

The Influence of Self Efficacy on Cognitive Load In Online Learning In The Pandemic Covid-19 On Nursing Students

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Abstract: *online Learning is enacted as an effort to prevent the spread of covid-19. Various limitations and obstacles encountered during the process of online learning in the pandemic demanded adaptation better than educators and learners. Students need to do self-adjustment in learning and are expected to have the self efficacy to master and complete a task in online learning. Educators need to do the management of cognitive load in learning. The purpose of the study to determine the effect of self efficacy against the cognitive load in online learning in the pandemic covid-19. Quantitative research methods are correlational, involving 316 respondents. The process of data collection is done online. The results of the univariate analysis showed the majority of respondents have the level of self efficacy is high enough (27,2%), cognitive load category (73,1%). Most of the respondents have ICL the moderate category (66,8%), the ECL moderate category (71,8%) and all respondents have a GCL category (100%). Bivariate analysis using the correlation provided by kendall's tau-b shows there is significant influence the level of self efficacy of respondents to rate the cognitive load of the respondents where the value of Sig. (2-tailed) is 0.048% ownership of < 0.05, with the degree of influence of level of self efficacy of the respondents on the level of cognitive load that is very strong (of 0.96). Based on the results of the study, it is expected that lecturers can optimize the ability of students and develop values/character that support to increase self efficacy of students and make improvements learning strategies to reduce cognitive load of students.*

Keywords: *cognitive load, ECL, GCL, ICL, self efficacy*

INTRODUCTION

The pandemic covid-19 has a major impact on various aspects of life, one of them the field of education. Almost all schools or educational institutions in the whole world is closed. Students are instructed to learn in the house (learning from home), teachers work and teach from home (work from home). Teaching and learning activities before a lot is done directly (face to face) turned out to be learning online. Online learning in Indonesia in effect since March 9, 2020 with reference to the Circular Letter No. 2 and 3 of the Ministry of Education and Culture of Indonesia (Kebudayaan, 2020).

Politeknik Kemenkes Tasikmalaya has imposed tuition online since March 30, 2020. Measures taken include setting a policy of online learning, revise the academic calendar tailored to the needs of students and the ability of the Program Study with regard to the safety of the entire academic community and refers to the guidelines online. Optimization of online learning (e-learning) and restrict the activities of face-to-face, with learning modules that can be accessed through the <http://bppsdmk.kemkes.go.id/pusdiksdmk/modul-bahan-ajar-tenaga-kesehatan> and <http://vilep-poltekkes.kemkes.ac.id;http://bitly/BATBD2019>.

The changes are quite sudden due to a pandemic covid-19 this, of course requires the readiness, from both infrastructure and human resources educators and learners. Some educational institutions do not yet have an optimal preparation to organize the learning online. Whereas the key of the success of the learning process is preparation and planning. The lack of preparation of teachers and limitations in operating digital technology to start the learning process in e-learning. Surely this contributes to the acceptance of students in the learning process online. Similarly, the limitations of the learners in following the process of online learning, such as lack of internet quota, less stable signal/network at home, the number of tasks given by the teachers. The results of preliminary studies, the general impression felt after the student has applied learning from home and stay at home is quite tiring and lead to saturation. Students prefer face to face lectures, because the material presented by the lecturers is obvious, especially when the activities of practice. Face to face lectures also provide flexibility in accessing library services and laboratories, as well as allowing direct interaction with teachers and friends.

Institution Politeknik Kemenkes Tasikmalaya issued the Decision of the Director of the poltekkes Kemenkes Tasikmalaya number HK.02.03/1/1465/2020 guidelines about the teaching and learning process (PBM) online, followed by Learning Guidelines Online on the pandemic issued by the Director of the poltekkes Kemenkes Tasikmalaya March 18, 2020. The activities of the learning process for students of the second semester of FY 2019/2020 experience a change of face to face lectures in class to the lecture online. For lecturers, students and educational institutions that are not yet familiar with the lecture online, need to make adjustments in a short time. A variety of constraints become important records for *Poltekkes Kemenkes Tasikmalaya* who should pursue online learning quickly. Though technically and the system is not all ready. During this process of learning online is not running as it should be, still as a technical device, not as a way of thinking as the paradigm of learning. Online learning is not a method to change learn face-to-face with digital applications. Learning online is not anyway give you a burden for the students with tasks that piled up every day. Learning online is precisely supposed to be able to encourage students to become creative access as much as possible the source of knowledge, produce the work, sharpening the insights and form the student become a lifelong learner (Tasikmalaya., 2020b).

