Ready or not? An exploration of university students’ online learning readiness and intention to use during COVID-19 pandemic

Diem TN Hoang
School of Foreign Languages, Thai Nguyen University (Vietnam), Thainguyen, Viet Nam
School of Education, Edith Cowan University (Australia), Joondalup, WA, Australia

Thinh Hoang
Faculty of Foreign Languages, Banking Academy of Vietnam, Hanoi, Vietnam

Abstract
The outbreak of COVID-19 pandemic since the last days of 2019 has led to school closure worldwide and forced institutions at all levels to move to online or distance learning. This study was conducted to explore university students’ readiness to such a sudden situational shift to online learning. We surveyed 1304 online-learning students in a higher education institution in Vietnam. Through exploratory factor analyses, we identified three dimensions of online learning readiness (OLR): online learning motivation, online learning self-efficacy beliefs, and online self-directed learning. We then conducted multiple regression analyses to investigate the predictive power of different students’ individual characteristics and perceptions on OLR, and the impacts of the three OLR dimensions on students’ intention to use online learning (IU). Our results suggested that students’ perceived facilitating conditions and their online learning experience were the significant predictors of OLR. Furthermore, online learning motivation was the construct that exerted the strongest influence on IU, compared to other OLR constructs. The study highlights the need for improving facilitating conditions to support students’ OLR. It also suggests enhancing the usefulness and enjoyment that students perceive from online learning to improve their willingness to use this learning channel.

Keywords
Online learning, online learning readiness, intention to use online learning, COVID-19 pandemic, Vietnam

Corresponding author:
Thinh Hoang, Faculty of Foreign Languages, Banking Academy of Vietnam, No.12 Chuaboc, Dongda, Hanoi 1000, Vietnam.
Email: thinhhq@hvnh.edu.vn
Introduction

The twenty-first century has witnessed enormous changes in the global education system, one reason for which is technology advancement which has rapidly shifted brick-and-mortar education to online platforms (Means et al., 2014). Since late 2019, the unprecedented outbreak of COVID-19 pandemic has pushed online learning to the top agenda for education administration worldwide (Selwyn, 2020), forcing institutions to move in-person classes online at all levels (Crompton et al., 2021; Yates et al., 2021).

Along the same vein, universities in Vietnam have chosen to shift to online learning when school shutdown was mandated due to the pandemic lockdown between 2020 and 2021. During the first months of the shift in early 2020, Zoom and Microsoft Office was found to be popular tools used by teachers to spontaneously respond to the situation, but they had a number of technical limitations and inconveniences with free Zoom accounts and low Internet connection (Lee, 2020a). Teaching via television was also a common option for disadvantaged areas where digital access was limited (Linh, 2020). Later on in the second half of 2020, technology companies providing professional e-learning services in Vietnam also witnessed a rocket increase in their user numbers (Vietnam News, 2020). A report by the Ministry of Education and Training revealed that nearly half of higher education institutions had deployed online training during the closure due to the pandemic in 2020 (Nguyen and Pham, 2020).

With the initial positive response of Vietnamese education institutions to e-learning during the pandemic and the supportive policies of the government to technology use in education, online learning is predicted to fast grow in the near future (Pham and Ho, 2020). Recent studies on online learning during the COVID-19 pandemic in Vietnam have pointed to students’ satisfaction in online learning (Dinh and Nguyen, 2020), responses from the government and higher education sector (Pham and Ho, 2020), or factors affecting Vietnamese students’ intention to use online learning (IU) using technology acceptance model (Maheshwari, 2021). To date, however, there has been little research exploring Vietnamese university students’ online learning readiness (OLR) or possible factors that may influence students’ online learning readiness during the pandemic. After more than a year of intensive resort to different forms of online learning due to the state-wide mandate lockdowns between 2020 and 2021, it would be timely to evaluate online learning readiness among Vietnamese students and to examine the influential factors, which is potentially essential for the continuing investment and development of online learning systems in the nation.

While the use of different OLR models have been widely used to examine various aspects of online learning in various educational contexts in the world, there is a lack of empirical research in developing countries like Vietnam where the use of technology in education is still under-researched, particularly at the tertiary level (Vo, 2020). Drawn theoretically from Hung et al.’s (2010) OLR model, this study aimed to enrich the existing literature by continuing to explore the OLR factorial structure, investigate factors affecting OLR among tertiary students. In addition, the study aimed to extend its theoretical framework by examining the relationship between OLR dimensions proposed by Hung et al. (2010) and students’ intention to use online learning. The study addressed the following research questions:

(1) What are the underlying dimensions of online learning readiness of university students?
(2) To what extent are university students ready for online learning?
(3) To what extent are students’ demographic characteristics and perceived facilitating conditions related to their online learning readiness?
(4) To what extent is students’ online learning readiness related to their intention to use online learning?
Literature review

Online learning readiness

The concept of online learning readiness was initially proposed by Warner et al. (1998) who referred OLR to learners’ preference for the form of instruction delivery, competence and confidence in the use of Internet and electronic communication, and ability to engage in autonomous learning. The level of learners’ readiness in learning with technology is one of the important indicators of online learning success, designing, and implementation (Al-Emran et al., 2018; Lin et al., 2016; Rafiee and Abbasian-Naghneh, 2019). OLR is also an important factor that may affect students’ learning performance and satisfactions in online courses (Wei and Chou, 2020).

Since online learning came into practice, there have been different theories and models developed and validated to measure OLR. Smith et al. (2003), for instance, re-validated an existing OLR survey questionnaire from an unpublished report by McVay (2000) and identified two dimensions: comfort with e-learning and self-management of learning. However, the study was conducted on a small scale and encouraged further studies to identify other factorial structures (Smith et al., 2003). Some other studies revealed that there were more dimensions of OLR. The study by Bernard et al. (2004) identified four constructs including general beliefs about online learning success, confidence in prerequisite skills, self-direction and initiative, and desire for interaction. Another study by Parnell and Carraher (2003) developed an OLR scale of four dimensions which comprised of technological mastery, flexibility of course delivery, anticipated quality of course, and self-management orientation. Instead of developing a new scale, Ngampornchai and Adams (2016) combined different existing models to evaluate e-learning readiness and acceptance among Thai students and revealed mixed results in different constructs.

