



INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES



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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v12-i4/12955>

DOI:10.6007/IJARBSS/v12-i4/12955

Received: 10 February 2022, **Revised:** 13 March 2022, **Accepted:** 28 March 2022

Published Online: 07 April 2022

In-Text Citation: (Sakip et al., 2022)

To Cite this Article: Sakip, S. R. M., Mahayuddin, S. A., Nayan, N. M., Ismail, A., & Ahmad, A. C. (2022). Open and Distance Learning Ability Scale for Higher Education Students: Measurement Model Analysis. *International Journal of Academic Research in Business and Social Sciences*, 12(4), 518–532.

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Vol. 12, No. 4, 2022, Pg. 518 – 532

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Open and Distance Learning Ability Scale for Higher Education Students: Measurement Model Analysis

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Abstract

Online distance learning is becoming a standard delivery method in educational institutions since the spread of the Covid-19 pandemic in 2019. Public and private universities in Malaysia are no exception to facing various problems in online teaching and learning using the Open Distance learning (ODL) method. After nearly one and half years of performing an ODL teaching and learning method, students in public and private institutions of higher learning are beginning to show a trend of emotional decline. According to a scientific brief released by the WHO, the global prevalence of anxiety and depression increased by a massive 25% in the first year of the COVID-19 pandemic. Thus, this study is significant to identify the students' emotions along the ODL to surpass the issues. In addition, the measurement of emotional stability on the quality of online student learning ability is still growing. Therefore, the instrument to evaluate the research variables is crucial to ensure the quality of the output. Thus, this paper aims to assess the validity and reliability of the instrument for emotional stability on the quality of online student learning ability. This study applied a quantitative approach by using a random distribution of Google Forms questionnaires. The questionnaire was distributed among academicians in universities to re-distribute among their students to participate in this research. The survey involved 41 Students as respondents with various backgrounds in public universities. The data was analyzed by using SmartPLS 3 for the measurement model to achieve the aim of the research. The findings show the three variables to measure the emotional condition of online student learning ability, namely learning aids, learning environment, and lecturer, are valid and confirmed to measure student emotional stability. This study found that a latent variable emotional condition should have its items to measure the relationship between variables effectively. Thus, the restructuring of items for each latent variable will be reviewed and rearranged to ensure that the number of items measuring each construct is satisfactory in future research.

Keywords: Open Distance Learning, Higher Education, Emotional Stability, Measurement Model

Introduction

At the end of 2019, the world was shocked by the outbreak of the Covid 19 virus in Wuhan Province, China. On 5 January 2020, the World Health Organization (WHO) released the first report on the spread of the new virus. The first case of the Covid 19 outbreak outside of China was recorded in Thailand on 13 January 2020. At the end of January 2020, WHO's situation report reported 7818 confirmed cases worldwide, with the majority of confirmed cases being in China and 82 cases reported in 18 countries outside China. By 11 March 2020, WHO declared that COVID-19 could be characterized as a pandemic. Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus (WHO, 2021).

Among the factors influencing the spread of COVID-19 in the workplace are occupational and work environment factors. According to a Policy Brief produced by WHO on 19 May 2021, the outbreaks have been identified among retail workers, cleaning and domestic workers, food production workers, restaurant and hospitality workers, drivers and transportation workers, education workers, public safety workers, construction workers, agricultural workers and among individuals in social service occupations including social workers and counsellors. Meanwhile, work environments outbreaks have been identified in various work environments such as office environments, meat-processing facilities, other factories, migrant work camps, fitness centers, ships, other service-related occupations and transportation (WHO, 2021). The risks of getting COVID-19 are higher in crowded and inadequately ventilated spaces where infected people spend long periods together in closed spaces (WHO, 2022).

Pandemic COVID-19 also affected the educational sector worldwide. As reported in International Labour Organisation (ILO) Sectoral Brief, in June 2020, schools and universities have been closed in most countries around the world starting from 13 April 2020 to limit the spread of novel coronavirus disease (COVID-19). One hundred ninety-two (192) countries have mandated Nationwide closures. This situation affected nearly 1.58 billion learners (91.4 per cent of total enrolled learners), including primary and secondary school teachers, countless education support personnel, early childhood education personnel, technical and vocational training personnel and higher education teachers. This scenario prompted almost all education systems to establish distance learning solutions (ILO, 2020). As such, distance learning is becoming a standard delivery method in educational institutions since the spread of the Covid-19 pandemic. According to Simonson et al (2016), distance learning is a form of education that physically separates the teachers and students during instruction and uses various technologies to facilitate student-teacher and student-student communication. Distance learning has been implemented by higher education institutions, schools, and pre-schools.