Refer to the Guidelines for Teaching and Learning online, the process of teaching and learning theories was performed by the method of the online (Learning From Home /LFH) by using the media application either low technology or high technology in accordance with the achievement of competence courses. The implementation of LFH consider the ability, accessibility and affordability of access for lecturers and students. Methods of online learning can be done with WhatsApp group, email, zoom, skype, meet, hangout and other facilities and Virtual Learning Poltekkes Kemenkes (VILEP). Evaluation of the learning process the theory becomes the responsibility of each program of study.

The department of Nursing *Poltekkes Kemenkes Tasikmalaya* has held a workshop to refresh the use of the application VILEP. This application is a service portal e-Learning in the poltekkes Kemenkes integrated under the coordination of the Education Center of human resources for Health, VILEP serves portal online courses for the whole academic community of the poltekkes of the Ministry of health in order to increase the quality of education. Every student of Poltekkes Kemenkes identified as a user VILEP can be connected to the site e-Learning / Learning Management System (LSM)VILEP in each poltekkes. Each LMS Poltekkes Kemenkes has a diverse range of content and learning activities that can be accessed wherever and whenever desired from a wide variety of electronic devices such as computer or notebook, your smartphone, tablet and different types of other devices (Tasikmalaya., 2020a)

However, in the implementation of the learning process on the pandemic covid-19 there are constraints of use of VILEP due to a sharp increase in the number of accessed application VILEP from across the poltekkes of the Ministry of health in Indonesia. Various limitations and obstacles encountered during the learning process online in the pandemic covid-19, make a media learning is more flexible. Learning apps online has become an alternative option for lecturers is Google Class Room (GCR), zoom meeting, hangout, email, to application WhatsApp (WA). The process of coordination and to facilitate communication created a group (WAG) each class, special media delivery of information learning.

Mental load students are the things that need to be observed from the use of online learning (e-learning). The results of the research Widyanti et.al. (2020) prove that students in higher education in Indonesia has a high level of readiness of e-learning and higher mental workload in e-learning is high compared to learning face-to-face (Maseleno et al., 2019). In line with the results of the research (Kuntarto, 2017) in Jambi shows online learning is a challenging experience compared to conventional learning models or face-to-face.

Various studies about self efficacy be connected with learning achievement (Manullang, 2015), learning motivation (Adman, 2017), resilience (Oktaningrum, 2018), self-adjustment in learning (Mahmudi, 2014). The knowledge of the researchers, not much research self-efficacy specifically related to conditions pandemic covid-19. The results of other research that can be used as evidence based in this research such as research (Zimmerman, 2000) showed the role of emotions in academic to cognitive performance, especially cognitive load. Self efficacy predict emotional academic of the learners in learning the content of the lesson. Emotions academic influence on one's work in utilizing cognitive resources and more influential on learning achievement. Research Sunawan recommend to do further research on the context of online learning and multimedia. Based on the description above, the researchers wanted to determine the effect of self efficacy against the cognitive load in online learning in the pandemic covid-19 in the student Study Program Diploma III nursing *Poltekkes Kemenkes Tasikmalaya*.

LITERATURE REVIEW

Self efficacy

Self efficacy is one's judgment on the ability of the self to organize and display the necessary action in achieving desired performance. Self efficacy shows self-confidence to achieve goals on the basis of the business themselves. Self efficacy is closely related to beliefs about what can be done by a person and the various efforts that have been made of a person in performing a task and his ability to survive. An optimistic attitude or a strong belief in the ability owned by oneself, can boost morale and fighting power of someone, so that he will continue to strive to be able to achieve the expected goals (I. Sunarti, 2018).

