content" to satisfy learners' experience, needs and interests. China Open Resources for Education (CORE), founded in October 2003, is a non-profit organization. It is a consortium with some Chinese universities and provincial radio and television universities as members. CORE introduces excellent courses, advanced teaching technology and teaching method as a sharing platform applying to the Chinese teaching context. At the same time, the excellent courseware and cultural products of Chinese universities were promoted to the world, and an international platform for the exchange and sharing of educational resources were built.

The continuous integration of information technology and traditional classroom teaching presents the forms of internet-assisted classroom teaching, online and offline blended teaching, and internet-based online teaching. However, online education still plays a supporting role in the full-time education at colleges and universities. Unfortunately, although the modern distance education pilot program has accumulated rich experience in online education platform construction, resource construction, teaching and learning, management and support services, but it has not been effectively transformed and used to serve the full-time teaching in colleges

and universities (Wu et al., 2019). However, due to the COVID-19 pandemic, online learning has become compulsory to minimize the negative impact to the learning process. Therefore, to understand the situation of online-learning during the pandemic, this study aimed to explore the online learning readiness among the higher education students by measuring the four main aspects of online learning readiness namely, (1) learning favoritism, (2) self-directive, (3) self-efficacy and (4) hardware-soft skill support.

Method

Procedure and Respondents' profile

The present study adopted a quantitative approach. A survey form was utilized for data collection through online platform during the COVID-19 pandemic lockdown period. Informed consent was obtained from each respondent. Participation in the study was voluntary and randomly selected. The targeted population was students from higher education institutions (HEI) in Jiangxi, China. A total of 353 HEI's students participated in this study. The total number of respondents involved fulfilled the sample requirement calculated using G-Power Software with small effect size (.25), statistical power of .70 and alpha level of .05 (Erdfelder et al., 1996). From the pool of 353 HEI's students, they were reported as either pursuing the of undergraduate or postgraduate level. Two hundred and eighty-four (80.5%) were female students and 69 (19.5%) were male students; aged between 18 to 23 years old.

Instrumentation and Analyses

The instrument utilized in the present study was the Online Learning Readiness Assessment (RLRA). There were 28 items in the Online Learning Readiness Assessment (OLRA) to measure four important aspects on online learning, namely, (1) learning favoritism, (2) self-directive, (3) self-efficacy, and (4) hardware-soft skill support.

The OLRA was designed according to China's education culture. Items were adapted by referring to the existing established instruments to ensure all items in OLRA were suitable in measuring each indicator of readiness (Blankenship et al., 2010; Online Readiness Questionnaire, Vicki William; SPAHP Online Learning Readiness Assessment; Ünal et al., 2014). The instrument designed was aligned with the research objective i.e., to determine the level of readiness, and not an in-depth understanding of the trends (Cormack, 1991). The instrument was verified by a panel of experts in the field of study in China validating the content, language, understanding, and avoiding issues of sensitivity. The reliability value of the instrument achieved the statistical requirement (Hair et al., 2010). All dimensions reported reliability value greater than 0.70: (1) learning favoritism, 0.884; (2) self-directive, 0.925; (3) self-efficacy, 0.911; (4) hardware-soft skill support, 0.866.

A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used in the instrument. Three levels of mean score were used to identify the level of readiness. The composite mean was collapsed into three levels with equal intervals as shown in Table 1 to create an interpretation of the mean score as supported by Levin and Rubin (1998). According to Pallant (2010), it is more convenient to see the differences by categorizing the mean score into three levels. SPSS 21.0 was used to analyze the research data. Descriptive analysis was used in this present study. The statistics measurements of frequency, percentage, mean, and standard deviation were used.

Table 1: Mean Score Level Determination

Mean Score	Measurement Level
1.00 -2.32	Low
2.33 – 3.65	Moderate
3.65 -5.00	High

Findings

Students' Online Learning Readiness

Out of the 353 respondents, 263 (74.5%) fell under the moderate level of online learning readiness; 62 (17.5%) were categorized under the high level of online learning readiness and 28 (8%) were in the low level of online learning readiness. Overall, the respondents had moderate level of readiness with the mean score between 2.84 to 3.04 for each aspect. Among the four aspects, student readiness in self-directive were reported with the highest mean scores ($M=3.42$; $SD = .76$); while the level of favoritism indicated the lowest mean scores ($M=2.84$; $SD = .66$). Table 2 shows the frequency and percentage of the respondents in each aspect of the online learning readiness.