As soon as COVID-19 cases had been recorded in Malaysia, the Malaysia Government enforced the Movement Control Order (MCO) starting on 18 March 2020 (MKN, 2020). During the MCO, the Malaysian Government has implemented restrictions on movement, assembly and international travel and the closure of the business, industry, government and educational institutions to curb the COVID-19 cases in Malaysia. Subsequently, the commencement of ODL for all educational institutions was enforced by the Ministry of Education (MOE) and Ministry of Higher Education (MOHE) starting from March 2020, as soon as the Malaysian Government announced the MCO. The MCO was extended in 2020 and 2021 with different phases and restrictions in many aspects. Since then, various issues have arisen

among educators, students and parents related to virtual teaching that involve various constraints.

Public and private universities in Malaysia are no exception to face various problems in online teaching and learning using open and distance learning (ODL) method. After nearly one and half years of performing an ODL teaching and learning method, students in public and private institutions of higher learning are beginning to show a trend of emotional decline, based on newspapers and rumours from social media. According to a scientific brief released by the WHO, the global prevalence of anxiety and depression increased by a massive 25% in the first year of the COVID-19 pandemic. Multiple stress factors caused by social isolation due to pandemics were observed in most people worldwide, with women and young people getting the worst hit (WHO, 2022). Therefore, this paper aims to investigate the higher institution student's emotional condition in performing distance learning after three semesters of experience in this situation and focusing on the measurement model analysis.

Literature Review

Learning Environment: Physical vs Online Learning

The learning environment is very important in ensuring the learning system runs smoothly. However, the 'traditional' learning system has changed to one hundred percent digitally online when the world was hit by the COVID-19 pandemic in 2019. Since then, students and educators have had to adapt to new learning methods and new 'environments'. The physical learning environment usually attached the students to their dedicated spaces, either inside or outside the school or learning institution. As highlighted by the International Bureau of Education (IBE)(2022), a physical learning environment is defined as the learner's immediate physical surroundings (classroom, school), the resources made available to support the learning process, and the social interaction or types of social relationship functioning within this context and having an influence on learning (International Bureau of Education (IBE), 2022). A good physical learning environment should take into consideration "decent, safe, and secure facilities" for conducive teaching and learning experiences (National Center on Safe Supportive Learning Environment, 2021).

On the other hand, an open distance learning environment could be conducted in "a space, virtual or physical, in that the faculty and/or student has created for learning to occur" (Kyei-Blankson, Blankson, & Ntuli, 2021). Interestingly, distance learning could be implemented via standard synchronous face-to-face video platforms (such as Google Meet, Webex and Zoom) or an asynchronous session using online learning tools (such as Google Classroom). Synchronous learning allows students and instructors to be in the same selected virtual platform at the same time, whereas asynchronous learning is more flexible as it allows the students to log on to online learning at any time. With various platforms provided for the online learning environment, the learning experience has slowly changed from the traditionally lecturer-centered approach to a more student-centered approach (Mpungose, 2020; Riggs, 2020).

Advantages of Online Learning and Open and Distance Learning (ODL)

Online learning and Open and Distance Learning (ODL) require similar online learning tools. However, online learning still involves in-person interaction and applied blended learning techniques, whereas ODL includes no in-person interactions and one hundred percent rely on digital forms of communication including school's or university's Learning Management

System (LMS) (Stauffer, 2020). ODL is a more expensive option in education, but it can be practiced from an "anywhere" and "anytime" (Armstrong-Mensah, Ramsey-White, Yankey, & Self-Brown, 2020). Despite the differences, both platforms are excellent at increasing student engagement and more flexible for students and educators. Moreover, both learning techniques provide varieties of learning opportunities for students.

