# The Ease of Information through Internet – Does it Affect Students' Motivation to Think Critically?

Ira Puspitawati[1*] Praesti Sedjo[1]

[1]*Faculty of Psychology, Gunadarma University, Depok 16423, West Java, Indonesia*
[*]*Corresponding author. Email: iraps@staff.gunadarma.ac.id*

**ABSTRACT**
The internet has become a major part of human life, including campus life, especially since COVID-19 pandemic arises. Students are doing the learning process online and the information they need during studying is provided mostly by the internet. Therefore, interaction between students and the internet may have an impact on their cognitive processes. This study aims to reveal whether the length of time students interact with the internet and the ease of information they perceived can affect their critical thinking motivation. Critical thinking motivation is a disposition that activates critical thinking skills which describe how a person thinks rigorously. 202 students from several universities in Jakarta, participated in this study. Critical Thinking Motivation Scale (CTMS) were applied to reveal the expectancy and value dimension of critical thinking. The results showed that there was no difference in critical thinking motivation based on the length of time interacting with the internet ($p>0.05$) as well as based on the ease of information obtained from the internet perceive by the student ($p>0.05$) All respondents showed high critical thinking motivation, but 82% of the students participated in this study, perceived the ease of information for academic purposes through the internet as not easy. This indicate that students' critical thinking motivation was not affected by the ease of information obtained through the internet because students perceived that the internet doesn't provide enough information that they need for academic purposes.

***Keywords:*** *Critical Thinking Motivation, Expectancy, Values*

## 1. INTRODUCTION

Living in the 21st century requires critical thinking competence. Human life in no longer a traditional life that relies merely on human capability, it is a life filled with robust data assisted by a super computer that provides various information in all aspects of life [1] [2]. Human thinking ability is no longer challenged to find answers but to choose and sort out of the right solutions because various alternative problem solving have also been provided by artificial intelligence (AI) during the super intelligent society [3] [4].

Critical thinking is the ability to analyze logically, reflectively, systematically and productively which is carried out to make judgements and decisions [5] [6] [7]. Critical thinking in everyday life is very important because the explosion of information that exists today through technology, can be very misleading. Various hoax news can influence individuals in processing information and making conclusions [8]. Critical thinking is also needed in representing oneself online because online representation can affect individual self-concepts [9]. For students, critical thinking is important for personal development, preparing for adulthood, developing scientific knowledge and preparing for democratic life [10] .

During this pandemic, most students are doing their study online. Data from UNESCO [11] states that online learning is carried out by at least 9 out of 10 students in the world. Universities are not exemption from this condition. There has been a radical change from face-to-face learning to online learning [12]. The durations for a face-to-face encounter in online classes will certainly be shorter than traditional classes, but the information obtained from online classes are expected to remain richer because it is supported by Technology Enhanced Learning (TEL) which changes the online learning environment to be more interactive and increases learning effectiveness [13]. Therefore, this study aimed to reveal whether an online learning have an effect on students' critical thinking motivation because online learning which connect directly through the internet will provide more information to the students.

 

## 2. BACKGROUND

Critical thinking is one of the processes in higher order thinking skills that play a major role in problem solving, decision making and logical thinking [14] [15] . Therefore, the measurement of critical thinking has been carried out by experts since around 1950 when Bentley proposed a scale that measures several aspects of critical thinking [16]. However, the construct of critical thinking was still a big question mark at that time because approaches applied differently in education and in the career field (two fields that discussed critical thinking the most). A common view has not been reached.

### *2.1. Critical Thinking as a Disposition*

To reach the agreement on the construct of critical thinking, in the early 90's the American Psychological Association initiated a meeting attended by 46 experts in the field of critical thinking and they tried to explore aspects of critical thinking. After a long discussion, an agreement finally reached that concluded the main cognitive dimensions in critical thinking are (a) interpretation, (b) analysis, (c) evaluation, (d) inference, (e) explanation, and (f) self-regulation. [17]. From this agreement various critical thinking assessment tools were developed, including the California Critical Thinking Dispositions Inventory (CCTDI) developed by Facione, Sanchés and Facione [18]. CCTDI measures eight aspects of critical thinking, namely (a) cognitive maturity, (b) self-confidence, (c) analytics, (d) truth-seeking, (e) open-mindedness, (f) inquisitiveness, and (g) systematicity. .

