

EMERGENCY ONLINE TEACHING: EARLY CHILDHOOD EDUCATION LECTURERS' PERCEPTION OF BARRIER AND PEDAGOGICAL COMPETENCY

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Abstract: In this COVID-19 situation, online learning has been widely implemented in higher education contexts. This issue inspires the researchers to conduct further study on barriers encountered by lecturers in higher education. This study was carried out to explore how the lecturers perceive the barriers in online teaching practices and the level of pedagogical competencies perceived by the lecturers in conducting online learning in this emergency. The study employed a cross-sectional survey research design. Data were collected from 73 early childhood education lecturers from four regions in East Java, Indonesia. The questionnaires were developed to measure lecturers' perceptions of barriers in online teaching practices adopted from the TIPEC framework and measure the lecturers' pedagogical competencies. Multivariate analysis of variances was used to analyze the data. The results showed that limited bandwidth, connectivity, and security were the first significant barriers perceived by early childhood lecturers. Meanwhile, the second barriers are related to student lack of engagement and lack of feedback. Then, third barriers are computer viruses, the quality of course content, and reliability of the online assessment instrument. ANOVA results showed that there were significant differences between gender and technological factors, gender and instructional design factors, as well as educational qualification and strategy implementation of factors.

Keyword: *barriers, pedagogical competency, online teaching*

PEMBELAJARAN DARING DARURAT: PERSEPSI DOSEN PAUD TENTANG HAMBATAN DAN KOMPETENSI PEDAGOGIS

Abstrak: Dalam situasi COVID-19, pembelajaran daring telah diterapkan secara luas di konteks pendidikan tinggi. Hal tersebut telah mendorong peneliti untuk melakukan studi lebih lanjut terkait hambatan yang dihadapi oleh dosen di level pendidikan tinggi. Oleh karena itu, penelitian ini dilakukan untuk mengeksplorasi bagaimana dosen PAUD melihat hambatan dalam melaksanakan pembelajaran daring serta kompetensi pedagogis mereka selama pengajaran daring dalam situasi darurat ini. Penelitian ini menggunakan desain penelitian survei jenis *cross-sectional*. Penelitian ini melibatkan 73 dosen PAUD dari empat wilayah di Jawa Timur, Indonesia. Angket ini dikembangkan untuk melihat persepsi dosen tentang hambatan mengajar secara daring yang diadopsi dari kerangka kerja TIPEC dan kompetensi pedagogis. Analisis multivariat digunakan untuk menganalisis data. Hasil penelitian ini menunjukkan bahwa masalah jaringan dan konektivitas, serta keamanan menjadi hambatan signifikan pertama yang dirasakan oleh dosen PAUD. Sedangkan masalah hambatan lainnya berkaitan dengan keterlibatan mahasiswa dalam pembelajaran daring, kurangnya umpan balik, serta model pedagogis sebagai hambatan yang kedua. Hambatan ketiga meliputi serangan virus, kualitas konten mata kuliah, dan reliabilitas penilaian daring. Hasil ANOVA lanjutannya menunjukkan perbedaan yang signifikan antara jenis kelamin dan faktor teknologi, jenis kelamin dan desain pembelajaran, serta jenjang pendidikan dan faktor penerapan strategi.

Kata Kunci: *hambatan, kompetensi pedagogik, pembelajaran daring*

INTRODUCTION

The situation of spreading the COVID-19 pandemic has led to a shift from conventional teaching strategy, which is face-to-face, to an online teaching format. It is very likely

if technology-enabled learning has gained much attention among lecturers in higher educational institutions around the world, including Indonesia. Technology-enabled learning encourages lecturers to utilize several

learning technologies to facilitate conducive learning and teaching activities. Currently, education institutions from 175 countries are temporarily closed (WorldBank, 2020) and over 90% of the world's student populations are impacted (UNESCO, 2020). Therefore, due to this situation, the majority of lecturers in higher education institutions in Indonesia have implemented emergency online teaching since early March 2020.

Numbers of organizations, communities, and individuals have encouraged and offered supports in terms of resources in helping lecturers in higher education to design and implement online learning environment in the current time (AECT, 2020; Bates, 2020; Daniel, 2020; Snelling & Fingal, 2020). As suggested by Bennett & Lockyer (2004) and Kirkwood & Price (2016), the lecturers' ability to consider when, why, and how to use technology properly in online learning environment is the main critical factor for the successful implementation of online teaching. Several previous studies have discussed the issues and challenges in online learning environment from different countries and levels of education (e.g. Belawati & Zuhairi, 2007; Gulati, 2008; Pelgrum & Law, 2003). These studies have reported barriers perceived by lecturers during online teaching. However, little is unknown regarding the barriers to the implementation of emergency online teaching during the COVID-19 pandemic, especially in the Indonesian context.