(Baloran, Erick T. & Hernan, 2020) Self efficacy is self-assessment of the ability of a person to master the task. Self-efficacy includes judgments about one's ability to complete the task as well as confidence in the ability or skill to perform the task. In the context of this study, self efficacy is the judgments and beliefs the student to master and complete the task in learning online.

Cognitive Load

The theory of cognitive load is a psychological theory that aims to predict the results of the study with attention to the capabilities and limitations of the architecture of the human cognitive (Kirschner, 2002). The theory of cognitive learning emphasizes the mental processes that can not be observed that people use to learn and remember information or new abilities (Plass et al., 2010). Cognitive load is the mental effort that must be performed in working memory to process information received at a certain period (Sweller, J., Ayres, P., Kalyuga, 2010).

Management or processing of information in human cognitive called the theory of information processing. The main part of the system memory works in information processing is short-term memory and long term memory (Schnotz & Kürschner, 2007). Long-term memory is the system memory became a place to store information in a long time. Short-term memory (working memory or working memory) is a storage system that can contain information in a limited number for a few seconds. According to the theory of cognitive load, the strength and limitations of the architecture of the human cognitive is derived from instructional design.

Online Learning

Definition of learning according to the law Number 20, 2003 challenge of the National Education System is the process of interaction of students with educators and learning resources in a learning environment. Online learning is learning without face-to-face directly between lecturers and students, but done online. Learning can be done through the video conference, e-learning or distance learning. Some of the terms that are often used for online learning, including e-learning, System,

Online Learning, the Online Learning Model (OLM) and computer-based learning (Van Bruggen, 2005).

E-learning is information and communication technology to enable students to learn whenever and wherever. E-learning is an innovation that can be utilized in the learning process, not only in the delivery of learning materials but also a change in the ability of the various competencies of learners. The method of e-learning is a way in the process of teaching and learning that uses electronic media and the internet as an intermediary in the process of teaching and learning (Kanninen, 2008).

Learning online conducted when the pandemic covid-19, more demanding adaptation and independence of the student in learning the material and completing the assignments given by the lecturer. Learning online is clearly different with learning conventional face-to-face, can cause cognitive load (cognitive load) for the students. Cognitive load consists of 3 components, namely Intrinsic Cognitive Load (ICL), Extraneous Cognitive Load (ECL) and Germane Cognitive Learning (GCL). ICL depends on the level of the complex the material, the more elements and the linkages between the elements of the (increasingly complicated), it will cause ICL high. ECL relies on the way of presenting the material to be studied. If the presentation of the material, it can reduce the ECL, on the contrary, if the material is not designed properly, then there is the cognitive processes that are not relevant and efficient. GCL emphasis on the process or the effort that is done by the students in solving the problem after get learning. Individual characteristics, motivation, attitude towards the studied material, learning style and experience and knowledge can affect the GCL (Paas et al., 2003).

RESEARCH METHODS

This research is quantitative correlation with the independent variable self efficacy and the dependent variable cognitive load. The study population was all Nursing students *Poltekkes Kemenkes Tasikmalaya* academic year 2019/2020 which amounted to 477 people. The sampling technique using total sampling. The number of respondents involved in the study were 316 people. The scale of self efficacy is modified by the researcher based on aspects of self efficacy which was stated (Flammer, 2015).namely the level of magnitude, strength and spread. The scale of self efficacy is adopted from the components of the self efficacy of learning and performance from Motivation and Learning Strategies Questionnaire (MLSQ) developed by (Martin, 2013). The scale of cognitive load was adopted from the Cognitive Load Questionnaire developed by Leppink, Pass, Gog and Marrienboer (2014). The scale of cognitive load (cognitive load) for the third component (ICL, ECL and GCL) consists of 12 of the statement with 7 scale (1 = very low to 7 = very high).