Also aiming at developing a scale to measure learner readiness for online learning, Hung et al. (2010) constructed and validated an instrument with five psychological dimensions: computer/Internet self-efficacy, self-directed learning, learner control, motivation, and online communication self-efficacy. This model was adapted by Lin et al. (2016) to develop a scale to evaluate mobile learning readiness, or by Wei and Chou (2020) to investigate the relationships among online learning perceptions, OLR, and online learning performance. Rafiee and Abbasian-Naghneh (2019) combined some OLR constructs suggested by Hung et al. (2010) such as motivation, online communication self-efficacy, and perceived enjoyment with the Technology Acceptance Model (TAM) originally developed Davis (1989) to investigate the acceptance and readiness of technology among language learners. The study revealed positive links between both OLR and TAM constructs and students’ e-learning acceptance and readiness.

Socio-economic elements, different internal and external factors and behavioural factors related to online learning are also taken into consideration to investigate OLR in a number of studies. Darab and Montazer (2011) developed a model to assess e-learning readiness at higher education level which included nine readiness dimensions: communication network readiness, equipment readiness, security readiness, financial readiness, human resources readiness, support and supervision and coordination readiness, laws and regulations readiness, standards readiness, and finally content readiness. Watkins et al. (2004) developed a different self-assessment instrument to measure online learners’ readiness. The instrument included technology access, technology skills, online relationships, motivation, online readings, online video/audio, Internet chat, discussion boards, online groups, and importance to success.

While there are different approaches to measure OLR, we agree with Parasuraman (2000) on the point that readiness is more about individuals’ psychological state of how prepared they are for new
technologies. It also indicates learners’ belief in learning and communicating in computer-mediated environments (Blankenship and Atkinson, 2010). On that account, other factors such as socio-economic elements should be treated as the facilitating conditions or at organizational level (Lin et al., 2016) rather than individual level that may influence the level of OLR among learners. We discuss the influential factors on students’ online readiness in the next section.

Factors affecting online learning readiness

Studies to date have revealed mixed findings about the relationship between learners’ characteristics and the level of online learning readiness. Females have been found to be readier or perform better in learning with technology in a number of studies (Firat and Bozkurt, 2020; Lim, 2004; Wang et al., 2009). In contrast, another study by Hung et al. (2010) did not find any significant difference that gender made on OLR dimensions. While age differences and employment were strong indicators of OLR with higher readiness among employed learners of high ages (Firat and Bozkurt, 2020), learners’ experience of using Internet (Firat and Bozkurt, 2020; Wei and Chou, 2020) and part-time learning mode (Hannon and D’Netto, 2007) were found to impact OLR. Students’ disciplines and years of study were also found to affect students’ actual learning behaviours in an online learning platform (Lee, 2020b). Apart from learners’ demographic factors, learners’ characteristics such as reading and writing skills, computer literacy, motivation, and independent learning were also found to be prominent factors affecting OLR (Kerr et al., 2006).

In addition, studies to date reveal that institutions’ facilitating conditions affected certain dimensions of readiness for online learning. Institutional facilitations have been viewed from different perspectives such as preparedness in technological equipment and facilities (Marek, 2009), institutional long-term investment in professional development (Almpanis, 2015; Philipsen et al., 2022), and supportive leadership (Cowan, 2013). Institutional support was found to be a common factor which impacts greatly on students’ attitudes and intention to use (Hannon and D’Netto, 2007; Maheshwari, 2021). A study by Lai et al. (2016) found training support from institutions an effective factor in promoting self-directed use of technology among learners. A recent study on OLR during COVID-19 pandemic revealed that technical conditions such as technology infrastructure and Internet speed provided by institutions affected students’ enjoyment in online learning (Maheshwari, 2021).

Overall, previous studies have reported mixed results related to the effects of learners’ demographics and facilitating conditions on OLR. This, together with a lack of relevant empirical evidence in little researched settings like Vietnam, highlights the need to explore the effects of Vietnamese students’ demographics and infrastructure conditions on students’ online learning readiness. This understanding is necessary since it will inform better educational policy decisions and online teaching practices in similar contexts. Considering this, in our study we incorporated facilitating condition as one of OLR determinants. We also included other variables such as gender, year of study, and prior online learning experience which are reported to be important to investigate students’ online learning readiness elsewhere (Firat and Bozkurt, 2020; Lim, 2004; Wang et al., 2009).

Theoretical framework

With the view of OLR as a psychological state and personal belief, the current study adapted an OLR theoretical framework which was developed and validated by Hung et al. (2010). We decided to employ this framework because of its comprehensiveness with the following major constructs:
• Computer/Internet self-efficacy: The concept self-efficacy was originated from social cognitive theory which looked at human beliefs of being capable of successfully performing tasks and how such self-efficacy beliefs affect learning and performance regarding goals, efforts, and persistence (Bandura and McClelland, 1977). Computer/Internet self-efficacy is defined as individual’s ability to use the technology in online learning contexts (Hung et al., 2010).

• Online communication self-efficacy: The construct refers to individuals’ ability to communicate in online learning environments through commenting, questioning, responding, discussing, and/or collaborating online (Hung et al., 2010; Rafiee and Abbasian-Naghneh, 2019).

• Self-directed learning: Garrison (1997) proposed a self-directed learning model which combined processes of contextual control (self-management), cognitive responsibility (self-monitoring). Hung et al. (2010) adapted models by Garrison (1997) and McVay (2000) to generate a self-directed learning scale which covers learners’ attitudes, abilities, personality characteristics, and affective responses toward online learning.

• Motivation: The construct refers to individual’s own desires, attitudes and preferences towards online learning (Hung et al., 2010). The motivation items generated by Hung et al. (2010) were later revised by other studies (Lin et al., 2016; Rafiee and Abbasian-Naghneh, 2019) to make them more specific to contexts of learning with technology.

While investigating OLR with the important aspects proposed by Hung et al. (2010), the current study did not take the dimensions of this framework as granted. The study contributed the literature through exploring whether the four OLR dimensions emerged significantly in such contexts as Vietnam where online learning is newly implemented. To that end, we decided to use exploratory factor analyses which are described with more details in the subsequent section.