### *2.2. Critical Thinking as an Ability*

The instrument which was originally measured disposition of critical thinking, eventually evolved into a measurement of skills and abilities because it was not easy to measure disposition. Even though Ennis has tried to assess the disposition of critical thinking by giving situations to the testees so that their critical thinking skills are revealed through the Ennis-Weir Critical Thinking Essay Test [19], but the measurement of disposition still causes miserly information processing, resistance to myside thinking (social desirability took place), and absence of irrelevant context effects in decision-making (not all testees have been faced with the situation in the test) [20]. Therefore, critical thinking assessment as an ability began developing widely. Among them is the California Critical Thinking Skills Test (CCTST) by Facione [21]. Before Facione introduced CCTST which not only measures disposition but can measure skills or abilities of critical thinking, several experts have introduced standard measuring tools for critical thinking, including the Cornell Critical Thinking Tests (CCTT) [22]; the Watson-Glaser Critical Thinking Appraisal [23]; the Halpern Critical Thinking Assessment [24]. Aspect of critical thinking from the skill or ability perspective are grouped into assessing likelihood and uncertainty, argument analysis, verbal reasoning, thinking as hypothesis testing and making sound decisions [25].

### *2.3. Critical Thinking as a Motivation*

The concept of thinking as a motivation developed from the idea that even though critical thinking is a disposition and can be actualized as an ability, it requires a drive to activate it. This drive can be referred to as motivation which can be considered as hope/value [26]. Therefore, this study focuses on the motivation to think critically in order to understand things that are deeper than critical thinking as a disposition as well as a skill.

Critical thinking motivation is considered as hope or value, because critical thinking is very dependent on the values that are believed to be held, and on the hope of successful results [27] [28]. Therefore, critical thinking in this study will be focused as a product of expectations and task values [26] [28].

Expectations related to the individual's expectations about his ability to perform a task adequately. This expectation is different from Bandura's concept of self-efficacy [27], if self-efficacy is aimed at the individual's current abilities; expectations are related to the prediction of the individual's future abilities.

The value of the task is related to a value given to a task, meaning that the individual's critical thinking motivation depends on the following four sub-components: (a) achievement, (b) interest, (c) utility, (d) cost [29] [28] [26]. The four sub-components are described by Valenzuela [26] as follows: (a) achievement refers to how important the meaning of the task is to be carried out as well as possible by the individual. This relates to the ideals or abilities of individuals in certain fields. (b) interest is related to how far the individual gets enjoyment as the task being carried out. (c) utility related to the individual's future plans and the possibility of carrying out the task to achieve several goals at once. (d) costs related to the individual's assessment of how much effort the tasks put into so that the individual will determine his commitment.

The expectations and the value of the task and its four sub-components compiled by Valenzuela [26] become a measure of critical thinking motivation called the Critical Thinking Motivational Scale (CTMS). This scale will be adapted in the study.

### *2.4. Online Learning and Ease of Information Through the Internet*

The COVID-19 pandemic has turned traditional classrooms into online classes. This also happens at the University level. Online learning is often associated with 4 factors, namely [30]: (a) savings, because there is no need for other costs like transportation, living cost for students even though costs are still needed for internet quotas and equipping learning devices, (b) online collaboration, online collaboration can overcome geographical boundaries, (c) modern technology, technological

developments will support online learning so that learning will become more effective and efficient, (d) the ease of e-learning because learning through online makes it easier for students to carry out assignments, including being able to collect assignments online, repeating material that have not been understood during class and can probe deeper information from the material being studied.

The use of the internet in the learning process theoretically acts as knowledge management and content management [31]. As knowledge management, the internet helps the cognitive process to turn information into useful knowledge, while in content management, the internet will provide information that will be shared with knowledge. But in fact, most of the students have not used the internet for the actual learning process, but more for social contact and for entertainment [32]. Therefore, this study will reveal from the student's point of view about the ease of getting information for academic purposes from the internet which will be revealed through daily duration of students interact with the internet, daily duration that student use to learn when interacting with the internet and how easily information are obtained from the internet for academic purposes.

## 3. METHOD

### *3.1. Participants and designs*

Two hundred and two students aged 18 to 23 from several universities in Jakarta participated in this research ($M_{age}$= *20,* $SD_{age}$ *= 1.067*). Eighty-seven male and One hundred and fifteen female. Seventy-three participants belonged to social and humanity faculty and the remain had a background in IT, engineering, medical school and midwifery school. This study employed a quantitative analysis to reveal the effect of daily duration of students connected to the internet, daily duration that student use to learn when connected to the internet and how easily information is obtained from the internet for academic purposes on critical thinking motivation among students who do online learning.