Different stances appeared to have various ideas regarding the concept of online teaching in the COVID-19 pandemic situation. For example, some scholars proposed their concept on the difference between online teaching and remote teaching (e.g. Hodges, Moore, Lockee, Trust, & Bond, 2020; Lederman, 2020; Stauffer, 2020). Several previous studies have also made a simple way to understand the differences and similarities between these terms based on instructional media usage (e.g. Alley, 2008; Moore, Dickson-Deane, & Galyen, 2011). In this study, the researchers used the term of emergency online teaching based on the consideration that most of the Indonesian lecturers initially use face-to-face and remote teaching strategies before the era of COVID-19. Then they encountered a rapid shift to change their strategies to online teaching without sufficient preparation. Hence,

in this context, emergency online teaching was defined as the utilization of various learning technologies to deliver the content knowledge and to communicate with the students so that learning and teaching activities keep going.

Previous studies in higher education levels have discussed the barriers from the students' perceptions (Kebritchi, Lipschuetz, & Santiago, 2017; Srichanyachon, 2014; Verdonck, Greenaway, Kennedy-Behr, & Askew, 2019) as well as from lecturers' perceptions (Aldosemani, 2020; Lloyd, Byrne, & McCoy, 2012; Mercader & Gairin, 2020; O'Doherty, Dromey, Lougheed, Hannigan, Last, & McGrath, 2018) about online teaching. Among these strands of research, lecturers' perception of barriers to online teaching implementation in Indonesian context seems to be out of concern. Moreover, the literature and empirical studies concerning on barriers of integrating technology in the early childhood setting was rarely found (Nikolopoulou & Gialamas, 2015). Understanding more about the barriers that lecturers experienced during online teaching in the COVID-19 pandemic may help practitioners and policymakers understand how to support lecturers and educators in general to conduct better implementation of online teaching. Therefore, the current study aims to explore the early childhood lecturers' perception of barriers to emergency online teaching in higher education as well as investigate their pedagogical competence in the implementation of emergency online teaching.

A major line of research has revealed that many barriers exist concerning the implementation of emergency online teaching in higher education. Bozkurt *et al.* (2020), for instance, showed several current issues related to barriers of the implementation of online teaching during COVID-19 based on the investigation from 31 countries across the world are technology divide (e.g., inequality of internet and technology), physical and material limitations (e.g., number of computers and availability of sustainable internet connection), digital competence (e.g., lack of ICT skills), and insufficient pedagogical practices (e.g., creating learning resources and facilitating student-centered learning in online learning environment). In addition to that, Telles-Langdon (2020) have also demonstrated findings that that the security related to the learning activity

during online discussion and examination (e.g., cheating) perceived as a barrier during the emergency online teaching. In the different vein, the assistance related to students support, access to online resources, and guidance for learning from home were considered as the main challenges in the early weeks of the COVID-19 pandemic (Johnson, Veletsianos, & Seaman, 2020).

Another line of research have investigated lecturers' perceptions of barriers in online teaching such as Lloyd *et al.* (2012) who revealed that interpersonal, institutional, training, and technology, as well as cost/benefit, were found still become challenges for lecturers. They further demonstrated results that the lecturers in initial experience with online teaching perceived the more significant barriers than those who had many experiences in online teaching. Most recently, lecturers' perception from the varieties of academic disciplines revealed that professional barriers gained significantly higher ranks than other types of barriers such as time management, training, pedagogical approach, and experience using technology in online teaching (Mercader & Gairín, 2020).

Regarding the numerous lecturers' perceptions of the barriers in online teaching done by numbers of scholars, the current study will use four conceptual barriers highlighted by Ali, Uppal, & Gulliver (2018), namely technology, individual, pedagogical, and enabling condition (TIPEC). TIPEC framework (see Figure 1) was used to investigate the lecturers' perceptions of barriers in emergency online teaching during COVID-19. This framework not only fits the features for developing countries and has comprehensive dimension barriers, but also this framework has the most current undertaking in-depth qualitative review of the online teaching research studies dated between 1990 to 2016 (Ali *et al.*, 2018).

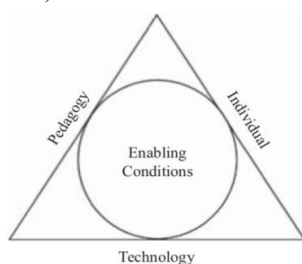


Figure 1. TIPEC Framework-structuring Technological, Individual, Pedagogical Barriers and Enabling Conditions (Ali *et al.*, 2018)

Lecturers' competencies in the face to face setting is different from the online setting. Thus, the online learning environment fundamentally changes the vital process in the instructional activity, such as interaction among lecturers, students, and content. Hence, to facilitate these interactions in an online learning environment, the new roles and competencies of lecturers are required. Several studies have highlighted the role of lecturers in online teaching. For example, the study reported that there are several roles of lecturers in online teaching such as process facilitator, advisor, assessor, researcher, content facilitator, technologist, designer, and manager/administrator (Chang, Shen, & Liu, 2014; Goodyear, Salmon, Spector, Steeples, & Tickner, 2001). These roles are still generally lacking with another role; however, the study has examined and added, such as professional, pedagogical, and social (Bawane & Spector, 2009).

To sum up, there are several roles required as competencies in order to successfully implement online teaching activities such as technical competency, didactical competency for the design materials suitable for the students, ability to create a multimedia, facilitating of the asynchronous learning process, use of innovative teaching method, the ability to mediate asynchronous communication and interaction, and the ability to create a community of learning in online teaching (Koch, 2014; Rice, 2015). These competencies were then categorized into three kinds of competencies, namely, technological, pedagogical, and communicative competency (Levinsen, 2007; Uerz, Volman, & Kral, 2018).