Through online learning and ODL, students "requires 40-60% less time to learn than in a traditional classroom setting" and provides more opportunity to "learn at their own pace, going back and re-reading, skipping, or accelerating through concepts as they choose" (Li & Lalani, 2020). Students also positively agreed that both techniques give more time to do assignments, are more lenient with assignment submission dates, and provide interactive interaction between students and the educators (Armstrong-Mensah et al., 2020).

Student Readiness on Home-based Learning Environment during Online and Open and Distance Learning (ODL)

The transition from face-to-face to online learning and distance learning has directly and indirectly, changed the learning environment of students and is able to affect students' emotions. Even though classes are conducted online, students are still physically attached to the surrounding of the learning environment. Research conducted on online graduate students has shown that home was the primary location spent by the majority of the students on learning and research activities (Alphonse, Orellana, & Kanzki-Veloso, 2019). Unlike the school-based or campus-based facilities provided in a physical classroom, students need to find their own conducive learning environment for online learning activities. A positive learning environment could help to foster students' attitudes and motivations and is strongly related to "students' ability to learn, academic achievement, and prosocial behaviour" (National Center on Safe Supportive Learning Environment, 2021). However, there is a lack of guidance from schools or universities on how to design a home-based learning environment for maximum effectiveness (Alphonse et al., 2019; Ng, 2021).

The ensure a conducive home-based learning environment, students need to creatively find ways on creating their own learning spaces and trying to minimize distractions. Ng (2021) proposed that a home-based learning environment should include the physical aspects (such as ambient features, spatial requirements, ergonomic furniture and physical infrastructures), and social aspects (people, and rules and norms) (Ng, 2021). All elements highlighted either in physical or social aspects are crucially needed for a functional and comfortable learning environment.

Physical aspects of the learning environment, for example, ambient noise, lighting, and indoor air quality could create a comfortable learning space and better concentration for the students (National Center on Safe Supportive Learning Environment, 2021; Ng, 2021). The study by Mil et.al (2018) found that noise and light condition impacts students' focus and ability to learn (Mil et al., 2018). For air quality aspects, a study conducted by Kabirikopaei et. al (2021) reveals that indoor air quality (IAQ) is associated with the students' performance (Kabirikopaei, Lau, Nord, & Bovaird, 2021). This finding is also supported by research completed by Pulimeno et. al (2020) that highlighted poor IQA could impact both students' health and learning outcomes (Pulimeno et al., 2020).

Regarding the social aspects, interruptions by people within and outside the home and the need for privacy during online learning activities are among the crucial issues faced by the students (Alphonse et al., 2019; Botros, 2020). In addition, interruptions can increase workload, delay the task's goal and score lower in academic tests (Guijosa, 2019). Although it is impossible to eliminate all disruptions, students should learn to face them by recognizing and controlling the factors. They could conquer this issue via good time management, effective time schedule and endless self-motivation (Botros, 2020).

Besides all factors mentioned, students' emotional conditions are also crucial in helping them sustain themselves in the online learning environment. Emotional conditions are integral parts of learning experiences and could influence students' learning ability. However, emotional experiences in physical learning environments are different from those learning in online platforms. The emotional can be fluctuated depending on the learning experiences and creating positive or negative emotions. Research conducted by Stephan et. al (2019) revealed that students that attended online courses have a higher level of positive emotions than negative emotions (Stephan et al., 2019). These emotions such as enjoyment, hope, and pride associated with students' self-determination, and self-regulated learning.

Different students might face different challenges during their online and distance learning lessons. Hence, it is very important to adopt all the necessary measures to ensure optimal performance of the students and create a better learning environment (Pulimeno et al., 2020). As schools and universities are moving towards online education, the pros and cons of students' learning environment need to be thoroughly evaluated. As highlighted by Guijosa (2019) "rather than discrediting online education, to improve its effectiveness, it is necessary to address these challenges (Guijosa, 2019, para. 10).