### *3.2. Procedures and Materials*

Data collection is carried out through the g-form considering that the pandemic is currently ongoing and data collection cannot be done directly. The students' registration number set as parameter to ensure that the respondent is really a student, whose data can be identified on the PDDIKTI portal (Higher Education Database). A snowball sampling was applied in this research. Data for critical thinking motivation were obtained through the adaptation of Valenzuela's Critical Thinking Motivational Scale [26] and the ease of information through internet was revealed from a simple questionnaire.

### *3.3. Measure*

The ease of information and the duration of connection to the internet is revealed through the following open questions:

(a) How many hours are you connected to the internet daily? (the answers were classified into 3 criteria which are: less than 6 hours, 6-12 hours and more than 12 hours a day)

(b) What percentage of your daily connection time do you use to study? (both online classes and self-study). The answers were classified into 5 criteria, but this classification has undergone a conversion process related to point (a) above, so the criteria based on the duration of the hour are as follows: (1=maximum 2 hours, 2=maximum 3 hours, 3=maximum 4 hours, 4=maximum 5 hours, 5=maximum 6 hours).

(c) How easy do you think information that supports the learning process can be obtained through the internet (consisting of 4 favorable answers; 4 = very easy; 3 = easy; 2 = hard; 1 = very hard)

Critical thinking ability is expressed through CTMS (Critical Thinking Motivational Scale) which is translated into Bahasa Indonesia with the permission of the author. CTMS consists of 4 items in expectancy, and 15 items in value which are divided into 4 items of utility, 4 items of interest, 3 items of cost and 4 items of attainment. All the items in CTMS are favorable with a range of 1 to 6. The final CTMS score is obtained by calculating the average of all subscale values multiplied by the average score of expectancy and then calculating the square root of the multiplication of value and expectancy. The calculation of the discrimination index and CTMS reliability with the Cronbach Alpha Technique can be seen in Table 1 below:

**Table 1** Reliability and Discrimination Index

| | |
|---|---|
| ***Utility*** | ***α = .829*** |
| Utility 1 | .664 |
| Utility 2 | .710 |
| Utility 3 | .579 |
| Utility 4 | .686 |
| ***Interest*** | ***α = .784*** |
| Interest 1 | .651 |
| Interest 2 | .577 |
| Interest 3 | .546 |
| Interest 4 | .595 |
| ***Cost*** | ***α = .681*** |
| Cost 1 | .439 |
| Cost 2 | .594 |
| Cost 3 | .458 |
| ***Attainment*** | ***α = .818*** |
| Attainment 1 | .625 |
| Attainment 2 | .638 |
| Attainment 3 | .736 |
| Attainment 4 | .591 |
| ***Value (the stratified coefficient alpha)*** | ***α = .9169*** |
| ***Expectancy*** | ***α = .826*** |
| Expectancy 1 | .677 |
| Expectancy 2 | .717 |
| Expectancy 3 | .642 |
| Expectancy 4 | .578 |

From Table 1. above, a conclusion can be drawn that the adaptation of the MCTS in Bahasa Indonesia meets the requirements as a good scale for a psychological measurement.

## 4. RESULT & DISSCUSSION

The regression analysis showed that there was no effect of internet connection duration (p>0.05), learning time duration when connected to the (p>0.05) and the ease of information obtained through the internet (p>0.05) with critical thinking motivation as shown in Table 2 below.

**Table 2** Linear Regression Analysis between Internet Connection Duration, Learning Time Duration when Connected to the Internet and Ease of Information from the Internet with Critical Thinking Motivation

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| 1 (Constant) | 4.447 | .179 | | 24.831 | .000 |
| Duration of Learning | -.046 | .128 | -.099 | -.359 | .720 |
| Duration of Connection | .110 | .202 | .150 | .544 | .587 |
| Ease of Information | .067 | .059 | .080 | 1.123 | .263 |

a. Dependent Variable : Critical Thinking Motivation

From the result above, it can be concluded that in this study there is no effect of the duration of learning time via an internet connection *($M_{online\_study\_duration}$ = 4 hours 33 minutes, $SD_{online\_study\_duration}$ = 52 minutes)* with critical thinking motivation *($M_{CT\_Motivation}$ = 5.5908, $SD_{CT\_Motivation}$ = .7486).* Likewise, the duration of the connection to the internet *($M_{internet\_duration}$ = 11 hours 44 minutes, $SD_{internet\_duration}$ = 2 hours 43 minutes)* with critical thinking motivation. The same thing happened to the ease of information obtained from the internet *($M_{ease\_internet\text{-}information}$ = 1.920, $SD_{ease\text{-}internet\text{-}information}$ = 0.7480)* with critical thinking motivation.
From the data above, it can be concluded that students' critical thinking motivation is very high with a mean value that is close to the maximum value, but the ease of information obtained through the internet is perceived to be very low by respondents as illustrated in Figure 1.