It should be noted that individuals’ internal psychological state and beliefs can influence or predict their actions (Lee, 2020b). A number of studies have attempted to examine the relationship between different dimensions of psychological states and students’ intention to use online and the results varied (Huang et al., 2020; Lai et al., 2012; Tarhini et al., 2017). While a number of studies revealed that the perceived usefulness of learning with technology significantly affected learners’ intention behaviours (Huang et al., 2020; Tarhini et al., 2017), another study by Lai et al. (2012) with a group of Hong Kong undergraduate students showed that perceived usefulness was a less powerful indicator of students’ behavioral use of technology compared to learning styles and supports. However, a consistent finding reported by these studies was that learners’ attitudes toward online learning was a factor that significantly impacted their intention to use technology (Huang et al., 2020; Lai et al., 2012; Tarhini et al., 2017). It appears that different contexts with different learners and measurement models may yield varying results in relation to learners’ intention behaviours in using technology for learning. Given the context of the study, little is known about different factors impacting on Vietnamese undergraduate students’ intention to continue using online learning under emergency situations (Maheshwari, 2021). This study was conducted to address this research gap. Drawn from Hung et al. (2010) OLR model, the study also intended to extend this framework by investigating possible impacts that the constructs within the model might have on students’ intention to use online learning in a Vietnamese context.

Methods
The current research was a quantitative study with a cross sectional design (Cohen et al., 2013). Specifically, we investigated students’ online learning readiness and related factors with a questionnaire administrated online. We decided to choose this design as it is recommended as the most
resource-efficient method to reach a largest sample of population of interest (Cohen et al., 2013). Moreover, an online survey seemed to be the most feasible data collection method under the lockdown circumstances of this study.

**Context and participants**

Participants of the current study were students who were enrolled in fully online courses offered by a public university in the north of Vietnam. Since the mandatory shutdown nationwide in March 2020, this institution shifted all ongoing courses online. Available free online-learning tools like Google classroom, Zoom, and a newly invested learning management system under pilot were used to deliver the course content. Subjects delivered online included both general courses in Vietnamese (e.g., Philosophy, Ho Chi Minh Ideologies, or Socio-linguistics) and specialised subjects in foreign languages (e.g., English Oral Proficiency, Chinese Written Proficiency, or Korean Translation). All courses were delivered in both synchronous and asynchronous format. Students downloaded materials, uploaded homework or assignments, and posted discussion questions on Google classrooms. Weekly synchronous seminars, tutorials, lectures were performed via Zoom.

We collected our data over two months, from September to October 2020 when online learning had been mandated for nearly a semester. With the permission from the institution, an anonymous online survey was distributed to all 2500 students who were taking online courses.

**Instruments**

The survey consisted of four main sections with 28 survey items. The first section (4 items) elicited learners’ demographic information including gender, academic year of study, majors, and prior online learning experiences. The second section initially comprised four constructs adapted from OLR model proposed by Hung et al. (2010) including computer/Internet self-efficacy (3 items), online communication self-efficacy (3 items), self-directed learning (6 items), and motivation (4 items). The next section included 4 items reflecting students’ intention to use online learning. Four items in the last section were related to facilitating conditions, centering around technical conditions, infrastructure, and institutional support. The items for each section were presented in Appendix 1. A five-Likert scale ranging from 1 (totally disagree) to 5 (totally agree) with 3 (neutral) as the cut-off point was applied for all the measures.

The survey was piloted with a group of 10 volunteer students. They were asked to complete the survey and simultaneously answer cognitive standard questions and usability standard questions (Groves et al., 2009). Their feedback helped to enhance the validity of the instrument as well as to ensure the ease of use of the online survey. They were also asked to measure the amount of time they used to complete the survey. Cronbach’s alpha (α) indices were computed to assess the reliability of the scales which are detailed in the preceding section.

**Data analysis**

Among the population of 2500 students, a sample of 1495 responses returned. The responses were coded and analysed with Statistical Package for the Social Sciences (SPSS®) version 27. After removing missing values and outliers, the final sample size was 1304 respondents whose demographic information are presented in Table 1.

We employed four analytical techniques to address the four research questions. Regarding the first question, exploratory factor analysis (EFA) was conducted to explore the underlying structure of students’ online learning readiness. It should be noted that we had examined the
data to ensure that the three key assumptions of normality, linearity and multicollinearity were met. Conducting EFA, we decided to employ the principle axis factoring extraction methods with promax rotation, which seem to outperform the other EFA methods (e.g. maximum likelihood; De Winter and Dodou, 2012) and has been more fully described elsewhere (Costello and Osborne, 2005; Hoang and Wyatt, 2021). Accordingly, we repeatedly conducted EFAs with the entire OLR items, removing either the items that cross-loaded on more than one factor with discrepancies less than 0.20 or those with the highest loadings under |0.30|. This iterative procedure left 14 OLR items remaining for the final EFA model which revealed the significant emergence of three factors (see Table 2).

We determined the reliability of those emergent factors as well as that of other investigated constructs (i.e. facilitating conditions and intention to use online learning) by computing their Cronbach alpha. The α values of the OLR factors (see Table 3) suggest that the three OLR factors all reached good levels of internal consistency (Tabachnick and Fidell, 2013).

In order to answer the second question, we calculated the levels of three online learning readiness dimensions by computing the mean scores of the items within the factors that were emergent after exploratory factor analyses (see Table 3). We then compared the mean differences by conducting one way repeated-measured ANOVA. Of note, the three key criteria of normality, homogeneity of variance, and sphericity were met before the ANOVA was calculated.

We conducted standard multiple regression analyses to address the third and four research questions. Before conducting those analyses, we had checked to ensure that the relevant assumptions (i.e. normality, outliers, multicollinearity, and normality, linearity and homoscedasticity of residuals) were all met. In the regression models addressing the third research question, three online learning readiness dimensions (i.e., SDL, SE, MOT) was put in as the outcomes, and students’ different demographic characteristics and their perceived facilitating conditions were set as the predictors. The demographic characteristics included gender, academic year of study, and online learning experience. Addressing the last research question, we conducted a standard multiple regression analysis in which intention to use was the dependent variable and the three OLR dimensions were set as the independent variables.
Findings

Demographic information. The frequency and percentage of demographic factors of the participants were calculated and presented in Table 1. Female students outnumbered the male peers with 94% (n = 1224). Most of them came from the first three academic years (first years: 39%; second year: 34.5%; third year: 30.7%) as students in their final years were more involved with internship components rather than taking courses. The majority of them were enrolled in English (38.3%) and Chinese programs (37.7%). More than half of the participants had less than one year of prior online learning experience (55%). Around a-third of them reported no prior experience of online learning, which could be explained by their new enrolment into the institution (i.e., first-year students) right before the time of data collection.