The process of data collection research was conducted online, respondents fill out a questionnaire self efficacy and cognitive load through the google form (bit.ly) has been released. This is in accordance with the policies imposed in the pandemic covid-19. Data analysis the study was conducted by univariate and bivariate. Univariate analysis to analyze the frequency distribution of the level of self efficacy and the frequency distribution of the level of cognitive load of the respondents. Cognitive load is analyzed further on the basis of three types, namely ICL, ECL and GCL. Bivariate analysis using rank correlation analysis Kendall to find the relationship and influence the level of self efficacy against the cognitive load of the respondents in online learning in the pandemic covid-19. The processing of the data was conducted with SPSS 18.0 for windows.

Results Of The Research

The results of the univariate analysis of this study in the form of the distribution of the respondents based on the level of self efficacy and the distribution of the respondents based on cognitive load. The second distribution is presented in table 1 and 2 below :

Table 1.

Distribution Respondents Based on The Level of Self efficacy		
Self Efficacy Level	Frequency (F)	Percentage (%)
Very low	15	4.7

Low	59	18.7
Quite low	36	11.4
Moderate	63	19.9
High enough	86	27.2
High	52	16.5
Very high	5	1.6

The majority of respondents have the level of self efficacy is high enough, i.e., to 27.2%. A small proportion of respondents (1.6 percent) have a level of self efficacy is very high, and there is a 4.7% of respondents with the level of self efficacy is very low.

Table 2
Distribution of Respondents Based on The Level of Cognitive Load

The Level of Cognitive Load	Frequency (F)	Percentage (%)
Low	42	13.3
Moderate	231	73.1
High	43	13.6

The cognitive load that is owned by most of the respondents (73,1%) in the moderate category. Further, the results of the analysis of the three types of cognitive load are presented in table 3 below :

Table 3
Distribution of Respondents Based on the Level of Cognitive Load : ICL, ECL and GCL

Types of cognitive Load	The Level Of Cognitive Load	Frequency (f)	Percentage (%)
ICL	Low	63	19.9
	Moderate	211	66.8
	High	42	13.3
ECL	Low	44	13.9
	Moderate	227	71.8
	High	45	14.2
GCL	Moderate	316	100.0

Most of the respondents (66,8%) had the ICL in the moderate category, the majority of respondents (71,8%) have an ECL in the moderate category, and all respondents (100%) has a GCL in the moderate category.

Table 4
The results of the Correlation Test of the Influence of the Level of Self Efficacy against the Cognitive Load

	Correlation	Self efficacy	Cognitive load
Self efficacy	Correlation coeff.	1.000	.096*
	Sig. (2-tailed)		.048
	N	316	316
Cognitive load	Correlation coeff.	.096*	1.000
	Sig. (2-tailed)	.048	
	N	316	316

Based on table 4 it can be concluded, that there is a significant influence the level of self efficacy of respondents to rate the cognitive load of the respondents where the value of Sig. (2-tailed) is 0.048% ownership of < 0.05 . The degree or strength of influence the level of self efficacy of respondents to rate the cognitive load of the respondents in this study is very strong, where its value is 0,96.

DISCUSSION

An overview of Self-Efficacy in Online Learning in The Pandemic Covid-19

Self efficacy in this study grouped into 7 (seven) categories, namely : very low, low, quite low, moderate, high enough, high and very high. The results showed the level of self efficacy that is owned by most of the respondents included in the category of high enough (to 27.2%). This gives the information that the self-efficacy held by students of the Department of Nursing during the process of online learning in the pandemic covid-19 is high enough. Although students feel the significant changes of the system of lectures which is generally done face-to-face being face-to-virtual (virtual), but students continue to adapt to follow the online learning in the pandemic. Students with a level of perseverance that is quite good, it remains to carry out the assignment or follow the activity of the learning program. Students do not easily give up or avoid the task given by the lecturer.

Respondents with self efficacy are high will have the confidence that they are able to do something to achieve success, able to follow online learning in the pandemic covid-19 with better. Respondents who have self efficacy is low, have the perception that they are not capable of doing the tasks given in the learning process online, so feel pessimistic about its success during the following process and evaluation of online learning in the pandemic covid-19.