Due to the previous study has examined to the highest priority role and competencies in online teaching, the current study aims to investigate the lecturers' pedagogical competency in their emergency online teaching because the previous study showed that the pedagogical role gained the highest level of competency in online teaching (Bawane & Spector, 2009; Bezuidenhout, 2018). Hence, the research questions were formulated as follows: (1) What are barriers of emergency online teaching perceived by early childhood lecturers? (2) How are the early childhood lecturers' pedagogical competences during the implementation of emergency online teaching? and (3) What demographic factors are related to

early childhood perceptions of barriers and the pedagogical competency?

METHODS

Research Design

This study employed quantitative approach using a survey research design, particularly the cross-sectional survey type. As this type of survey considered one of the most commonly used in survey design, in the cross-sectional survey, the researchers collect data at one point in time to examine current attitude, opinion, or practices (Creswell & Guetterman, 2019). Hence, the cross-sectional survey design was adopted to examine the perception of barriers and pedagogical competencies experienced by a group of early childhood lecturers who have conducted the emergency online teaching.

Participants

In every type of research, it would be optimum to use the big population, however, in most cases, it is not possible to include every subject since the population is almost finite. Due to this rationale, convenience sampling

involving 73 volunteers of early childhood education lecturers from different institutions in East Java, Indonesia was used in this study. Convenience sampling is a type of nonprobability or nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Fink, 2011). Another rationale of using this type of sampling was because elements might be selected in the sample simply as they just happen to be situated, spatially or administratively.

As shown in Table 1, the total of 73 participants, the majority of them were female ($Mo = 2$) with ages between 30-39 years old ($Mo = 2$), having a working experience ranging between 1 to 5 years ($Mo = 1$), and holding master degree ($Mo = 2$). The majority of participants were familiar with google classroom ($Mo = 2$) and Moodle ($Mo = 1$) as learning management system that used during emergency online teaching.

Table 1. Demographic Information

Variable		Frequency	% of Sample	Mo
Age (years old)	20-29 (1)	12	32.9	
	30-39 (2)	29	39.7	
	40-49 (3)	14	19.2	2
	50-59 (4)	4	5.5	
	60-69 (2)	2	2.7	
Gender	Male (1)	16	21.9	
	Female (2)	57	78.1	2
Level of education	Bachelor degree (1)	1	1.4	
	Master degree (2)	59	80.8	2
	Doctoral degree (3)	13	17.8	
Work experience (years)	1-5 (1)	47	64.4	
	6-10 (2)	13	17.8	
	11-15 (3)	9	12.3	1
	16-20 (4)	4	5.5	
LMS	Moodle (1)	18	24.7	
	Google classroom (2)	25	34.2	
	Edmodo (3)	3	4.1	
	WhatsApp (4)	10	13.7	2
	Zoom meeting (5)	12	16.4	
	Schoology (6)	4	5.5	
	Microsoft teams (7)	1	1.4	

Note: Mo = Mode

Instrument

The data was collected through the online questionnaire which consisted of three sections, namely (a) demographic information, (b) lecturers' perceptions of barriers, and (c) the lecturers' general pedagogical competencies. The lecturers' perception of barriers questionnaire had four dimensions: technological, individual, pedagogical, and enabling conditions. The items of the questionnaire which aimed to explore lecturers' perception of barriers in emergency online teaching was adopted from TIPEC framework (Ali *et al.*, 2018). Cronbach's alpha coefficient was calculated to assess the internal consistency of the scale and see the reliability of the Likert scale. The value of Cronbach's alpha was .91 which implied very good internal consistency and reliability (Pallant, 2011).

Meanwhile, the questionnaire which aimed to document the lecturers' general pedagogical competencies in emergency online teaching was adopted from (Bawane & Spector, 2009). It consisted of five dimensions: instructional design strategies, develop appropriate learning resources, implement instructional strategies, facilitate participation among students, and sustain students' motivation. Cronbach's alpha coefficient was calculated to assess the internal consistency of the scale and to see the reliability of the Likert scale. The value of Cronbach's alpha was .92 which suggested very good internal consistency and reliability.

The items of the questionnaire which were originally written in English were translated into Bahasa Indonesia so that it fitted to Indonesian early childhood lecturers. To ensure the validity of the instrument in this study, the items of the questionnaires have been validated by a Professor on Curriculum and Teaching and a Master on Educational Technology. Additionally, the instrument has been tried out to four early childhood lecturers to make sure that all items were clear and self-explanatory. Feedback and comments offered by validators and the four lecturers were used to make the instrument better and well-formulated. All items for lecturers' perception of barrier and their general pedagogical competencies sections were constructed by using Likert scale, which ranges from 1 (not a barrier) to 4 (a significant

barrier) for barrier and ranges from 1 (very poor) to 4 (very good) for the general pedagogical competencies.

