Perceptions of Students in Indonesian Higher Education Institutions Regarding Internet Access for Online (Remote) Learning during the COVID-19 Pandemic

Bambang Riadi, Rian Andri Prasetya, Albet Maydiantoro, I Komang Winatha, Gede Eka Putrawan, and Hisham Dzakiria

***Abstract*—While the COVID-19 crisis has sparked renewed interest in online learning research, there are only a few well-documented studies on students' perceptions of Internet access in online (remote) learning. As a result, we adopted a quantitative approach to investigate students' perceptions of Internet access for online (remote) learning in Indonesian higher education institutions during the COVID-19 pandemic. The data were analysed using descriptive statistics and content analysis. The findings indicate that students in Indonesian higher education institutions negatively perceive their experience with online (remote) learning during the COVID-19 pandemic. They are dissatisfied with the poor performance of the Internet as well as the high cost of Internet access. They also have concerns and impediments regarding online (remote) learning. Finally, the current study's implications are discussed, along with some recommendations for future research.**

***Index Terms*—Online learning, pandemic COVID-19, remote teaching, belief.**

I. Introduction

Recently, there has been a surge of interest in online education studies due to the global COVID-19 pandemic. For example, in Indonesia, higher education institutions (HEIs) are currently transitioning away from traditional face-to-face classes and toward online (remote) learning. Faculty members and students are currently adjusting to their new teaching and learning culture. Hodges and Moore *et al*. [1] state that this is done to effectively prevent the spread of the coronavirus disease of 2019 (COVID-19), and the list of HEIs that have decided and announced their policy on moving classes online continues to grow daily. Czerniewicz [2] states that due to the COVID-19 outbreak, HEIs are being brought online on a never-before-seen scale.

Moore and Dickson-Deane [3] found that terminology to refer to online learning, e-learning, and distance learning, which is oftentimes interchanged, is inconsistently used. They further state that the term ‘online learning’ is the more updated version of ‘distance learning’. The other term ‘e-learning’ is a kind of ‘online learning’ (Triacca, Bolchini, Botturi, & Inversini, 2004 as cited in [3]. It is generally accepted that their umbrella term ‘online education’ has been studied by researchers for decades. We could not agree more that the effectiveness of learning outcomes results from carefully designed and planned instructions [1]. Because online learning experiences that are carefully and well prepared by the instructors are different from learning offered online in response to the COVID-19 crisis [1], [4], we would therefore use a term ‘online (remote) learning’, which [1] call as ‘emergency remote teaching’.

Until recently, a substantial body of research has been published on perceptions of online (remote) learning during the COVID-19 pandemic (see, among others, [4]–[8]). To our knowledge, however, only a few studies about students’ perception of the Internet access for online (remote) learning during the COVID-19 pandemic in higher education settings have appeared in the literature (see, for example, [9], [10]); thus, this situation in the Indonesian context is still not completely understood and has remained unclear. Therefore, our purpose was to shed light on students’ perception of Internet access for online (remote) learning during the COVID-19 crisis in Indonesia. The following is the research question posed in this study:

What is students’ perception of Internet access for online (remote) learning at higher education institutions in Indonesia during the COVID-19 pandemic?

II. Literature Review

A. COVID-19 Crisis and Sustainability of the Education

The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020 [11]. The term 'pandemic' refers to a disease outbreak that spreads rapidly across a large geographic area and affects an abnormally large proportion of the population [12]. "This is not simply a public health disaster; it is a problem that will touch every sector," WHO Director-General Dr Tedros Adhanom said at a press conference. As a result, every sector and individual must participate in the battles [13]. Clearly, education is one of the sectors impacted by the COVID-19 crisis.

In response to the crisis, the Indonesian government has taken steps to halt the spread of COVID-19. To address this situation, the Republic of Indonesia's Ministry of Education and Culture has issued regulations, including circular (mandate) number 2 of 2020 dated 2 March 2020 on COVID-19 prevention and management within the Ministry of Education and Culture and circular (mandate) number 3 of 2020 dated 10 March 2020 on COVID-19 outbreak

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prevention in all education units throughout Indonesia. The Ministry of Health of the Republic of Indonesia has also issued a circular (mandate) number HK.02.01/MENKES/199/2020 dated 12 March 2020 on the communication of COVID-19. A circular (mandate) number 36603/A.A5/OT/2020 dated 15 March 2020 on prevention of the spread of COVID-19 in the Ministry of Education and Culture of the Republic of Indonesia was also issued. The Ministry of Education and Culture's education units are obligated to adopt the policies outlined in the circular (mandate) to reduce and prevent the spread of COVID-19. One of the orders requires civil officials to work from home. Higher education institutions in Indonesia have also implemented a "working-from-home" policy as a result of the circular (mandate) release. Education, on the other hand, must continue, and other teaching and learning pathways are urgently needed. As a result, the solution is to fully integrate technology into the teaching and learning process through online education. It is the only means for faculty members or professors to maintain offering education to their students through online teaching. It is the only means by which students can continue studying and communicating with their professors via the Internet.