Table 2: Frequency and Percentage of the Level of Online Learning Readiness

Dimension	Low	Middle	High
	Frequency (%)	Frequency (%)	Frequency (%)
Learning Favoritism	60 (17%)	245 (69.4%)	48 (13.6%)
Self-Directive	27 (7.7%)	187 (53%)	139 (39.3%)
Self-Efficacy	28 (7.9%)	212 (60.1%)	113 (32%)
Hardware-Soft Skill Support	59 (16.7%)	210 (59.5%)	84 (23.8%)

Means and Standard Deviations for Each Aspect of Online Learning Readiness

Learning Favoritism

There was a total of 6 items in learning favoritism to measure the respondents' learning preferences as well as learning style. Items measuring the respondents' favorite on online learning were online tutorials, online lectures, interaction, motivation etc. Table 3 indicates that all items in learning favoritism achieved moderate level mean scores ($M=2.33-3.65$) with an overall mean score of 2.84 ($SD=.66$). The respondents moderately preferred learning through online tutorials ($M=3.03$; $SD=.82$), and they agreed that they could learn through listening to online lectures, audio recordings or podcasts ($M=3.48$; $SD=.89$). Furthermore, the respondents also moderately agreed that online learning was more motivating ($M=2.58$; $SD=.94$) and improved their learning ability ($M=2.76$; $SD=.95$). It allowed more interactions and engagement between tutor and respondents ($M=2.57$; $SD=.94$). Item 2 clearly defined that respondents moderately preferred online lectures than traditional classroom learning ($M=2.67$; $SD=.94$).

Table 3: Means and Standard Deviations in Students Learning Favouritism

Statements	Item		Overall
	Mean	SD	
1. I prefer learning through online tutorials	3.03	.82	
2. I prefer online lectures than traditional classroom learning.	2.67	.94	
3. I feel more motivated to learn through online.	2.58	.94	
4. Learning online has improved my learning ability.	2.76	.95	M=2.84 SD=.66
5. Online teaching and learning allow more interaction and engagement between the tutor and students.	2.57	.94	
6. I can learn through listening to online lectures, audio recordings or podcasts.	3.48	.89	

Self-Directive

Self-directive is important for online learning, students with self-directed learning can actively respond with the online sessions to get more information and to spend more time on topics of interests. Therefore, self-directive is measured to understand respondents' self-readiness in mongering and directing their learning. Noticeably, self-directive reported the highest mean score level among the four main aspects of online learning readiness, $M=3.42$; $SD=.76$. Table 4 indicates that respondents moderately agreed they set the goals for achievement ($M=3.31$; $SD=.87$), they were self-motivated ($M=3.52$; $SD=.84$), good in time-management ($M=3.33$; $SD=.88$), understood the learning responsibility ($M=3.62$; $SD=.85$) and always stayed on track of their goals ($M=3.35$; $SD=.88$). As a conclusion, the findings reported students were moderately prepared for online learning.

Table 4: Means and Standard Deviations in Students Self-Directive

Statements	Item		Overall
	Mean	SD	
1. I set goals and work towards them.	3.31	.87	
2. I am self-motivated.	3.52	.84	M=3.42 SD=.76
3. I am good in time-management.	3.33	.88	
4. I understand my responsibility for learning.	3.62	.85	
5. I always stay on track for my goals	3.35	.88	

Self-Efficacy

Self-efficacy was used to measure students' confidence in online learning through 8 items. The findings revealed students' moderately agreed they were confident in mongering and participating in online learning ($M=3.31$; $SD=.72$). Table 5 shows students achieved moderate mean scores for academic abilities ($M=3.27$; $SD=.87$), basic technical online learning ($M=3.54$; $SD=.93$), online skills and knowledge ($M=3.46$; $SD=.90$), online searching ($M=3.49$; $SD=.90$), use of communication tools ($M=3.39$; $SD=.90$), and confident participation in online discussion ($M=3.24$; $SD=.90$). Similarly, students also demonstrated moderate confidence in the online examination system (item 7) and assignment submission platform (item 8) as shown in Table 5. In general, the study reported students had moderate readiness in self-efficacy for online learning.

Table 5: Means and Standard Deviations in Students Self-Efficacy

Statements	Item		Overall
	Mean	SD	
1. I am confident in my academic abilities.	3.27	.87	M=3.31 SD=.72
2. I am confident in performing the basic technical functions for online learning.	3.54	.93	
3. I am confident with my software related skills and knowledge for online learning.	3.46	.90	
4. I am confident in internet browsing to search for online learning academic material	3.49	.90	
5. I am confident to use the online communication tools for online learning.	3.39	.90	
6. I am confident to actively participate in discussion during online learning.	3.24	.90	
7. I am confident to the procedure and validation of online examination	3.07	.96	
8. I am confident to submit my assignment using online platform	3.07	.96	

Skill Support

Skill support consisted of 9 items measuring the technology and soft skill support. Table 6 reported a low level of agreement regarding item 1 “I have a printer” (M=1.61; SD 1.13). While, other items reported moderate level agreement with mean scores between 2.76 to 3.41. In general, students moderately agreed (M=3.04; SD.79) they were well prepared with the technology and skill needs for online learning sessions. The students also agreed with items; “I am computer savvy” (M=2.76; SD 1.07); and “I am comfortable in conducting searches, setting bookmarks, and downloading files” (M= 3.33; SD1.03). These two items were important to represent students’ soft skills readiness on online learning.