Data Collection

In collecting the data, the researchers sent the link of the online questionnaire through individual e-mail and WhatsApp group messages to personal acquaintances and hundreds of membership of early childhood lecturers in four different regions in East Java. The announcement included the background information regarding the main goal of the study and explained the objectives of the study briefly. The researchers also asked the prospecting respondents to fill the questionnaires voluntarily as well as guaranteed the anonymity of the participant. Once the questionnaire has been distributed to early childhood lecturers, they were given one month to fill in the questionnaire. After one month of the data collection process, 73 questionnaires were returned to the researchers to be further analyzed.

Data Analysis

The data was statistically analyzed by using SPSS 20 through the following steps; first, the data of demographic information brought to calculate for frequency; second, the data of lecturers' perceptions of barriers and the lecturers' general pedagogical competencies brought to calculate for average means and standard deviations. Multivariate analysis of variance (MANOVA) was employed to examine the differences among faculty in their responses to the survey with respect to gender, educational level, and age. Factor barriers (technological, individual, pedagogical, enabling condition) and factor pedagogical competencies (design instructional strategies, develop appropriate learning resources, implement instructional strategies, facilitating participant among students, sustain students' motivation) were used as dependent variable in MANOVA and analyzed using Statistical Package for the Social Science (SPSS) version 23. We used effect sized from MANOVA (small = .01; moderate = .06; large = .14) to document the effect size of obtained differences (Cohen, 1988).

FINDINGS AND DISCUSSION

Findings

The Description of Lecturers' Perception of Barriers in Emergency Online Teaching

The results suggested that the lecturers in early childhood education perceived all the possible barriers to emergency online teaching. Considered at least “somewhat of a barrier” ($M > 2.0$). Figure 2 shows the mean rankings per barrier. The analysis of the mean value from the online questionnaire with the Likert scale rating were able to ascertain that the highest rankings correspond to the following barriers indicators: *bandwidth issue and connectivity* ($M = 2.58, SD = .95$); *security* ($M = 2.56, SD = .81$), *engagement of students online* ($M = 2.48, SD = .91$), *lack of feedback from lecturers* ($M = 2.44, SD = .88$), *pedagogical model* ($M = 2.41, SE = .11$), *virus attacks* ($M = 2.37, SD = .99$), *quality course content* ($M = 2.34, SE = .88$), *reliability of online measuring instrument* ($M = 2.34, SD$

$= .74$), and *absences of real-time feedback* ($M = 2.32, SD = .88$). In short, these barriers are identified by lecturers as obstacles in emergency online teaching.

Interestingly, Figure 2 also shows the mean ranking is below 2 for *technology infrastructure* ($M = 1.49, SD = .64$), *technology confidence* ($M = 1.53, SD = .62$), as well as *motivation and commitment* ($M = 1.82, SD = .68$). Thus, these three barriers were identified by early childhood lecturers not as a barrier in emergency online teaching. Additionally, the barrier most highlighted by early childhood lecturers' perception reach across TIPEC framework were the technological, individual, pedagogical, and enabling conditions factors. Table 2 also shows that the barriers with the highest rankings are mainly the enabling conditions and the pedagogical factors. Moreover, these two factors are also the ones with the most subtypes of the barrier within their area.