A small proportion of respondents (4.7 percent) have the level of self efficacy is very low, meaning that there are still respondents who have less self-belief. This can be caused by differences in the ability of the respondents in receiving the lecture material during the process of learning online and the difference in the ability of respondents to learn independently in order to explore the material being studied. Based on the results of the analysis of qualitative data about the impression and message to the online learning, obtained the information for the administration of the tasks given by the lecturers of any subjects sometimes piled up so not all assignments can be solved optimally and on time.

Self efficacy is an important thing that need to be owned by everyone, including learners and educators. The office of the high intelligence possessed by the learners, if not accompanied by high self efficacy, then students will never be able to achieve the optimal learning. The role of educator in an educational institution is very important in improving the confidence of learners. Every educator should have a commitment to high work, includes a commitment to the organizers of educational institutions, commitment to students, commitment to teaching and commitment to the profession as an educator. This is consistent with the results of the research (Baloran, Erick T. & Hernan, 2020), that the crisis of the self efficacy significantly affects work commitment of educators during the pandemic. Educators can utilize the pandemic covid-19 is to build self efficacy in teaching (Resnick, 2011). (Bandura, 2000) asserts that the belief in self efficacy (self efficacy biliefs) comes from four sources namely, mastery experiences, vicarious experiences, verbal persuasion, physiological and affective states). An educator with the belief in self efficacy is high, plays an important role for learners and belief in self efficacy high proven benefit of learning (Bandura, 2000). In other words, if teachers have self-efficacy is high, it is expected that the educator is able to create a conducive learning environment that encourages learners to use his abilities optimally. Thus, learners will have the self efficacy is high.

If compared with some results of previous research about self-efficacy, has a variety of grouping levels of self efficacy, so the results are quite diverse. Research (T. Sunarti et al., 2018) using 3 (three) categories of self efficacy, namely high, moderate and low. The results of the research Sunarti aligned with the findings in this study, that most of the respondents of the research have self efficacy is high (77%). Different categories found on the research (Manullang, 2015), self-efficacy was grouped into 4 (four) categories, namely very good, good, quite good and less good. The results of the research Manullang shows most of the respondents have average to 2.84, which means that

self-efficacy better. The results of the research (Fitriana,S., Ihsan, H. & Annas, S. 2015) to distinguish the level of self efficacy in 5 (five) categories, namely very high, high, moderate, low and very low. The results of the research Fitriana et.al this shows the majority of respondents have self efficacy is high (75,58%). The results of the research (Adman, 2017) indicates the level of self efficacy that is owned by most of the students of Private Vocational Schools in the Western District belongs to the moderate category.

The results of the research (Sunaryo, 2017) presented the average score of the overall scale self efficacy was 3.07, also it is included in the positive category. More elaborated on the basis of the dimensions of self efficacy data obtained score average dimension of a magnitude of 3.1 which means positive, the dimensions of the spread of scores on average of 2.9 which means the negative and the dimensions of the strength score on average of 3.2 which means positive. The dimensions of the magnitude associated with the level of difficulty of the task faced by the learners. The dimensions of spread describe the feeling of ability shown by learners in the context of different tasks. The dimensional strength is the strong belief of learners with regard to their ability.

Similar to this study, research (Sunaryo, 2017) also use the classification of self efficacy 7 category. The level of self efficacy obtained from the calculation results in the form of conversion score average. Based on the results of the conversion of the scores the average overall is 3.07 n / a, then it belongs to the category of self efficacy levels are. This means that students in MTsN 2 Ciamis have the level of self efficacy are towards learning Mathematics. The results of the conversion of the score of the average of the third dimension is : the dimension of the magnitude to 62 (moderate level), the dimensions of the spread to 58 (the moderate level) and dimensional strength to 64 (moderate level).

The results of the research (Amir, n.d, 2016) on the 140 students of the Chemical Education FKIP Bengkulu University showed that the self efficacy of students has a significant and linear to achievement motivation. The better and high level of self efficacy of students, it will be followed by an increase in achievement motivation of students. Vice versa, the lower the level of self efficacy of students, the lower the motivation possessed by the students to excel.