Issues and Challenges in Open and Distance Learning (ODL)

The implementation of ODL not only affected teaching and learning activities for educators and students, but included transformations in instructional strategies, technology readiness among educators in implementing online learning, the support given by institutions, and the motivation of educators and students (Tajuddin et al., 2020). The most common problem in ODL is internet connectivity (Tajuddin et al., 2020; Junus et al., 2021; Yao et al., 2021) and internet fee (quota) (Junus et al., 2021). Other issues encountered by the lecturers while working online during MCO are unsuitable working environment, lack of or outdated computer hardware and knowledge on online teaching (Tajuddin et al., 2020). A non-conducive working environment at home also hampered lecturers' synchronous online classes.

Most of the lecturers were concerned with practical classes related to psychomotor domain of the course learning outcome. The lecturers were worried about the issue of fulfilling the learning outcomes, particularly the ones which involved the psychomotor domain (Tajuddin et al., 2020). Other related issues are course delivery and teaching strategies, evaluation of learning outcomes and process, time constraints as the longer time needed to prepare lecture materials, monitoring students' tasks and understanding, motivating students to focus and be actively involved in the learning process (Junus et al., 2021). During the ODL, there is also a lack of effective offline learning management and supervision and insufficient interaction between lecturers and students (Yao et al., 2021).

Open Distance Learning is a tough challenge to educators as they have to embrace numerous new methods or learning aids for teaching and learning that offer various online learning environments (Saidi et al., 2020). Educators must adapt using the new method of teaching using all kinds of alternative platforms such as Google Classroom, Microsoft Teams, WhatsApp and Telegram within only a few months. With appropriate features, lecturers will be better prepared and more confident when using Learning Management System for online courses (Junus et al., 2021).

Lecturers' Readiness on Open Distance Learning (ODL)

The COVID-19 pandemic has forced a shift to implement ODL in colleges and universities which require educators or lecturers to adapt this mode of teaching in a very short time even though they were not prepared. Lecturers' readiness to ODL refers to the term of the level of access to the internet, the level of application of instructional design principles in courseware development for online learning, the current level of technology used for learning, teaching and research and influence of gender on ICT skills (Fakinlede et al., 2014). Therefore, measuring readiness for online teaching is important when physical distancing is needed due to COVID-19 (Hosny, 2021). The readiness of the lecturers can be determined by their students' responsiveness, achievement or persistence in engaging ODL. However, the readiness to conduct ODL at home depends on the proper workplace, comfortable with video conferencing, internet connection and internet data plan (Tajuddin et al., 2020).

This transition affected teaching and learning activities for educators and students. (Tajuddin et al., 2020). There are clear indications of lecturers' concern on the need for them to be fully prepared for online classes. The preparation includes being technology savvy, understanding many online teaching applications and how to use them as well as managing undergraduates' learning experiences. In addition, the faculty need to be prepared in all four areas of online teaching which are course design, course communication, time management, and technical (Martin et al. 2019).

Lecturers need to adapt and adjust to the ODL method in a short period during the MCO. Therefore, their preparation and readiness may affect the efficacy of delivery. Their willingness to adapt and adjust their teaching to the demands of ODL is also important. The ODL experience will determine the educators' self-efficacy apart from adoption and practice (Scherer et al., 2021). The readiness may go beyond their self-efficacy and teaching presence and depends on the institutional, cultural, and innovation context (Scherer et al., 2021). Even experienced and self-confident lecturers in face-to-face teaching became suddenly deskilled when conducting ODL. Therefore assistance from a professional and sufficient time to prepare for ODL are necessary to assist educators to be more competent and self-confident.

Teaching online requires educators to have more competencies skills compared to traditional teaching (Lasi, 2021). Thus, readiness in terms of technical ability to conduct online learning classes becomes a major concern among lecturers. A more complex set of skills that include pedagogy knowledge is needed to ensure effective online learning. Lecturers who are prepared for online teaching basically have previous online teaching experience, have good basic skills to operate electronic devices and Learning Management Systems (LMS); already feel comfortable with the usage of LMS; have good skills in class management and design of the student learning process and capable of communicating online, both verbally and in

writing (Junus et al., 2021). Skill development is critical to promote a flexible, responsive approach and maintain technological capabilities (Roddy et al., 2017).

Methodology

This study is a pilot study on the identified variables obtained from previous research and the current COVID-19 scenario. A pilot study is a preliminary small-scale study that supports the researchers to decide before conducting a larger research project. From the pilot study, identification of variables, refinement of the research questions, estimation on time and resources required, troubleshooting unforeseen issues and determination on the best research method for the study could be attained (Crossman, 2020).