What are the underlying dimensions of online learning readiness?. In the final EFA, Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) value was 0.910, and the chi-square value of Barlett’s Test of Sphericity was $\chi^2 = 7535.73$ (df = 91, $p = 0.000$). The values of these measures indicated a high level of appropriateness for a factor analysis (Tabachnick and Fidell, 2013). Table 2 details our EFA results which suggested a clear three factors cumulatively explaining 60.96% of the variances. This solution was confirmed by Scree plot (Appendix 2). The factors were labelled in accordance with the items loading on them.

Factor 1 consisted of one item (i.e., m3) reflecting students’ openness to online learning, and three items reflecting the usefulness (i.e., m2 and m4) and the enjoyment (i.e., m1) that participants perceived from online learning. Therefore, this factor was named online learning motivation (MOT).

Factor 2 was labelled online self-directed learning (SDL) as it included six items, all of which are related to students’ beliefs on their ability to self-direct their learning. Factor 3 was formed by four items revolves around students’ computer/Internet self-efficacy (cis2, cis3, and cis1) and online communication self-efficacy (ocs1); thus, the factor was labelled online learning self-efficacy (SE).

To what extent are Vietnamese students ready for online learning?. The descriptive results are presented in Table 3. The results of ANOVA indicated a significant main effect for Factor; $F(2, 2606) = 206.86, p < 0.001$, partial $\eta^2 = 0.14$. The analyses of Bonferroni multiple comparisons revealed that the SDL mean score ($M = 3.62, SD = 0.54$) was significantly higher than those of SE ($M = 3.52, SD = 0.71$) and MOT ($M = 3.23, SD = 0.88$), both at $p < 0.001$; and that SE mean score was significantly higher than MOT mean score ($p < 0.001$). These results suggested that the research participants had the highest readiness in terms of self-directed online learning strategies, followed by online learning self-efficacy. They reported the lowest level of readiness in terms of online learning motivation.

To what extent are students’ demographic characteristics and perceived facilitating conditions related to their online learning readiness?. The results of the regression analysis (Table 4) showed that the four dependent variables together accounted for approximately 33% of the variance in online learning motivation ($R_{adj}^2 = 0.33, F(4, 1299) = 164.98, p < 0.001$). A further scrutiny revealed that facilitating conditions ($\beta = 0.56, p < 0.001$), online learning experience ($\beta = 0.07, p < 0.01$) and academic year ($\beta = 0.07, p < 0.01$) were positive and significant predictors of online learning motivation. Gender ($\beta = 0.00, p = 0.901$), however, did not significantly predict online learning motivation.

With regard to online learning self-efficacy beliefs, the combination of the four dependent variables significantly predicted 34% of the variance of the independent variable ($R_{adj}^2 = 0.34, F(4,$
Table 2. Pattern matrix, for principal axis analysis with promax rotation of online learning readiness items in the final model.

| Items | Factor 1 (MOT) | Factor 2 (SE) | Factor 3 (SDL) | h² |
|-------|----------------|---------------|----------------|----|
| m1. I enjoy online learning in general. | 0.828 | 0.017 | -0.013 | 0.686 |
| m2. Online learning is convenient. | 0.820 | -0.097 | 0.049 | 0.651 |
| m4. In general, online learning is useful for my foreign language learning. | 0.785 | 0.012 | -0.016 | 0.609 |
| m3. I am open to new online learning methods and online features. | 0.764 | 0.048 | -0.005 | 0.616 |
| sdl2. I set my learning goals. | -0.056 | 0.845 | -0.108 | 0.585 |
| sdl1. I carry out my own learning plan. | -0.038 | 0.785 | -0.033 | 0.560 |
| sdl6. I adjust my learning methods to be suitable with online learning. | 0.133 | 0.546 | 0.073 | 0.453 |
| sdl5. I seek assistance when facing learning problems. | -0.005 | 0.529 | 0.143 | 0.384 |
| sdl3. I have high expectations for my learning performance. | -0.044 | 0.472 | 0.036 | 0.222 |
| sdl4. I manage time well. | 0.144 | 0.431 | 0.081 | 0.330 |
| cis2. I feel confident in using functions in online learning platforms. | -0.071 | -0.016 | 0.824 | 0.593 |
| cis3. I feel confident in using the Internet to find and gather information for online learning. | -0.002 | 0.040 | 0.671 | 0.481 |
| ocs1. I feel confident in using online tools to effectively communicate with others. | 0.076 | 0.027 | 0.654 | 0.520 |
| cis1. I feel confident in my knowledge and skills of using basic applications needed for online learning | 0.073 | -0.007 | 0.643 | 0.475 |

Eigenvalue | 5.71 | 1.68 | 1.15 | — |
Percentage of variance accounted for by factor | 40.75 | 12.03 | 8.19 | — |
Average communality | — | — | 0.512 | — |

Note. N = 1034. Major factor loadings for each item (coefficients above 0.30) are bolded. MOT = Online learning motivation, SE = Online learning self-efficacy beliefs, SDL = Online self-directed learning.

Table 3. Descriptive results of online learning constructs.

| Variables | M | SD | α |
|-----------|---|----|---|
| Online learning motivation (MOT) | 3.23 | 0.88 | 0.87 |
| Online learning self-efficacy beliefs (SE) | 3.52 | 0.71 | 0.81 |
| Online self-directed learning (SDL) | 3.62 | 0.54 | 0.80 |
| Facilitating conditions (FC) | 3.30 | 0.68 | 0.67 |
| Intention to use online learning (IU) | 3.20 | 0.86 | 0.83 |

Note. N = 1034.