Table 6: Means and Standard Deviations on Students Hardware-Soft Skill Support

Statements	Item		Overall
	Mean	SD	
1. I have a printer	1.61	1.13	M=3.04 SD=.79
2. I have headphones or speakers and a microphone ready for online learning	2.96	1.16	
3. I have no problem connecting to the internet for online learning when needed.	3.30	1.12	
4. I have a personal computer for online learning	3.26	1.44	
5. I am computer savvy	2.76	1.07	
6. I am comfortable conducting searches, setting bookmarks, and downloading files	3.33	1.03	
7. I have virus protection software running on my computer	3.37	1.24	
8. My browser is able to play several common multimedia (video and audio) formats	3.41	1.04	
9. I can find a comfortable place for online learning	3.40	1.00	

Discussion

Learning environment is a key element affecting students' efficacy and determining their acceptance and readiness of online learning. The present study showed students preferred online learning more than traditional classroom teaching. This was in line with Yu et al (2020) research finding that reported during the COVID-19 pandemic, both students and teachers were satisfied with the online learning, probably because students were more motivated to learn online and more willingly to actively participate in online discussions. Cao, Lv and Wang (2020) explained that in traditional classroom teaching, students were afraid to show up in a large group or feeling shy to express themselves. It could be possible online learning might provide relatively free and relaxed atmosphere that allowed students to express themselves comfortably. There was a significant positive correlation between learners' external learning motivation and college students' online learning satisfaction. The research finding was similar with Chen, Yi and Chen (2015) which pointed out that students could have more opportunities to communicate and discuss with peers through online learning. The emphasis on learner-centered learning is the prerequisite for the formation of a personalized online learning community and the main medium for learners to carry out a series of team-oriented teaching activities among themselves (Hu, 2015). However, some studies reported that students preferred traditional classroom learning rather than online learning, probably because students perceived classroom learning could ensure learning efficiency and learning progress (Hu & Liu, 2020).

Compared to the traditional classroom learning, online learning strongly depends on individual's consciousness owing to the fact that this approach requires minimal teachers restrain, thus putting forward higher requirements on students' preparation and adaptability. Nevertheless, our data showed that students set the goals for achievement, self-motivated, good in time-management, understood the learning responsibility and always stayed on track of their goals. According to Bandura (1997), in order to achieve their learning goals, individuals were actively involved in their learning process and determined their action. This also indicated that college and university students could resist the interference of external environment, as well as selective in their learning methods, which made it easy to achieve high-quality online learning. As mentioned by Li et al. (2014) self-directive in the learning process was an important characteristic of adult learning due to their development in social adaptability, learning ability, meta-cognitive ability, problem-solving ability and other aspects which signified maturity and stability. Prior studies showed self-directive was a dominate characteristic of successful online learners. These individuals normally had the ability to work independently, effective time management, computer skills and communication skills (Ludwig-Hardman & Dunlap, 2003; Rovai, 2003).

Self-efficacy played an important role in enhancing students' learning motivation and improving their learning outcomes (Bandura, 1986; Hatlevik-Thronsen et al., 2018; Schunk,1991). The finding was supported by Li, Wang and Wu (2015), which claimed that adult online learners had a high sense of self-efficacy in the dimension of learning technology, and adults were very confident in their mastery of learning technology. Although, the research findings showed students were confident in online learning, however numerous studies had pointed out that due to lack of supervision from teachers, online learning may not be as good as offline learning (Du & Ding, 2020). Lack of emotional communication between students and teachers, to a certain extent, might reduce students' learning efficiency. Furthermore, students cheating in examinations and skipping classes were a common phenomenon for on-line classes

(Du & Ding, 2020). “Lack of learning atmosphere” was the most concentrated and prominent problem faced by college and university students during their online courses.

Literature reviews confirmed individuals’ prior computer experiences and skills were the main variables affecting their learning outcomes, lack of computer skills and experiences might impede students’ learning (Fuller et al., 2006; Wan et al., 2008). Prior studies had also found a significant relationship between Information and Communication Technologies (ICT) and students’ Computer and Information Literacy (CIL) (Fraillon et al., 2014; Rohatgi et al., 2016; Yang & Chen, 2009). The research findings revealed most of the students were well-prepared for their computer and information literacy. Nevertheless, there were a small group of students who were lacking in information technology equipment support and information literacy. As Hu (2015) explained during the pandemic, college students’ online courses were mostly influenced by their family location and Internet environment.

Conclusion

Generally, the present study reported that among the Chinese students, they achieved positive online learning readiness during the COVID-19 pandemic. Students were obliged to be ready for the new norm of learning due to the pandemic lockdown. This indirectly enhances the implementation of online learning in China and assists policy making towards the success of online learning in the Chinese education institutions. However, this study also suggested that further researches are warranted to explore the effectiveness of online learning on students’ academic and non-academic performance. The four stages of continuous improvement plan which involved the Plan-Do-Check-Act is required to ensure the success of online learning education among the Chinese population.

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