For this study, the pilot questionnaires are distributed via an online platform using Google Forms to students of one higher learning institution in Malaysia, namely Universiti Teknologi MARA. The questionnaire used a 5-point Likert scale to survey the level of agreement on the variables: 5- Strongly agree, 4-Agree, 3-Neutral, 2-Disagree, and 1- Strongly disagree. There is limited published guidance on determining sample size for a pilot study. A total of 41 questionnaires were completed and returned. According to Hertzog (2008), samples ranging from 10 to 40 per group are evaluated as adequate in providing precise estimates to meet any possible aims. Therefore, the 41 responses are considered enough for this pilot study. There are various levels of students ranging from PhD, Master, Degree, and Diploma who respond to this study.

Smart PLS for Partial Least Squares Structural Equation Modelling (PLS-SEM) is used as the tool to analyze the data obtained. PLS offers advantages such as lower sample size requirements, easier testing of moderating relationships (Shackman 2013). This measurement model analysis is preferred due to its ability to define the relationship between the four latent variables in this study, i.e. emotional condition, learning aids, learning environment and lecturers.

Data Analysis & Result

Descriptive Analysis

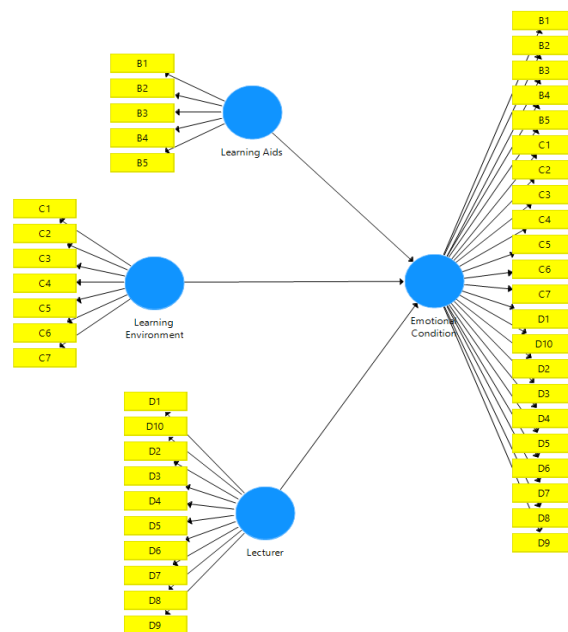
An in-depth account of the information about the respondents is provided in Table 1. All the participants shared almost similar characteristics. A total of 41 students completed the questionnaire through the google form of this survey. 26.8% were male, and 73.2% were female. Most of these respondents are in age 20's (95.1%) and 30's (4.9%). There are stay in three locations: urban area 46.3%, suburbs 51.2%, and inland 2.4%. Currently in a year 2021, there are in semester 1 (12.2%), semester 2 (17.1%), semester 3 (24.4%), semester 4 (31.7%) and semester 6 (14.6%). 2.4% respondents in PhD level education, 9.8% in Master, 48.8% in Degree level and 39% in Diploma level.

Table 1 Students' Demographic Data

Variable	Answer	Frequency	Percentage (%)
Gender	Female	30	26.8
	Male	11	73.2
Age	20's	39	95.1
	30's	2	4.9
Location area	Urban	19	46.3
	Suburbs	21	51.2
	Inland	1	2.4
Semester of study	Sem 1	5	12.2
	Sem 2	7	17.1
	Sem 3	10	24.4
	Sem 4	13	31.7
	Sem 6	6	14.6
Level of education	PhD	1	2.4
	Master	4	9.8
	Degree	20	48.8
	Diploma	16	39

Measurement Model Analysis

The software used for this study is the Smart PLS for Partial Least Squares Structural Equation Modeling (PLS-SEM). It is very famous, widely used, and readily available to academics and researchers. Moreover, this software has a user-friendly interface and advanced reporting features (Alshurideh et al., 2019). Convergent validity and discriminate validity are two classes of validities generally employed to evaluate any measurement model (Chin, 1998). The measurement model defines the relationship between the indicators and the latent construct being assessed (Ramayah et al., 2018).