**Figure 1** The Ease of information provided by the internet for academic purposes from students' perspective

The illustration in Figure 1 shows that only 18% of respondents perceived the ease of information obtained by the internet for academic purposes; while 82% considered the ease of information for academic purposes cannot be obtained through the internet. This is in line with various studies on the application of online learning in various countries that have not been prepared to switch the traditional classroom into online classes but forced to do so due to the COVID-19 pandemic. Infrastructure limitations, such as internet connection and electricity availability, are some aspects that hindered the online learning process. From the economic point of view, inability to afford internet quotas and tools for online learning are also an obstacle to the online learning process. In addition, the unpreparedness of teachers to teach online can also cause students to become bored and sometimes become stressed because there are too many assignments given by the teacher [33] [34] [35]. It was also revealed in this study that the main cause of obstacles in an online-lectures is the problem of network infrastructure and servers at the university as illustrated in Figure 2 below:

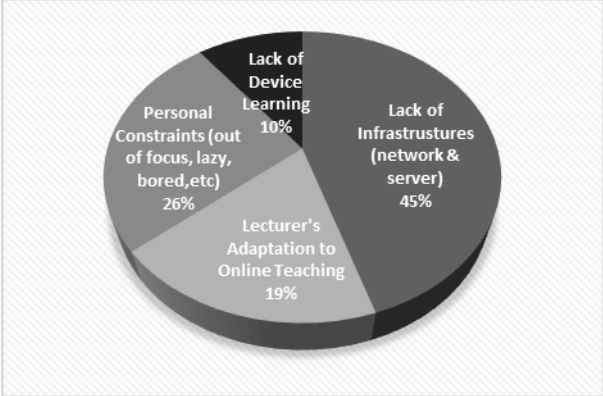


**Figure 2** Barriers to online lecture from the students' perspective

Interesting results were also obtained from the duration of time students used to connect to the internet. Most of the students who took part in this study lived in urban areas and the time spent connecting to the internet was around 11 hours 44 minutes *($M_{internet\_duration}$ = 11 hours 44 minutes, $SD_{internet\_duration}$ = 2 hours 43 minutes).* This data is aligned with the information provided by Digital Information World. Data survey stated that Indonesia is the fourth highest country in internet daily using with an average of 8 hours 36 minutes per day. This duration is higher than the world average, which is about 6 hours 42 minutes [36]. This is in sync with the 2019-2020 APJII Internet Survey Report on the behavior of internet users in Indonesia which stated that internet users in Indonesia connect to the internet more than 8 hours per day [37].
If the average duration of time used for learning while connected to the internet in this study is only about 4 hours 33 minutes *($M_{online\_study\_duration}$ = 4 hours 33 minutes, $SD_{online\_study\_duration}$ = 52 minutes),* then kinds of activities while students are online should be revealed because there are more time remains. The results showed that social

media are activities that most students do when they connected to the internet. Playing online games are second best activities that students do as illustrated in Figure 3 below.
The illustration in Figure 3. above shows that most of the students use their connection time with the internet for social media activities.