1299) = 164.82, p < 0.001). Facilitating conditions (β = 0.55, p < 0.001), online learning experience (β = 0.09, p < 0.001) and academic year (β = 0.06, p < 0.01) statistically and positively predicted online learning self-efficacy beliefs. Nevertheless, gender (β = -0.03, p = 0.21) were not a significant predictor of online learning self-efficacy beliefs.
In terms of online self-directed learning, the model of the four independent variables significantly explained 22% of the total variance in the independent variable ($R_{adj}^2 = 0.22$, $F(4, 1299) = 91.00$, $p < 0.001$). In this regression model, facilitating conditions ($\beta = 0.46$, $p < 0.001$), online learning experience ($\beta = 0.06$, $p < 0.05$) significantly and positively predicted the level of online self-directed learning. However, gender ($\beta = 0.01$, $p = 0.730$) and academic year ($\beta = 0.02$, $p = 0.414$) were not significant predictors of online self-directed learning.

Taken together, these results indicated that the three dimensions of online learning readiness were better predicted by students’ perceived facilitating conditions and their online learning experience than their academic year and gender.

To what extent is students’ online learning readiness …use online learning? The regression results (Table 5) showed that the combination of the three OLR constructs significantly predicted intention to use, accounting for 60% of the variance ($R_{adj}^2 = 0.60$, $F(3, 1300) = 647.49$, $p < 0.001$). While all the OLR dimensions were significant and positive predictors of IU, online learning motivation ($\beta = 0.68$, $p < 0.001$) seemed to have stronger predictive power than those of online learning self-efficacy beliefs ($\beta = 0.09$, $p < 0.001$) and online learning self-directedness ($\beta = 0.07$, $p < 0.01$).

### Discussion

With one of the aims as to explore the structure dimensions of Vietnamese students’ online learning readiness, the study findings revealed that there were only three OLR dimensions emergent among

---

**Table 4. Results of regression analyses for online learning readiness constructs as independent variables.**

| Variable                        | Equation | Coefficients | 95% C.I. | | | |
|---------------------------------|----------|--------------|---------|---|---|---|
| **Online learning motivation**  | $R_{adj}^2$ | $F$ | $\beta$ | $pr$ | $sr$ | Lower | Upper | $t$ | Sig. |
| Gender                          | 0.00     | 0.00         | 0.00    | -0.17 | 0.15 | -0.12 | 0.901 | | |
| Academic year                   | 0.07     | 0.08         | 0.06    | 0.02  | 0.10 | 2.87** | 0.004 | | |
| Online learning experience      | 0.07     | 0.09         | 0.07    | 0.03  | 0.14 | 3.17** | 0.002 | | |
| Facilitating conditions         | 0.56     | 0.56         | 0.55    | 0.67  | 0.78 | 24.54*** | 0.000 | | |
| **Online learning self-efficacy beliefs (SE)** | $R_{adj}^2$ | $F$ | $\beta$ | $pr$ | $sr$ | Lower | Upper | $t$ | Sig. |
| Gender                          | -0.03    | -0.03        | -0.03   | -0.22 | 0.05 | -1.26 | 0.208 | | |
| Academic year                   | 0.06     | 0.08         | 0.06    | 0.01  | 0.08 | 2.79** | 0.005 | | |
| Online learning experience      | 0.09     | 0.11         | 0.09    | 0.05  | 0.14 | 4.10*** | 0.000 | | |
| Facilitating conditions         | 0.55     | 0.56         | 0.55    | 0.53  | 0.63 | 24.30*** | 0.000 | | |
| **Online self-directed learning (SDL)** | $R_{adj}^2$ | $F$ | $\beta$ | $pr$ | $sr$ | Lower | Upper | $t$ | Sig. |
| Gender                          | -0.01    | -0.01        | -0.01   | -0.13 | 0.09 | -0.35 | 0.730 | | |
| Academic year                   | 0.02     | 0.02         | 0.02    | -0.02 | 0.04 | 0.82  | 0.414 | | |
| Online learning experience      | 0.05     | 0.06         | 0.05    | 0.00  | 0.07 | 2.08*  | 0.038 | | |
| Facilitating conditions         | 0.46     | 0.46         | 0.45    | 0.32  | 0.40 | 18.4*** | 0.000 | | |

Note. $N = 1034$. $R_{adj}^2 = \text{Adjusted R Square}; * p < 0.05, ** p < 0.01, ***p < 0.001$. C.I. = Confidence interval.
our participants, including motivation, self-efficacy beliefs and self-directed learning. While this result was different from previous research on learner’s online learning readiness with more than three OLR dimensions (Hung et al., 2010), it can be explained by the exploratory approach we employed and the characteristic of our participants. The current study employed exploratory factor analysis (EFA) while previous studies (Hung et al., 2010; Yilmaz, 2017) mainly used confirmatory factor analysis. The advantage of EFA was that it allowed our research to be open to possible online learning readiness dimensions emergent in a fresh context, rather than limited to ‘predetermined’ constructs as in confirmatory factor analysis (Tabachnick and Fidell, 2013). As our expectation, the items assessing students’ beliefs regarding on their ability to communicate online, their competence to use Internet/computer collapsed into a single factor which was named online learning self-efficacy beliefs. Indeed, our results of three OLR dimensions seemed to paint a less muddy picture of various OLR facets as reported in previous studies (Christensen and Knezek, 2017; Hung et al., 2010; Rafiee and Abbasian-Naghneh, 2019). This may be explained by the fact that the students in this study just underwent online learning for a short period of time; therefore, they had not differentiated their self-efficacy beliefs regarding this learning channel. This result highlighted the need for an exploratory approach of factor analyses in the contexts where online learning is new experience to students.

The second purpose this study was to investigate the extent to which students were ready for online learning. In this study, the mean scores of three OLR dimensions were around the theoretical means of 3.00, which indicated that the Vietnamese university students in the study were only slightly ready for online learning. Given the OLR scales with the same 5-point intervals, our participants seemed to be less ready for online learning than those in the study by Hung et al. (2010) who found that their Taiwanese students reported OLR mean levels ranging from 3.60 to 4.37. This finding, however, was unsurprising as the Vietnamese participants in our study had limited exposure to online learning (Pham and Ho, 2020; Vo, 2020). Of note, descriptive results revealed that 90% of the participants had less than one year of online learning experience. The lack of online learning experience may explain why the participants reported low levels of online learning readiness.