B. Students' Perception of the Internet Access for Online (Remote) Learning during the COVID-19 Pandemic

[10] conducted research on the complexity of accessing the Internet for distance education and how the problems affect their capacity to get an education. They employed interviews with seven Master's students in Bangka Belitung, Indonesia. They found that the participants of their investigation living in a remote area encountered several obstacles, including quality of the Internet speed, financial issues, the distance between their homes and the technology itself, and their limited knowledge of technology. If compared to those having adequate access to the Internet, the participants actually do not have proper access to learning resources. Thus, it affects their knowledge mastery.

University students hold a positive perception of online learning, but as a supplement to their 'offline' classes [14] and understanding the way students perceive their learning environment at higher education institution contexts is of vital importance because their perception affects their learning experiences [15]. For example, the perception of students with high achievements is significantly more positive than those with low achievements [16]. Eleven factors that are related to success in e-learning have been identified, four of which are instructor, student, basic technical knowledge, and learning materials [17]. They have also further identified seven technological aspects that have to do with e-learning, two of which are the level of interaction and the Internet quality. Interaction between instructor and students is said to have a huge impact on students' satisfaction in online learning [18]. In addition, students' perception of their readiness for an online learning experience is slightly positive. They are familiar with mobile devices and social media applications but unfamiliar with e-learning tools for collaborative tasks [19]. It is important that students' readiness also plays an essential role in the success of online learning [20].

III. The Study

A. Participants

A total of 500 undergraduate students from the public (77.2%) and private (22.8%) higher education institutions in Lampung, Indonesia, took part in the current study. Most of them (67.6%) were female, and the rest (32.4%) were male. They were nearly at the same age ranging from 17 – 33 years old, 19.77 years on average. We explained the purpose of the study to them and guaranteed anonymity and confidentiality. By filling out an online questionnaire, they consented to the use of data they provided for research purposes.

B. Instruments

Between April and December 2020, data were collected via an online questionnaire with closed- and open-ended questions (6 and 2 questions, respectively), using a free cloud-based survey and questionnaire tool, Google Forms. The close-ended questions of the online questionnaire were developed based on two aspects or dimensions according to our literature review because they are still related to online (remote) learning in response to the COVID-19 situation, including students' technological skills and accessibility to the Internet [14], [17], and the Internet quality [17]. We also made some adjustments to the questions under each aspect or dimension above to fit into the current online education situation due to the COVID-19 pandemic. The questionnaire was also equipped with two open-ended questions to dig for more information from the respondents.

The questionnaire received a pilot testing from 50 students before it was distributed to the respondents. It was to make sure that everything was understandable, clear, and reasonable in length [21] and to assess its appropriateness and design that the questionnaire could achieve the research purpose [22].

C. Data Analysis

The data collected from the closed-ended questions of the online questionnaire were quantitatively analysed using SPSS 23 for Windows through a descriptive statistics method. The data from the open-ended questions were analysed using content analysis, which is a subjective interpretation of the participants' responses to the questions that involve coding, classification, and theme or pattern identification [23] to provide thorough descriptive interpretations of a social phenomenon (Tesch 1991 as cited in [24].

IV. Findings

A. Students' Mobile Device, Type of Internet Access, and Their Self-assessed Digital Literacy

During the COVID-19, students' most frequently used device for online (remote) learning is depicted in Fig. 1. As can be seen, the smartphone is the most frequently used device (78%), followed by the laptop (20%) and desktop PC (2%).

Fig. 2 gives information about the Internet network the students under investigation rely on for their online (remote) learning during the COVID-19 crisis. It is apparent that 396 students (79.2%) do not subscribe to home Internet access on

a monthly basis from an Internet service provider; only 104 of them (20.8%) take out a monthly subscription to an Internet service provider. Turning to cellular data Internet network, it is reported that 466 students (93.2%) use their cellular data Internet network via their smartphone, only 34 of them (6.8%) state that they do not use cellular data Internet network for their online (remote) learning.