The conceptual model formed based on the previous scholar as shown in Fig.1. Fig.1 shows four latent variables: Learning Aids with five observed variables, Learning Environment with seven observed variables, lecturer with nine observed variables, and Emotional Condition

with 18 observed variables. This model will be tested to identify the confirmatory factor analysis for the measurement model analysis.

Figure 1 Conceptual model of Online Distance Learning Ability

The internal consistency of all the indicators in a relationship of any construct makes it possible to measure their reliability. Therefore, to check the reliability of indicators, three measurements of a reflective measurement model, considered for the analysis; internal consistency reliability (Cronbach's Alpha and Composite Reliability - CR), convergent validity (Average Variance Extracted - AVE), and discriminant validity (Heterotrait-Monotrait ratio of correlation - HTMT). Table 2. shows the summary of indices for measurement model analysis. For internal consistency, although Cronbach's Alpha and CR are measured, the CR value considers the loadings of the indicators.

Table 2 Indices for Measurement Model Analysis with PLS-SEM

No	Assessment	Name of Index	Guidelines
1	Internal Consistency	Composite Reliability (CR)	CR > 0.90 (Not desirable) CR > 0.7-0.9 (Satisfactory) CR > 0.6 (accepted for exploratory research)
2	Indicator Reliability/ Factor Loadings	Indicator Loadings	Loading 0.708 or higher is recommended, but loadings > 0.7, 0.6, 0.5 or 0.4 is adequate if other items have high scores of loadings to complement AVE and CR
3	Convergent validity	Average Variance Extracted (AVE)	AVE > 0.50
4	Discriminant validity	Cross loading	Loadings of each indicator are the highest for the designated constructs
		Fornell & Larcker's Criterion	The square root of AVE of a construct should be larger than the correlations between the construct and other constructs in the model
		HTMT Criterion	HTMT .85 (Kline,2011) (Stringent Criterion) HTMT .90 (Gold et al., 2001) (Conservative Criterion) HTMT inference using bootstrapping technique (Henseler et al., 2015): Does 90% bootstrap confidence interval of HTMT include the value of -1<HTMT<1 (Liberal Criterion)

Source: Ramayah et al (2018)

In this study, the factor loading must be equal to or greater than 0.708. A factor loading value lower than 0.708 will eliminate because it is not a good observed variable to measure the latent variable. The AVE value must be greater than 0.5. Figure 2 shows the measurement model that has gone through reviewing the correlation between the latent and observed variables. A loading value of less than 0.708 has been dropped in this process.

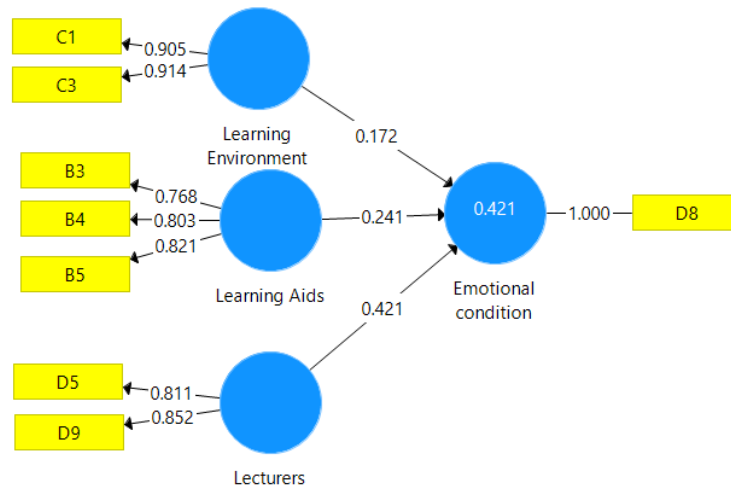


Figure 2 Measurement Model of Online Distance Learning Ability

After going through the validity discrimination process that ensures the Fornell-Larcker condition is met, the cross-loading value for each variable is in the correct group. The HTMT value is not more than 0.9 (refer to Table 2). For example, in Figure 2, the latent variable Learning Environment has only two items, Learning Aids-3 items, the latent variable Lecturer - 2 items and the latent variable Emotional condition only 1 item. This may be influenced by the number of samples in this pilot study which is 41. The number of samples affects the validity and reliability (Ramayah et al., 2018). Therefore, the item evaluation for each latent variable will be reviewed for further research, and the number of samples will be increased. However, the findings of this study show that these three latent variables are valid and reliable to measure the latent variable Emotional condition on learning by ODL.