Table 5. Results of regression analyses for intention to use online learning as the independent variable.

| Variable                           | $R_{adj}^2$ | $F$      | $\beta$ | $r$ | $r_s$ | $t$   | $\text{Upper}$ | $\text{Lower}$ | $\text{Sig.}$ |
|-----------------------------------|------------|----------|---------|-----|------|-------|---------------|---------------|---------------|
| Intention to use online learning (IU) | 0.60       | 647.49***| 0.68    | 0.65| 0.55 | 0.63  | 0.71          | 31.13***      | 0.000         |
| Online learning motivation (MOT)   | 0.09       | 4.06***  | 0.09    | 0.11| 0.07 | 0.07  | 0.20          | 3.24**        | 0.001         |
| Online self-directed learning (SDL)| 0.07       |          | 0.07    | 0.09| 0.06 | 0.04  | 0.14          |               |               |

Note. $N = 1034$. $R_{adj}^2 = \text{Adjusted R Square}; ** p < 0.001, *** p < 0.001$. C.I. = Confidence interval.
among this research context, given the most important role of online learning motivation in predicting participants’ intention to study online, as discussed with regards to the fourth research question.

The third purpose of this study was to explore the influence of different factors on online learning readiness. Unlike other previous studies which found the significant effects of participants’ gender on OLR or adoption of technologies in online learning (Firat and Bozkurt, 2020; Lim, 2004; Wang et al., 2009) or years of study (i.e., academic year) on online learning behaviours (Lee, 2020b), this study shows that there were negligible effects of those factors on students’ online learning readiness. Our results revealed that participants’ perceptions of facilitating conditions seemed to be the strongest predictor of their OLR. One possible reason can be that most students were aware of their institution’s policies and technological preparation to resort to online learning in continual lockdown time. They were aware that taking online courses was a requirement for all ongoing subjects and they were prepared for this. This finding related to effects of facilitating conditions on OLR was in accordance with the results of previous studies (Hannon and D’Netto, 2007; Lai et al., 2016) which emphasized on the need of further support from the institution to enhance students’ readiness for online learning.

The other learner factor – online learning experience was found to significantly affect OLR. This finding seems to be understandable as the more students were experienced with online learning, the more they became self-efficient and confident in using the technology to learn. This finding is aligned with a study by Hannon and D’Netto (2007) who reported the impact of students’ familiarity with computer technology on their satisfaction levels in online learning. Similar to this finding, the literature suggests that gaining more experience in online learning and digital literacy training can develop an understanding of the online learning setting and enhance online learning skills as well as academic performance (Firat and Bozkurt, 2020; Smith, 2005; Vonderwell and Savery, 2004; Xiao and Sun, 2021).

While both facilitating conditions and online learning experience were significant predictors of OLR, the former exceeded the latter as revealed in the current study. This finding aligns with several previous studies which point to the need of support in facilitating conditions to promote online learning willingness, self-directed use of technology as well enhance learning performances (Hannon and D’Netto, 2007; Lai et al., 2016; Maheshwari, 2021). This finding is important in informing administrators to prepare and improve the facilitating conditions for online learning. As reported in various studies, institutional support was considered as one of the important factors for online learning readiness and learning outcomes (Almpanis, 2015; Lai et al., 2016; Philipsen et al., 2022).

The final purpose of this study was to investigate the link between students’ online learning readiness and their intention to use online learning. Among the three OLR dimensions, the study finding showed that students’ motivation was deemed the strongest predictor of their intention to use online learning. This result suggests that those who find online learning useful and enjoyable are more likely to continue to use this channel of learning. The finding is consistent with the literature and those of many previous studies (Lee, 2020b; Luan and Teo, 2009; Tarhini et al., 2017) which found motivation among the significant determinants of intention to study online. A recent study with Vietnamese university students also concluded that students’ attitude toward learning with technology was the most important factor to predict their intention of use (Vo, 2020). This finding of the current study helps to fill the gap left open by previous studies (e.g. Rafiee and Abbasian-Naghneh, 2019) which have not confirmed the relationship between technology readiness and the behavioral intention in a similar higher education context with undergraduate language learners. On a more practical level, the finding highlights the need to enhance the usefulness and enjoyment that students perceive from online learning.
Conclusion and suggestions for future research

This study aimed to extend an existing theoretical framework of OLR and simultaneously investigate university students’ OLR and their intention to use online learning in a setting where research evidence in online learning is limited. The study findings offer a number of significant contributions and implications. Theoretically, the current study specifically focuses on re-examining OLR constructs and investigating the relationship between learners’ characteristics and OLR as well as OLR and students’ intention to use online learning. The study suggested that our Vietnamese students’ online learning readiness was shaped by three dimensions of motivation, self-efficacy and self-directed learning. It also revealed that Vietnamese students were slightly ready for online learning; and that their perceived facilitating conditions and online learning experience were two determinant factors affecting their level of readiness. Moreover, the study demonstrated that, among the OLR constructs, students’ online learning motivation was deemed to exert the strongest influence on their intention to use online learning. Pedagogically, instructional designers should also consider factors or elements that improve the usefulness and enjoyment that students perceive from online learning so that students’ intention to use this learning channel can be enhanced. The findings related to facilitating conditions as the most important OLR predictor may inform policy makers and institution administrators to consider investment strategies to create more supporting conditions for learners. The finding associated with online learning experience may be significant for administrators to provide further training for inexperienced online learners.

This study had a few limitations that need to be acknowledged. First, while the study explored the effect of students’ online learning readiness on their intention to study online, it is hard to determine to what extent students’ intention would reflect their actual online learning behaviour. Future research is recommended to employ alternative methods (e.g., observation) to tackle this limitation. Another limitation of the study was linked to the fact that our research participants were language students. They all took more than one online unit during the lockdown periods, some of which were delivered in a foreign language, others in their mother tongue. This study did not focus on investigating the differences in the effect of the delivery language on students’ online learning perceptions and behaviours. Future study which involves language learners may consider including this potentially significant factor. The third limitation of the current study pertains to its reliance on self-reported survey. While this instrument seems to be the most common tool of data collection to access a large number of participants, unique stories from individual perspectives were not explored. It is suggested that future research integrate qualitative instruments (e.g., semi-structured interviews) to have in-depth examination of online learning constructs from end users’ perspectives.