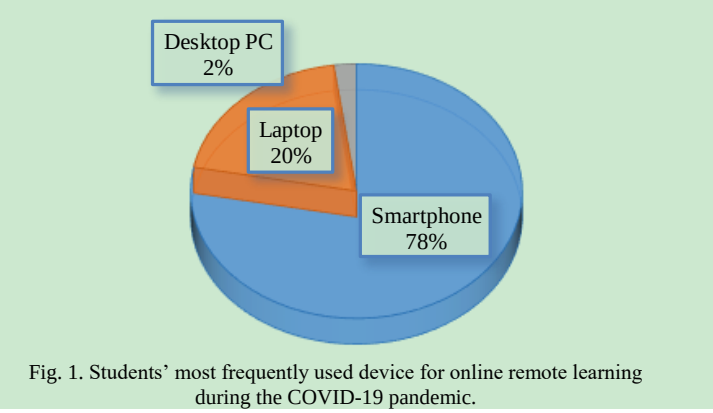

Fig. 1. Students' most frequently used device for online remote learning during the COVID-19 pandemic.

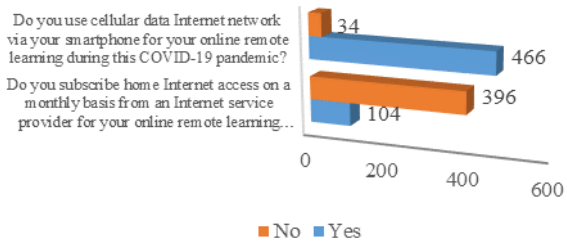

Fig. 2. Students' Internet network for online remote learning during the COVID-19 pandemic.

Fig. 3 shows information about students' self-assessed digital literacy. More than half of them (56%) state that they are good at digital literacy. Some state that their digital literacy is acceptable (31%) and very good (13%). No one reports that their digital literacy is poor or very poor.

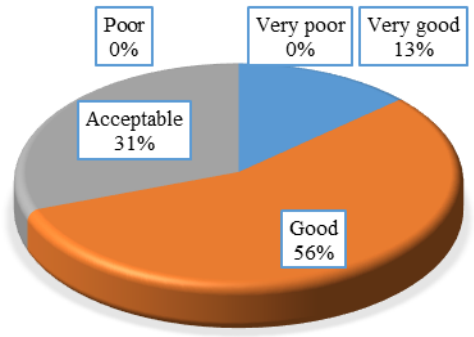

Fig. 3. Students' self-assessed digital literacy.

B. *Students' Internet Connection in Online (Remote) Learning*

Fig. 4 illustrates the satisfaction students obtain from the Internet connection in their online (remote) learning during the COVID-19 crisis. It is apparent that most of them (214 students or 42.8%) disagree that they are satisfied with their Internet connection. More than a quarter of them (133 students or 26.6%) strongly disagree with this statement. Only 136 students (27.2%) and 17 students (3.4%) agree and strongly agree with this statement.

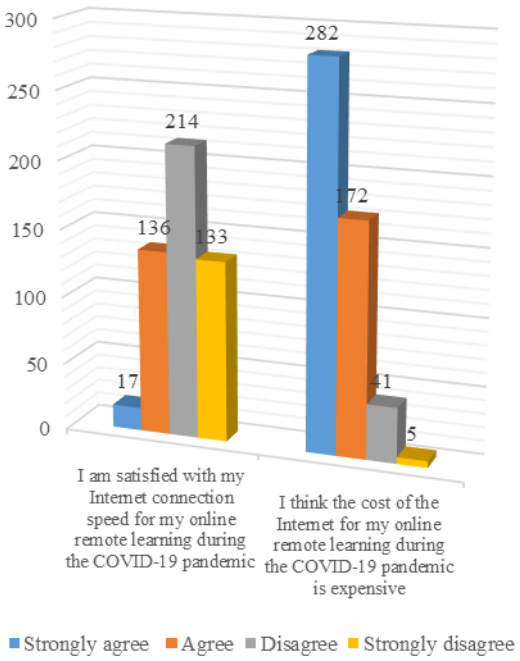

Fig. 4. Students perceptions of the Internet for their online (remote) learning.

Regarding the cost of their Internet access, more than half of them (282 students or 56.4%) strongly agree that the cost they spend for the Internet access during the COVID-19 pandemic is expensive. A total of 172 students (34.4%) agree with this statement. Only a few of them, 41 students (8.2%) and five students (1%), disagree and strongly disagree with this statement.