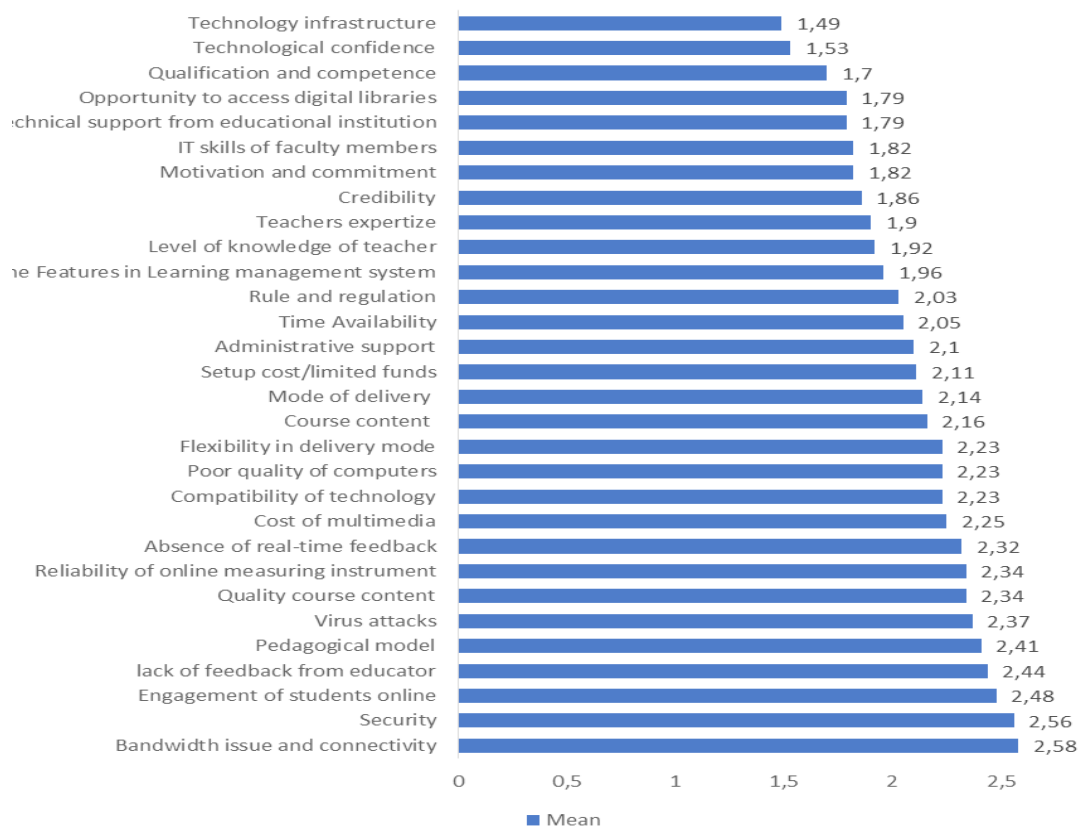


Figure 2. Mean Scores for Barrier Indicators for Emergency Online Teaching

Table 2. Mean Scores for TIPEC Framework

TIPEC Factors	Technological Factor	Individual Factor	Pedagogical Factor	Enabling Conditions Factor
Mean	2.1164	1.7774	2.1481	2.1986
N	73	73	73	73
SD	.65774	.56144	.51280	.56819

The Description of Lecturers' General Pedagogical Competencies

The results suggest that, in general, early childhood lecturers perceived good practice from all of the pedagogical competencies. Figure 3 shows the mean rankings per pedagogical competencies. The current study was able to ascertain that the highest-ranking ($M > 2.0$)

correspond with the following the pedagogical competencies: *encourage students to participate and contribute* ($M = 3.38, SD = .61$), *identify and sequence the learning content* ($M = 3.36, SD = .71$), *reinforce students' contributions* ($M = 3.36, SD = .58$), *select appropriate resources* ($M = 3.34, SD = .65$) and *initiate the learning activity* ($M = 3.34, SD = .67$).

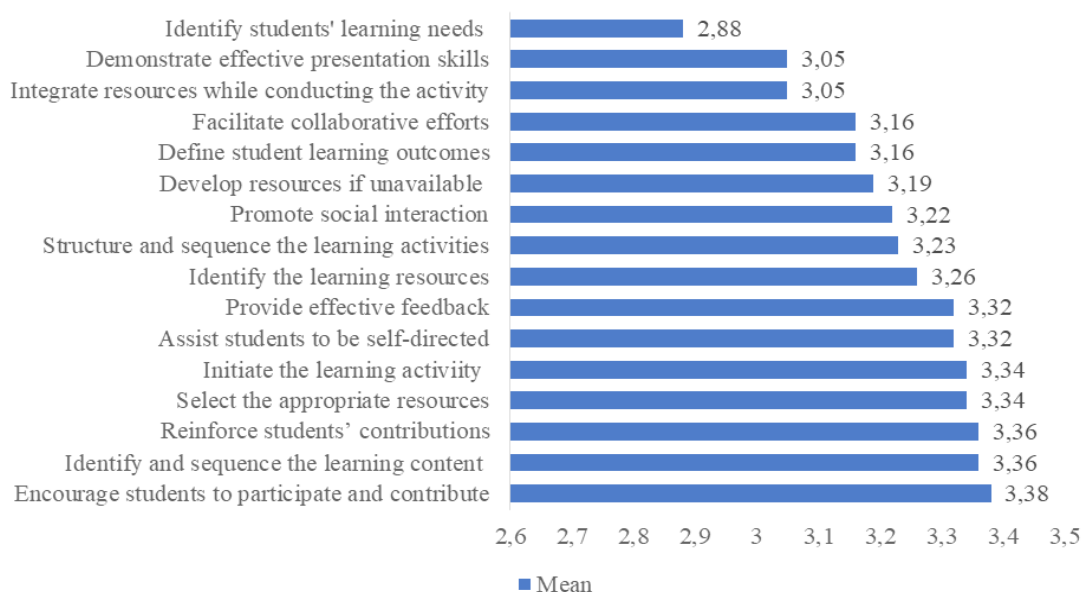


Figure 3. Mean Scores for Pedagogical Competency Indicators

Demographic Factors Related to Lecturers' Perception of Barriers and the Pedagogical Competencies

Differences in lecturers' perceptions and their pedagogical competences in emergency online teaching with respect to gender, education level, and age were examined using MANOVA. Statistically, significant results of MANOVA (using Wilks' lambda) were followed by ANOVA. Results from ANOVA showed significant differences in gender for lecturers' perceptions of barriers. Results also showed significant differences in gender and

educational level for lecturers' perceptions of the pedagogical competency. Meanwhile, no significant differences were found among other demographic factors. Table 3 shows the result.

One-way multivariate analysis of variance test showed statistically significant associations between gender and linear combination of all four factors of barriers, Wilk's lambda = .79; $F(4, 68) = 4.36, p = .003 < .05$. In details, according to the Table 3, a significant difference was found between female and male lecturers' perceptions about the technological factor $F(1, 71) = 11.88; p = .001 < .05$, partial $\eta^2 = .14$ (large effect).