Acknowledgements

We would like to thank the participants who contributed to the findings of the study. We would also like to thank our colleagues of the selected institution for distributing the survey to students of all online courses.

Author contributions

All authors conceptualized and wrote the article. Diem Hoang collected data and Thinh Hoang analysed the data. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by EdTech_BAV research group, Banking Academy of Vietnam (Grant ID: NCM.04/2021).

Data availability

The dataset is available from the authors upon reasonable request.

ORCID iD

Thinh Hoang https://orcid.org/0000-0003-2421-2932

References

Al-Emran M, Mezhuyev V, Kamaludin A, et al. (2018) Technology acceptance model in m-learning context: A systematic review. Computers & Education 125: 389–412.

Almpanis T (2015) Staff development and institutional support for technology enhanced learning in UK universities. Electronic Journal of E-Learning 13(5): 366–375.

Bandura A and McClelland DC (1977) Social Learning Theory. Englewood cliffs: Prentice Hall.

Bernard RM, Brauer A, Abrami PC, et al. (2004) The development of a questionnaire for predicting online learning achievement. Distance Education 25(1): 31–47.

Blankenship R and Atkinson JK (2010) Undergraduate student online learning readiness. International Journal of Education Research 5(2): 44–54.

Christensen R and Knezek G (2017) Validating a mobile learning readiness survey: Assessing teachers’ dispositions toward adoption. Journal of Digital Learning in Teacher Education 33(4): 148–159.

Cohen L, Manion L and Morrison K (2013) Research Methods in Education. London: Routledge.

Costello AB and Osborne J (2005) Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research & Evaluation 10(7): 1–9.

Cowan P (2013) The 4I model for scaffolding the professional development of experienced teachers in the use of virtual learning environments for classroom teaching. Contemporary Issues in Technology and Teacher Education 13(1): 82–98.

Crompton H, Burke D, Jordan K, et al. (2021) Learning with technology during emergencies: A systematic review of K-12 education. British Journal of Educational Technology 52: 13114.

Darab B and Montazer GA (2011) An eclectic model for assessing e-learning readiness in the Iranian universities. Computers & Education 56(3): 900–910.

Davis FD (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly 13(3): 319–340.

de Winter JCF and Dodou D (2012) Factor recovery by principal axis factoring and maximum likelihood factor analysis as a function of factor pattern and sample size. Journal of Applied Statistics 39(4): 695–710.

Dinh LP and Nguyen TT (2020) Pandemic, social distancing, and social work education: students’ satisfaction with online education in Vietnam. Social Work Education 39(8): 1074–1083.

Firat M and Bozkurt A (2020) Variables affecting online learning readiness in an open and distance learning university. Educational Media International 57(2): 112–127.

Garrison DR (1997) Self-directed learning: Toward a comprehensive model. Adult Education Quarterly 48(1): 18–33.

Groves RM, Fowler FJ, Couper M, et al. (2009) Survey Methodology. Hoboken, NJ: Wiley.
Hannon J and D’Netto B (2007) Cultural diversity online: Student engagement with learning technologies. *International Journal of Educational Management* 21(5): 418–432.

Hoang T and Wyatt M (2021) Exploring the self-efficacy beliefs of Vietnamese pre-service teachers of English as a foreign language. *System* 96(2021): 1–14.

Huang F, Teo T and Zhou M (2020) Chinese students’ intentions to use the Internet-based technology for learning. *Educational Technology Research and Development* 68(1): 575–591.

Hung M-L, Chou C, Chen C-H, et al. (2010) Learner readiness for online learning: Scale development and student perceptions. *Computers & Education* 55(3): 1080–1090.

Kerr MS, Rynearson K, Kerr MC, et al. (2006) Student characteristics for online learning success. *The Internet and Higher Education* 9(2): 91–105.

Lai C, Shum M and Tian Y (2016) Enhancing learners’ self-directed use of technology for language learning: the effectiveness of an online training platform. *Computer Assisted Language Learning* 29(1): 40–60.

Lai C, Wang Q and Lei J (2012) What factors predict undergraduate students’ use of technology for learning? A case from Hong Kong. *Computers & Education* 59(2): 569–579.

Lee C (2020a) Challenges for Education Sector While Coping with COVID-19. Vietnam: Vietnamtimes. Available at: https://vietnamtimes.org.vn/challenges-for-education-sector-while-coping-with-covid-19-19748.html

Lee C (2020b) Intention to use versus actual adoption of technology by university English language learners: what perceptions and factors matter? *Computer Assisted Language Learning* 1: 29. DOI: 10.1080/09588221.2020.1857410.

Lim DH (2004) Cross cultural differences in online learning motivation. *Educational Media International* 41(2): 163–175.

Lin C-H, Zhang Y and Zheng B (2017) The roles of learning strategies and motivation in online language learning: A structural equation modeling analysis. *Computers & Education* 113: 75–85.

Lin H-H, Lin S, Yeh C-H, et al. (2016) Measuring mobile learning readiness: scale development and validation. *Internet Research* 26(1): 265–287.

Linh T (2020) Minister of Education and Training Phung Xuan Nha requests UNICEF’s support in distance learning. New York, NY: UNICEF. Available at: https://www.unicef.org/vietnam/stories/minister-education-and-training-phung-xuan-nha-requests-unicefs-support-distance-learning

Luan WS and Teo T (2009) Investigating the technology acceptance among student teachers in Malaysia: An application of the technology acceptance model (TAM). *Asia-Pacific Education Researcher* 18(2): 261–272.

Maheshwari G (2021) Factors Affecting Students’ Intentions to Undertake Online Learning: An Empirical Study in Vietnam. *Education and Information Technologye* 26: 6629–6649. DOI: 10.1007/s10639-021-10465-8

Marek K (2009) Learning to teach online: Creating a culture of support for faculty. *Journal of Education for Library and Information Science* 50(4): 275–292.

McVay M (2000) Developing a web-based distance student orientation to enhance student success in an online bachelor’s degree completion program. In: *Unpublished practicum report presented to the Ed. D. Program*. FL: Nova Southeastern University.

Means B, Bakia M and Murphy R (2014) *Learning Online: What Research Tells Us about whether, when and How*. New York: Routledge.