Table 3 Convergent Validity Results Which Assure Acceptable Values

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Emotional Condition	0.830	0.887	0.663
Learning Aids	0.717	0.837	0.632
Learning Environment	0.786	0.875	0.701
Lecturer	0.702	0.831	0.623

Table 3 shows the convergent validity results for this study. The AVE value for the latent variable was more than 0.5 (0.6 - 0.7), and the composite reliability (CR) value was 0.8, which is more than 0.708. All of them surpass the minimum desirable value. In addition, the conjoint variance between the indicators and their construct is represented by the convergent validity, which is measured by the Average Variance Extracted (AVE). Moreover, the standard threshold for these values should be more than 0.50 (Fornell & Larcker, 1981). Table 4 (Fornell-Larcker Scale) provides the square roots of the AVE, indicated by bold numbers in the diagonal, and the correlation between constructs that highlight the acceptable discriminant validity of the measurements. The discriminant validity between constructs the AVE square root can be confirmed if greater than the correlation between constructs (Fornell & Larcker, 1981).

Table 4 Fornell-Larcker Scale.

	Emotional Condition	Learning Aids	Learning Environment	Lecturer
Emotional Condition	1.00			
Learning Aids	0.419	0.798		
Learning Environment	0.483	0.448	0.909	
Lecturer	0.562	0.240	0.482	0.832

The convergent and discriminant validity of the measurements was completed by analyzing the factor structure matrix of loadings and cross-loadings (Table 5-Heterotrait-Monotrait Ratio). Items measuring the matching construct imply prominently and noticeably higher factor loadings on a single construct (bold numbers) than other constructs. Once the individual reliability for every item and the convergent and discriminate validity of the constructs is recognized, the structural model is tested next. This also highlights the convergent and discriminate validity of the measurement. Regarding et al (2000), the second condition of discriminant validity is that the loading of every item must be higher than the loading of its equivalent variable. Hence, it is evident from Table 6 (Cross-loading result) that the second criterion has also been fulfilled. The third condition of discriminant validity is that the values of HTMT must be less than 0.85. It is evident from Table 5 that the third criterion has also been confirmed, resulting in the fact that the discriminant validity has been established.

Table 5 Heterotrait-Monotrait Ratio (HTMT)

	Emotional Condition	Learning Aids	Learning Environment	Lecturer
Emotional Condition				
Learning Aids	0.485			
Learning Environment	0.542	0.579		
Lecturer	0.752	0.454	0.719	

Table 6 Cross-loading results

	Emotional Condition	Learning Aids	Learning Environment	Lecturer
B3	0.378	0.768	0.500	0.098
B4	0.280	0.803	0.329	0.327
B5	0.327	0.821	0.215	0.182
C1	0.429	0.447	0.905	0.336
C3	0.449	0.371	0.914	0.536
D5	0.441	0.031	0.352	0.811
D8	1.000	0.419	0.483	0.562
D9	0.492	0.351	0.445	0.852

Findings and Conclusion

The purpose of this study is to evaluate the validity and reliability of the instrument for emotional stability on the quality of online student learning ability. The survey involved a random distribution of questionnaires conducted using google form in which 41 complete questionnaires were examined. The findings show that the three variables to measure the emotional condition of online student learning ability, namely learning aids, learning environment, and lecturer, are valid and confirmed to measure student emotional stability. However, the limitation of the sample affects the findings of the values of AVE, HTMT and cross-loading. Therefore, the sample number will increase for the following actual study to achieve a good result. In addition, the restructuring of items for each latent variable will be reviewed and rearranged to ensure that the number of items measuring each construct is satisfactory. Similarly, a latent variable emotional condition should have its items to measure the relationship between variables effectively. However, the findings from this study indicate a valid and reliable measurement method in the context of the survey conducted.

Fundings

There is no funding for this research.

Conflict of Interest

The authors declare no conflict of interest.

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