Table 3. Results of Multi-Factor Variance Analysis for Gender and Sub-factor of Barriers

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
Gender	Technological factor	4.467	1	4.467	11.886	.00*	.14
	Individual factor	.878	1	.878	2.857	.09	.03
	Pedagogical factor	.003	1	.003	.010	.92	.00
	Enabling conditions factor	.637	1	.637	2.002	.16	.02

(Wilk's Lambda = .79; $F(4,68) = 4.36, p < .05$), * $p < .05$

Furthermore, Figure 4 showed that male ($M = 2.58$, $SD = .15$) perceived barriers were significantly higher than female ($M = 1.98$, $SD = .08$). Meanwhile, no significant difference was found between female and male in perceiving

barriers on the individual factor, $F(1, 71) = 2.85$, $p = .09$; pedagogical factor, $F(1, 71) = .01$, $p = .92$; and enabling condition factors, $F(1, 71) = 2.00$, $p = .16$.

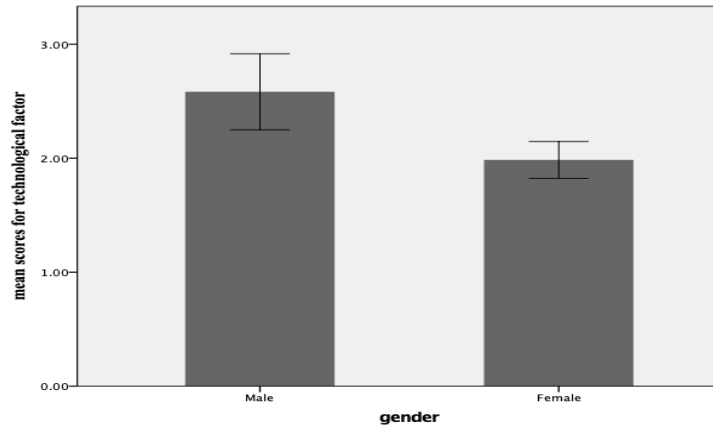


Figure 4. Boxplot for Technological Barrier Scores Perceived by Gender

Although one-way multivariate analysis of variance test showed no statistically significant associations between Gender and the linear combination of all five pedagogical competencies, Wilk's lambda = .92; $F(5, 67) = 1.17$, $p = .33 > .05$, Table 4 showed a significant difference was found between female and

male lecturers' perceptions about the ability in designing the instructional strategies, $F(1, 71) = 4.42$, $p = .039 < .05$, partial $\eta^2 = .05$ (small effect). Furthermore, Figure 5 showed that female ($M = 3.24$, $SD = .08$) perceived the ability was significantly higher than male ($M = 2.85$, $SD = .16$).

Table 4. Results of Multi-Factor Variance Analysis for Gender and Sub-Factor of Pedagogical Competency

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
Gender	Instructional design	1.822	1	1.822	4.423	.03*	.05
	Develop resources	.675	1	.675	1.829	.18	.02
	Implement strategy	1.122	1	1.122	2.963	.09	.04
	Facilitating learning	.350	1	.350	.902	.34	.01
	Sustain motivation	.203	1	.203	.709	.40	.01

(Wilk's Lambda = .92; $F(5, 67) = 1.17$, $p = .33 > .05$), * $p < .05$

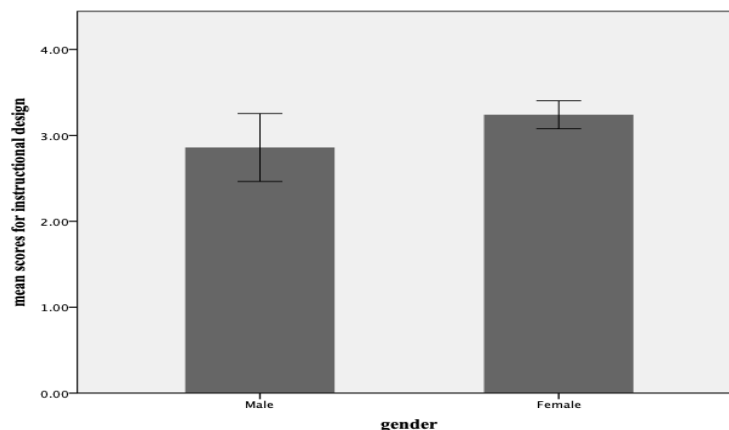


Figure 5. Boxplot for Instructional Design Scores Perceived by Gender

Meanwhile, no significant differences were found between female and male lecturers' perceptions of the ability in developing the appropriate learning resources, $F(1, 71) = 1.82, p = .181$; implementing instructional strategies, $F(1, 71) = 2.96, p = .09$; facilitating participation among students, $F(1, 71) = .90, p = .345$; and sustaining students' motivation, $F(1, 71) = .70, p = .403$.

One-way multivariate analysis of variance showed no statistically significant associations between education levels (undergraduate, masters, and doctor) and the linear combination of all four factors of barrier, Wilk's lambda = .79; $F(4, 68) = .37, p = .93$. However, Table 5 shows a significant difference was found between

educational level and the ability in implementing instructional strategies, $F(2, 70) = 3.25, p = .045$, partial $\eta^2 = .08$ (moderate effect), in which in Figure 6, it is shown that lecturers with doctor degree ($M = 3.46$) perceived the ability was significantly higher than master degree ($M = 3.06$).