Ngampornchai A and Adams J (2016) Students’ acceptance and readiness for E-learning in Northeastern Thailand. *International Journal of Educational Technology in Higher Education* 13(1): 34.

Nguyen H and Pham T (2020) Is COVID-19 an Opportunity to Strengthen Online Teaching? Cambridge, GB: University Worldnews. Available at: https://www.universityworldnews.com/post.php?story=20200512154252178

Parasuraman A (2000) Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research* 2(4): 307–320.
Parnell JA and Carraher S (2003) The Management Education by Internet Readiness (Mebir) Scale: Developing a scale to assess personal readiness for Internet-mediated management education. *Journal of Management Education* 27(4): 431–446.

Pham H-H and Ho T-T-H (2020) Toward a ‘new normal’ with e-learning in Vietnamese higher education during the post COVID-19 pandemic. *Higher Education Research & Development* 39(7): 1327–1331.

Philipsen B, Tondeur J, Scherer R, et al. (2022) Measuring institutional support for online and blended learning professional development: validating an instrument that examines teachers’ perceptions. *International Journal of Research & Method in Education* 45(2): 164–179.

Rafiee M and Abbasian-Naghneh S (2019) E-learning: development of a model to assess the acceptance and readiness of technology among language learners. *Computer Assisted Language Learning* 34: 730–750. DOI: 10.1080/09588221.2019.1640255

Selwyn N (2020) *Online Learning: Rethinking Teachers’ ‘digital Competence’ in Light of COVID-19*. Melbourne, Australia: Monash University Clayton Campus. Available at: https://lens.monash.edu/@education/2020/04/30/1380217/online-learning-rethinking-teachers-digital-competence-in-light-of-covid-19

Smith PJ (2005) Learning preferences and readiness for online learning. *Educational Psychology* 25(1): 3–12.

Smith PJ, Murphy KL, Mahoney SE, et al. (2003) Towards identifying factors underlying readiness for online learning: An exploratory study. *Distance Education* 24(1): 57–67.

Tabachnick BG and Fidell LS (2013) *Using Multivariate Statistics*. MA: Pearson Boston.

Tanini H, Hone K, Liu X, et al. (2017) Examining the moderating effect of individual-level cultural values on users’ acceptance of E-learning in developing countries: a structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments* 25(3): 306–328.

Vietnam News (2020) *E-Learning Methods See Boom during COVID-19 Pandemic*. Available at: https://vietnamnews.vn/economy/715821/e-learning-methods-see-boom-during-covid-19-pandemic.html

Vo NH (2020) Understanding higher education learners’ acceptance and use of mobile devices for language learning: A Rasch-based path modeling approach. *Computers & Education* 146(2020): 1–15.

Vonderwell S and Savery J (2004) Online learning: Student role and readiness. *Turkish Online Journal of Educational Technology-TOJET* 3(3): 38–42.

Wang Y-S, Wu M-C, Wang H-Y, et al. (2009) Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology* 40(1): 92–118.

Warner D, Christie G and Choy S (1998) *Readiness of VET Clients for Flexible Delivery Including On-Line Learning*. Brisbane: Australian National Training Authority.

Watkins R, Leigh D and Triner D (2004) Assessing readiness for E-Learning. *Performance Improvement Quarterly* 17(4): 66–79.

Wei H-C and Chou C (2020) Online learning performance and satisfaction: do perceptions and readiness matter? *Distance Education* 41(1): 48–69.

Widjaja AE and Chen JV (2017) Online learners’ motivation in online learning: the effect of online-participation, social presence, and collaboration. *Learning Technologies in Education: Issues and Trends* 12: 72–93.

Xiao F and Sun L (2021) Profiles of student ICT use and their relations to background, motivational factors, and academic achievement. *Journal of Research on Technology in Education* 1: 17. DOI: 10.1080/15391523.2021.1876577.

Yates A, Starkey L, Egerton B, et al. (2021) High school students’ experience of online learning during Covid-19: The influence of technology and pedagogy. *Technology, Pedagogy and Education* 30(1): 59–73.

Yilmaz R (2017) Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. *Computers in Human Behavior* 70: 251–260.
Appendix 1

Table A1. Items of the original survey.

| 1. Computer/Internet self-efficacy |
|-----------------------------------|
| cis1 | I feel confident in my knowledge and skills of using basic applications needed for online learning (e.g., Microsoft office programs, downloading and installing software, voice recording) |
| cis2 | I feel confident in using functions in online learning platforms (e.g., navigating in Google Classrooms, uploading assignments and downloading tutorials/materials). |
| cis3 | I feel confident in using the Internet to find and gather information for online learning. |

| 2. Online communication self-efficacy |
|-------------------------------------|
| ocs1 | I feel confident in using online tools to effectively communicate with others (e.g., Skype, Zoom, email). |
| ocs2 | I feel confident in posting questions in online discussions. |
| ocs3 | I feel confident in expressing myself through text (e.g., in commenting, suggesting, responding). |

| 3. Self-directed learning |
|--------------------------|
| sdl1 | I carry out my own learning plan. |
| sdl2 | I set my learning goals. |
| sdl3 | I have high expectations for my learning performance. |
| sdl4 | I manage time well. |
| sdl5 | I seek assistance when facing learning problems. |
| sdl6 | I adjust my learning methods to be suitable with online learning. |

| 4. Motivation |
|---------------|
| m1 | I enjoy online learning in general. |
| m2 | Online learning is convenient. |
| m3 | I am open to new online learning methods and online features. |
| m4 | In general, online learning is useful for my foreign language learning. |

| 5. Intention of use |
|---------------------|
| IU1 | I am willing to continue using online learning for my language learning. |
| IU2 | I am willing to spend more after-class time on online learning. |
| IU3 | I want some subjects to be continued being delivered online. |
| IU4 | I am willing to upgrade my devices for online learning. |

| 6. Facilitating conditions |
|---------------------------|
| FC1 | I have enough necessary devices for online learning. |
| FC2 | I have strong and stable Internet connection for online learning. |
| FC3 | My school administration is supportive of online learning. |
| FC4 | My school infrastructure and Internet connection can accommodate online learning. |
Appendix 2

Figure 1. Scree plot.