C. *Students' Worries about Online (Remote) Learning*

The students' worries about their online (remote) learning were obtained from an open-ended question in the online questionnaire. The question was: "Considering this online (remote) learning situation during the COVID-19 pandemic, do you have any worries?" Their responses to the open-ended question were analysed through content analysis which was done through coding classification and theme or pattern identification. Here are the students' responses to the question in Fig. 5.

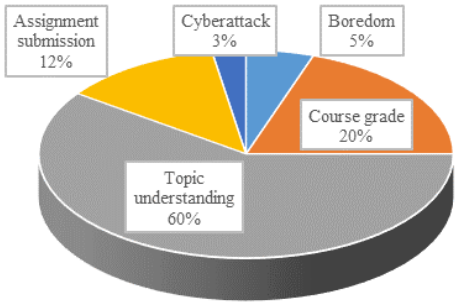

Fig. 5. Students' worries of online (remote) learning during the COVID-19 pandemic.

Students' worries about online (remote) learning during the COVID-19 crisis are depicted in Fig. 5. It is clear that they are concerned that they will not comprehend the topics covered by their lecturers during online classes (60%). They are worried that they will fail courses as a result of poor course grades (20%) and will be unable to submit assignments due to a poor Internet connection (12%). When they are unable to comprehend a subject clearly, they are

fearful of succumbing to boredom (5%). Classes are conducted online, but they are concerned about the possibility of a cyberattack (3%). Here are what they say about their worries (English translation).

"I have a fear of boredom in my learning."

"Once I complete my courses in this semester two, I will become a student with no knowledge because learning in an online mode is so boring."

"Without direct interaction with my classmates and lecturers, I feel demotivated."

"When using an online application, I have a fear of data theft."

"I am worried that lecturers might give me bad grades."

"Online exams in a very short time and poor signal strength, I am worried that my final grades are dependent on the signal strength."

"I have a fear that I might fail my courses."

"I don't really understand what is conveyed by my lecturer."

"I am afraid I cannot build up my knowledge and many students get stressed because I have more assignments compared to when I was having 'offline' classes."

"Topic is not clearly understood."

"Due to poor Internet strength, I am afraid I miss some information about class assignments."

"I am afraid my lecturers don't receive my assignments due to poor signal strength."

"I find it hard to submit my assignment because sometimes my signal dissappears all of a sudden."

"When I submit my assignment online, I am not sure whether it is well received or not by my lecturers."

D. Students' Obstacles in Online (Remote) Learning

The students' obstacles to online (remote) learning were obtained from an open-ended question in the online questionnaire. The question was: "Do you encounter obstacles in your online (remote) learning during the COVID-19 pandemic?" Their responses to the open-ended question were analysed through content analysis which was done through coding classification and theme or pattern identification. Here are the students' responses to the question in Fig. 6.

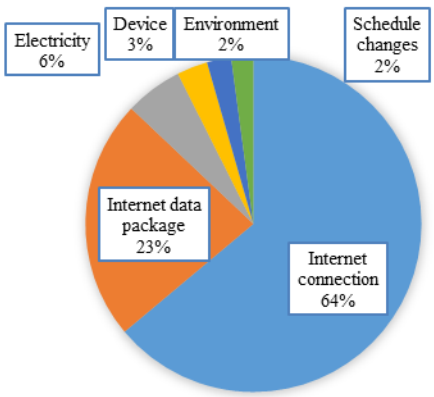

Fig. 6. Students' obstacles to online (remote) learning during the COVID-19 pandemic.

Fig. 6 details the online (remote) learning barriers faced by students during the COVID-19 pandemic. The Internet connection (64%) is the most significant impediment to their online (remote) learning, followed by expensive Internet data packages (23%). Electricity, the device for online classes, environment, and schedule changes are also obstacles that they encounter during the COVID-19 pandemic, 6%, 3%, 2%, and 2%, respectively. Here are some excerpts of what they say about their obstacles (English translation).

"Poor signal strength."

"Slow Internet connection, not to mention the price is getting more expensive."

"Limited Internet access."

"No signal, no money for buying a mobile Internet data package."

V. Discussion

The current study's findings indicate that the majority of participants (78%) frequently use a smartphone for online (remote) learning, followed by a laptop (20%) and desktop PC (20%). This finding is consistent with those made previously by [25], [26] that students preferred to learn online via a smartphone. Students can also use social media to aid in their learning and maintain a sense of connection to their studies when using a smartphone [27]. It is also reported that rural and urban students receive the same educational benefits. Still, students who use a computer for online education perform better on exams than students who use a smartphone [28].