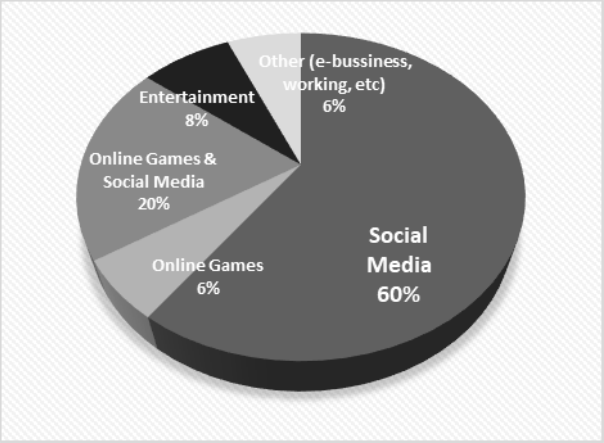


**Figure 3** Students' activities during online

This trend has not only occurred since the pandemic period where activities to socialize with peers became very limited, but even before the pandemic occurred the tendency of teenagers to use the internet as a means of social media had become a common trend [32] [38].
From the results above, it can be concluded that the long duration of connection with the internet have not been used optimally by the students for academic purposes. This can be an interesting exploration for future research. For the answer on why students still perceived it is hard to obtain information for academic purposes through internet or how government policy can support student to have more access to knowledge database provided by the internet, such as journals and research reports that are not free for students; could be interesting for further research. Other topic of research could consider the support from the educator's point of view to access knowledge information via the internet.
The high critical thinking motivation score of the respondents involved in this research will also requires further study. It will be very useful to follow up with the research on the actualization of critical thinking in students. Other research that revealed critical thinking in lecturers will be very beneficial, too because a teacher who does not think critically, will find it difficult to teach critical thinking to his students.

## REFERENCES

[1] C. N. Rojas, G. A. A. Peñafiel and D. F. L. Buitrago, Review : Society 5.0 : A Japanese Concept for a Superintelligent Society, *Sustainability*, vol. 13, no. 6567, pp. 1-16, 2021.

[2] M. L. Potter, www.microsoft.com/teachers, 2010. [Online]. Available: http://download.microsoft.com/download/a/6/4/a645e848-4937-4564-9cf6-16a57ef8bf48/criticalthinking.pdf. [Accessed on 23 July 2021].

[3] S. H. Saleh, R. Ismail, Z. Ibrahim and N. Hussin, Issues, Challenges and Solutions of Big Data in Information, *International Journal of Academic Research in Business and Social Sciences,* vol. 1393, no. Vol. 8 , No. 12, p. 1382, 2018.

[4] K. Wadhwani and Y. Wang, www.researchgate.net, February 2017. [Online]. Available: https://www.researchgate.net/publication/313819009_Big_Data_Challenges_and_Solutions. [Accessed on 23 July 2021].

[5] R. J. Sternberg and D. F. Halpern, Critical Thinking in Psychology 2nd edition, New York: Cambridge University Press, 2010.

[6] R. H. Ennis, The Nature of Critical Thinking: An Outline of Critical Thinking Dispositions, May 2011. [Online]. Available: https://education.illinois.edu/docs/default-source/faculty-documents/robert-ennis/thenatureofcriticalthinking_51711_000.pdf. [Accessed on 23 July 2021].

[7] L. Zakiah and I. Lestari, Berpikir Kritis dalam Konteks Pembelajaran, Bogor: Erzatama Karya Abadi, 2019.

[8] C.-L. Munroe-Lynds and J.-L. Lemiuex, eiui.ca, Environmental Information : Use & Influence, 27 March 2020. [Online]. Available: https://eiui.ca/disinformation-misinformation-and-decision-making/. [Accessed on 30 July 2021].

[9] G. Lang, www.researchgate.net, July 2012. [Online]. Available: https://www.researchgate.net/publication/256029633_Think_Twice_before_You_Post_The_Impact_of_Online_Self-Presentation_on_the_Self-Concept. [Accessed on 28 July 2021].

[10] H. A. R. Tilaar, Pedagogik Kritis, Perkembangan, Substansi dan Perkembangannya di Indonesia, Jakarta: Rineka Cipta, 2011.

[11] www.unesco.org, unesco, 21 April 2020. [Online]. Available: https://en.unesco.org/news/startling-digital-divides-distance-learning-emerge. [Accessed on 31 July 2021].

[12] A. Wahab, Online Learning for Higher Education During Pandemic, *Higher Education Studies,* vol. 10, pp. 16-25, 2020.

[13] P. K. Dhal, Enhancing Learning with Emerging Technology, in *World Conference (EDUCON2019)*, Thailand, 2019.

[14] H. A. Butler, Halpern Critical Thinking Assessment predicts real-world outcomes of critical thinking, *Applied Cognitive Psychology*, vol. 5, no. 25, pp. 721-729, 2012.

[15] D. F. Halpern, Is intelligence critical thinking? Why we need a new definition of intelligence., in *Extending intelligence: Enhancement and new constructs*, New York, Erlbaum, 2006, pp. 349-370.

[16] T. B. Edwards, Measurement of Some Aspects of Critical Thinking, *The Journal of Experimental Education*, vol. 18, no. 3, pp. 263-278, 1950.