Regarding the age, one-way multivariate analysis of variance showed no statistically significant associations between age and the linear combination of all four factors of barriers, Wilk's lambda = .87; $F(16, 199) = .56, p = .90$ and also no statistically significant associations between age and the linear combination of all five factors of pedagogical competency, Wilk's lambda = .79; $F(20, 213) = .75, p = .76$.

Table 5. Results of Multi-Factor Variance Analysis for Education Level and Sub-factor of Pedagogical Competency

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
Education levels	Instructional design	.663	2	.332	.763	.47	.05
	Develop resources	.721	2	.360	.964	.38	.02
	Implement strategy	2.383	2	1.191	3.255	.04*	.04
	Facilitating learning	2.173	2	1.087	2.957	.058	.01
	Sustain motivation	1.406	2	.703	2.571	.08	.01

(Wilk's Lambda = .88; $F(10, 132) = 9.85, p = .57 > .05$), * $p < .05$

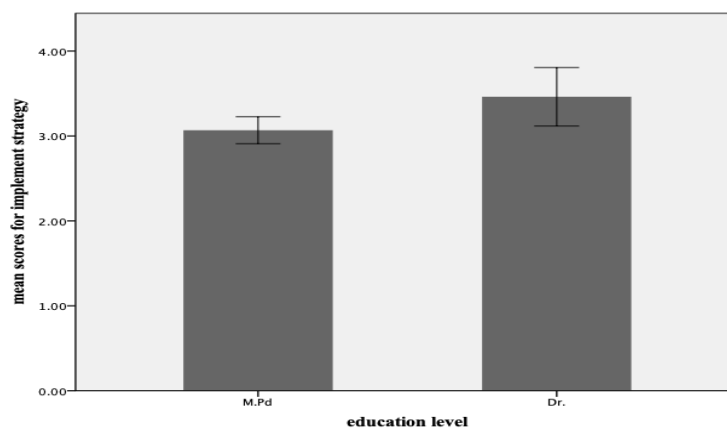


Figure 6. Boxplot for Implement Strategy Scores Perceived by Education Level

Discussion

This study was in an attempt to investigate four factors of barriers to emergency online teaching perceived by early childhood lecturers, namely technological, individual, pedagogical, and enabling conditions factor. Findings showed that the pedagogical and enabling conditions factor perceived as the most significant barrier by the participants. In the current study, bandwidth

issue and connectivity, and security are perceived as the first significant barrier for early childhood lecturers in emergency online teaching. This finding corresponds to several previous studies that internet access has become the significant barrier in the implementation of online teaching such as in Lebanon (El Turk & Cherney, 2016), Australia (Fox, Diezmann, & Lamb, 2016), Greece (Nikolopoulou & Gialamas, 2015), and

Brazil (Luz, Rolando, Salvador, & Souza, 2018). Additionally, the current research in emergency remote teaching showed that the internet access in online teaching during COVID-19 pandemic perceived as barriers both for lecturers and students in ASIAN higher education contexts (Bozkurt *et al.*, 2020).

Regarding the security barrier, this finding is in line with the previous study by (Chen & Bryer, 2000), mentioned that the privacy perceived as the major challenge. In the current study, lecturer's data in learning technologies (e.g. Moodle, google classroom, Edmodo, and Zoom) during emergency remote teaching has marketing potential, is being collected, even in some cases, sold to third parties (Bozkurt *et al.*, 2020). Thus, there is a need for better cybersecurity for lecturers' data privacy. Barriers related to engagement of students online, lack of feedback and the pedagogical model (e.g. student-centered learning) in emergency online teaching was perceived as the second significant barriers. These findings were in line with several previous studies. For instance, a study by Jung (2001) showed that lack of interaction between in-service lecturers and among them, as well as among instructors in Korea was reported as the challenge in online teaching. In the similar vein, a study in lecturers' perceptions in online World language courses by Lin & Zheng (2015) showed that engaging students with content was reported as a major challenge. Currently, the study from the lecturers' perspective also revealed that the lack of social presence such as giving feedback perceived as a challenge for them (Wynants & Dennis, 2018).

Regarding the pedagogical model such a student-centered learning barrier, the result of this study is similar to the study by Lin & Zheng (2015) in which they showed that the change of the pedagogical role from teacher-centered in the face to face setting to student-centered in online teaching perceived as a challenge for lecturers. A study by (Andersson & Grönlund, 2009) also reported that the appropriateness of the pedagogical method for online teaching such as more a learner- oriented approach where students take ownership of their learning frequently was considered as a the main challenge. Additionally, a literature review also confirmed that one of the continuous major problems with online teaching was transitioning lecturers from face

to face to online teaching (Kebritchi *et al.*, 2017). Therefore, early childhood lecturers should be aware of the design effective learning environment that focuses on student-centered activities.