Most of the participants disagree and strongly disagree that they are satisfied with the Internet connection they are using for online classes. Nearly 100% of them agree and strongly agree that they spend much on Internet access. This is in line with [29] finding that cost and Internet access are students' barriers to learning in an online mode. Additionally, this confirms previous Turkish research findings that Internet access and infrastructure deficiencies continue to be a source of concern for students during the pandemic [30]. According to the report from Pakistan and Brunei, there is a correlation between student satisfaction and access to online education [31]. Students who lack basic technical skills and access to technology will struggle to succeed in online education [32].

Significant facts were also found in response to the open-ended questions. It turns out that students are concerned about online (remote) learning during the COVID-19 crisis. It is self-evident that they are worried that they will fail classes due to failing course grades if they do not comprehend the topics presented by their lecturers. This implicitly confirms what is found by [33] that they prefer face-to-face meetings to facilitate the acquisition of knowledge. Additionally, they are concerned that they will be unable to submit the assignment due to a poor Internet connection, experience boredom, and be a victim of a cyberattack. While some students adapt well to a new learning environment, others become bored and lonely in this new online environment [34]. It is admitted that online systems and networking can attract hackers [35] and are vulnerable to security attacks in terms of authentication, availability, confidentiality, and integrity attacks (Rjaibi, Rabai, Aissa & Louadi, 2012 as cited in [36].

Besides, they report several obstacles during their online (remote) learning. They state that the biggest obstacle they encounter is the Internet connection. This finding corroborates prior research in various geographical contexts indicating that internet connectivity is a significant issue in online learning [37], [38]. They also complain about the cost they spend on their mobile Internet data package. This finding resonates with the findings of [29], [39], [40] that the cost of Internet access is a barrier for students when learning online. In addition, electricity, device for online classes, environment, and schedule changes are also obstacles they encounter in their online (remote) learning during the COVID-19 crisis. In a study, it is also stated that most online students experience difficulties [41]; for example, in Uganda, the most significant impediments to online learning are high internet costs and inadequate internet connectivity [38]. Therefore, according to reports, students require their lecturers to understand their financial situation and the availability of Internet access [42].

VI. Conclusions

Students in higher education institutions are dissatisfied with the Internet connection, which is inadequate, and with the high cost of Internet access. As it turns out, they are concerned about the possibility of online (remote) learning during the COVID-19 crisis. They are worried that they will not comprehend lecture topics, fail classes due to poor course grades, struggle to submit assignments due to a poor Internet connection, become bored, and suffer a cyberattack. Their worries are due to obstacles they encounter during their online (remote) learning. The poor Internet connection is their biggest obstacle, not to mention they spend much on mobile Internet data packages.

This study has several implications. Due to the interruption of traditional class meetings, in which the courses that had been well designed and planned for in-person classes are inevitably delivered over the Internet [43], six instructional strategies to help students increase their motivation, engagement, and concentration as well as "five high-impact principles for online education" proposed by [44], (p. 115) are in need to be taken into account. The findings imply that governments should develop policies and programs to enhance digital services. At the same time, educational institutions should place a greater emphasis on academic and technical support for students [45] based on the principles of simplicity, accessibility, affordability, adaptability, and empathy in all learning activities that take place in adverse circumstances [31], [46]. Finally, to make sure that sustainable learning is for all and prevent broader inequities in education [47], faculty members, governments, and policy makers are hoped to listen to the voice of the students.

This study, however, has some limitations. Although this study has shed light on a relatively significant aspect of students' perceptions of online (remote) learning during the COVID-19 pandemic in the Indonesian context, it was conducted in a medium sample size (n = 500). We have carefully concluded the phenomenon under investigation because we assume that our study's number of respondents or participants and empirical data are insufficient. In other words, we do not make blanket statements about our findings being conclusive across the country. Thus, we believe that additional research with a larger sample size and more advanced quantitative and qualitative data analysis is necessary to understand the phenomenon in the Indonesian context. Thus, we would be able to produce more valid findings and draw more trustworthy conclusions.

Conflict of Interest

The authors declare that there is no conflict of interest.

Author Contributions

Bambang Riadi and Rian Andri Prasetya conceived of the presented idea. Albet Maydiantoro and I Komang Winatha verified the methods, performed the computations, and designed the figures. Gede Eka Putrawan and Hisham Dzakiria verified and supervised the results and discussion of this work. The findings were discussed among the authors, who all contributed to the final manuscript and approved the final version.

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