[17] O. L. Liu, L. Frankel and K. C. Roohr, Assessing Critical Thinking in Higher Education: Current State and Directions for Next-Generation Assessment, Wiley Online Library, New Jersey, 2014.

[18] N. C. Facione, C. A. Giancarlo and P. A. Facione, The Disposition Toward Critical Thinking as a Measure of Competent, *Journal of Nursing Education*, vol. 33, no. 8, pp. 345-350, 1994.

[19] R. H. Ennis and E. Weir, The Ennis–Weir Critical Thinking Essay Test, California: Midwest Publication, 1985.

[20] D. Hitchcock, www.plato.standford.edu, 2018. [Online]. Available: https://plato.stanford.edu/entries/critical-thinking/assessment.html. [Accessed on 31 July 2021].

[21] P. A. Facione, The disposition toward critical thinking: Its character, measurement, and, *Informal Logic*, vol. 20, no. 1, pp. 61-84, 2000.

[22] R. H. Ennis, J. Millman and N. T. Tomko, Cornell critical thinking test level X & level Z - manual, California: Midwest Publications, 1985.

[23] G. Watson and E. M. Glaser, Watson–Glaser Critical Thinking Appraisal, forms A and B manual, San Antonio, TX: The Psychological Corporation, 1980.

[24] D. F. Halpern, Halpern Critical Thinking Assessment manual, Vienna: Schuhfried GmbH, 2010.

[25] D. F. Halpern, Thought and knowledge: An introduction to critical thinking, New Jersey: Erlbaum, 2003.

[26] J. Valenzuela, A. M. Nieto and C. Saiz, Critical Thinking Motivational Scale: a contribution to the study of relationship between critical thinking and motivation, *Electronic Journal of Research in Educational Psychology*, vol. 9, no. 2, pp. 823-848, 2011.

[27] A. Bandura, Self-Efficacy: The Exercise of control, New York: W.H. Freeman and , 1997.

[28] J. Eccles and A. Wingfield, Motivational beliefs, Values and Goals, in *Annual Review of Psychology*, Palo Alto, California, Annual Reviews, 2002, pp. 109-132.

[29] J. S. Eccles, T. F. Adler, R. Futterman, S. B. Goff, C. M. Kaczala, J. L. Meece and C. Midgley, Expectancies, Values, and Academic Behaviors, in *Achievement and Achievement Motivation*, San Fransisco, W.H. Freeman, 1983, pp. 75-146.

[30] V. Rana, www.elearningindustry.com, eLearning industry, 9 April 2016. [Online]. Available: https://elearningindustry.com/increasing-ease-of-elearning. [Accessed on 31 July 2021].

[31] H. Arsham, Impact of the Internet on Learning and Teaching, *United States Distance Learning Association*, vol. 16, no. 3, pp. 10-21, 2002.

[32] M. H. Deniz and S. K. Geyik, An Empirical Research on General Internet Usage Patters of Undergraduate Students, *Procedia : Social and Behavioral Sciences*, no. 195, pp. 895-904, 2015.

[33] I. Yuzulia, The Challenges Of Online Learning During Pandemic : Students' Voice, *Wanastra : Jurnal Bahasa dan Sastra*, vol. 13, no. 1, pp. 8-12, 2021.

[34] D. Gupta and N. N. Khairina, blogs.worldbank.org, worldbank.org, 21 August 2020. [Online]. Available: https://blogs.worldbank.org/eastasiapacific/covid-19-and-learning-inequities-indonesia-four-ways-bridge-gap. [Accessed on 31 July 2021].

[35] S. Ladyanna and Aslinda, Problems and Challenges of Online Lectures in Indonesia, in *3rd International Conference on Educational Development and*, Padang, 2020.

[36] S. Salim, www.digitalinformationworld.com, Hootsuite & We Are Social , 4 February 2019. [Online]. Available: https://www.digitalinformationworld.com/2019/02/internet-users-spend-more-than-a-quarter-of-their-lives-online.html. [Accessed on 31 July 2021].

[37] Indonesia Survey Centre, Laporan Survei Internet Asosiasi Penyelenggara Jasa Internet Indonesia 2019-2020 (Q2), Asosiasi Penyelenggara Jasa Internet Indonesia, Jakarta, 2021.

[38] M. Safdar, K. Mahmood and S. Qutab, Internet Use Behavior and Attitude of CollegeStudents: a Survey of Leadership Colleges'Network, *Library Philosophy and Practice (e-journal)*, pp. 1-9, 2010.