Lastly, barriers related to the quality course content and reliability of online measurement assessment in emergency online teaching are perceived as the third significant barrier. Regarding the quality course content barrier, accordingly to the study by Kebritchi *et al.* (2017), it was reported that the majority of the online course, the task of generating new materials or adjusting the materials from face to face class to online learning could be very challenging. Hence, early childhood lecturers should be encouraged to take content, pedagogy, and technology into account when designing online courses (Koehler, Mishra, Hershey, & Peruski, 2004). Regarding the reliability of the online measurement assessment barrier, Arnold (2014) pointed out that reliability issue in the online teaching front needs much more attention. Most recently, the study also mentioned that the existing instrument in online teaching suffer from the issue of validity and bias, so that failed to align with the instructional goals (Byrne & Donlan, 2020). Thus, early childhood lecturers should be empowered to generate online measurement assessment that reliable and valid.

Interestingly, early childhood lecturers perceived all of the pedagogical competences in emergency online teaching as good practices. While this finding suggests that early childhood lecturers' pedagogical competences such as encourage students to participate and contribute, identify and sequence the learning content, reinforce students' contributions, select appropriate resources and initiate the learning activity were perceived as a good profile, however, the current study focuses on early childhood lecturers' perceptions. Therefore, it is required to investigate the future study of early childhood lecturers based on their product such portfolio and in a different framework of the pedagogical competences.

As the implication of this study, it is suggested for policy makers related to higher education in early childhood to empower lecturers to enhance their pedagogical competency in online teaching to create online learning courses that fulfill the students' needs.

Additionally, during COVID-19 pandemic, Trust & Whalen (2020) suggested that lecturers should be provided with in-service lecturers training and support by involving them in online forum that focus on learner-centered activities that allow them to develop knowledge and skills of teaching with the integration of technology in any format or circumstances, including online, remote, or blended setting. Therefore, early childhood lecturers must take into account a set of online tools combined with the appropriate pedagogical approach in designing an online course, because it can foster interaction (learner-content and cognitive presence) (Saadatmand, Uhlin, Hedberg, Åbjörnsson, & Kvarnström, 2018).

Regarding the gender and early childhood lecturers' perceptions of barriers, the results of this study demonstrated that gender has impacts on the perceived technological barriers. The results showed that male early childhood lecturers' perceptions were significantly higher than female lecturers' perceptions about the technological barrier. The results of this study are similar to Peluchette & Rust's (2005) survey, which showed significant difference in technology perceived by different gender. Compared to male, female lecturers indicated a significant preference for the use of technology. This corresponded with the result of investigation by Martin, Budhrani, & Wang (2019) that female faculty members place higher importance on online competencies than male faculty members.

In regards to gender and early childhood lecturers' perception of pedagogical competency, this study demonstrated that gender impacted on the perceived ability in designing instructional strategies. The results showed that female early childhood perception of pedagogical competence was significantly higher than male perception about the ability in designing the instructional strategy. The finding of this study is in the agreement with Campbell & Varnhagen (2002), who found that female faculty members are more inclined to use learning technology, when they fit with existing instructional goal than male. In this view, female faculty may be more likely to use technology as a tool. Moreover, work by Chang *et al.* (2014) and Martin *et al.* (2019) showed that female perceptions were significantly higher than male perceptions about the importance of designing the learning content, value beliefs

and practice in online instruction than male perception. In other words, female lecturers put greater emphasis on designing the instructional strategy than technology, while males tend to be attracted by the technology first.

Therefore, previous study recommend that professional development for females should involve more showcases and interactions while training for males would be more appropriate when it provides many hands-on activities (Zhou & Xu, 2007). Additionally, in regard with the level of education and early childhood lecturer perception of pedagogical competency, this study demonstrated that level education impacts perceived the ability in implementing the instructional strategy. The results show that early childhood lecturers who hold doctor degree perceived the ability of implementing instructional strategy was significantly higher than early childhood lecture who hold a master degree. The finding of this study supported by Kowalczyk-Wałędziak, Lopes, Menezes, & Tormenta (2017), who found that the doctorate degree has a strong influence on lecturers in term of professional practice.

CONCLUSION

This study was in attempts to explore early childhood lecturers' perception of barriers and their general pedagogical competencies during the implementation of emergency online teaching. The findings categorized top three barriers perceived by early childhood lecturers, namely bandwidth issue and connectivity, and security in emergency online teaching, cultivating students' engagement, lacking of feedback, and designing student-centered learning in an online learning environment, as well as designing and developing quality course content and reliability of online measurement assessment, respectively. The results of analysis of variance showed that there was a significant difference between gender and technological factors, gender and instructional design factors, as well as education level and the implementation of strategy factors.

The results of this study have implied that there is a need for higher educations in general to pay more attention to the accessibility including the internet quality and connectivity to enable online learning activities to run effectively. In addition, it is also necessary to provide lecturers training and professional development program

to develop their competence in implementing online teaching. Regarding the early childhood lecturers' perceptions and their general pedagogical competences in emergency online teaching that has been explored, the researchers should have been very cautious in presenting the speculative interpretation of the research findings, particularly because the data was not complemented with interviews for confirmation with the participating lecturers. Hence, deeper exploration and further investigation involving interviews and other instruments such as observation and lecturers' self-reports are highly recommended for future researchers. This study has also focused only on the early childhood lecturers in the higher education context, thus, future researchers are suggested to investigate lecturers' perception of barriers and the pedagogical competencies in different contexts and pedagogical competencies framework.

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