All countries in the world affected by the pandemic covid-19, in this case in the field of education. Similar to the conditions in the country of Indonesia, in a Spanish University also tries not only to adapt to changes caused by the pandemic covid-19, but also have to face a model new methodology e-learning (Wargadinata, W., Maimunah, I., Dewi, E. & Rofiq, 2020). This situation can lead to increased stress due to the uncertainty of the changes that occur in the pandemic. Research (Alemany-Arrebola I, Rojas-Ruiz G., 2020.) involved 427 students of University of Granada (Spain) aims to analyze the relationship between self efficacy perceived in the period of the pandemic with the level of trait anxiety and status anxiety during the covid-19. The results showed that there is a relationship that is inversely proportional between anxiety and self efficacy; men show the perception of self efficacy the highest, while the women had a score of anxiety (TA and SA) higher. Student shows the level of anxiety is high (TA and SA) express more negative emotions and also perceive self with self efficacy academic low.

Different with this research, the research (Alemany-Arrebola I, Rojas-Ruiz G.,2020), self efficacy academic classified into three groups namely self efficacy academic low, self efficacy being and self efficacy of high. Data shows 99 respondents (23,2%) have the level of self efficacy is low, among them there are 42 people (42,4%) shows the level of status anxiety and trait anxiety were very high. Of the 42 people, 39 women and 3 men show a level of status high anxiety. Additional Data from this study, the anxiety experienced by students is increasing with the presence of one case of a student suffering from covid-19, and 19 relatives of respondents exposed covid-19 and five of them have died as a result of covid-19. Respondents who lost relatives due to covid-19 get the value of the self efficacy academic lower. The results of the analysis of the inferential based on the variable gender shows a significant difference. The woman shows the level of self efficacy are lower than men (the average in men 14,73 while the average in women 12,91).

The results of the research of (AM, Al Qahtani, AL Mani, SY, Ibrahim, HA, Elgzar, WT, Elfeki, NK, Alessa, MA, Alyami, BH, Almuqati, RM, & Alwadei, 2020) involving 761 students of the University of Najran Saudi Arabia showed that the majority of respondents (45,9%) have self-efficacy were, and 22,9% of them have self efficacy low to face the pandemic covid-19. Furthermore,

a statistically significant relationship ($p < 0.05$) between the self efficacy of the respondents related to the pandemic covid-19 and gender, college, marital status, and income of their families. On the other hand, there is no relationship between the self efficacy of the respondents by age, residence and history of any chronic disease.

Someone who has self efficacy high can regulate their emotions and manage their time while experiencing stress. Self efficacy is the mental component that is vital for health in times of crisis. Self-efficacy produces self-confidence that it is better to control the pandemic and lead to a more optimistic view.

Research (Yang X, Zhang M, Kong L, Wang Q, Hong J. 2020) has developed the innovation models of teaching and learning based game that is supported by the intelligence technology mobile. Model Question-Observation-Doing-Explanation (QODE) - based smartphone built and applied to the learning of science during the pandemic covid-19. The results of the research prove there are two types of self efficacy scientific shown by the ability to learn scientific and behavior scientific study to correlate negatively with anxiety cognitive. While, anxiety cognitive also negatively correlated with the four types of involvement of science in the form of the involvement of cognitive, emotional involvement, involvement of behavior and social engagement through the interaction of the smartphone. These findings provide further evidence for learning-based games that promoted by the smartphone, contributing to a deeper understanding of the association between self efficacy scientific, anxiety and cognitive engagement of science. The implications of this study indicate that the model of the QODE is appropriate to be implemented on smartphone devices for science learning students.

Research (A.Patricia Aguilera-Hermida., 2020) by involving 217 learners investigated the use and acceptance of learning emergency online in the pandemic covid-19 by the student. Factor to be analyzed is the attitude, influence and motivation (behavior that is perceived of ease of use of technology, self efficacy and accessibility), as well as the involvement of cognitive. The results of the research show that motivation, self efficacy and the use of technology plays an important role in cognitive engagement and academic performance of learners. In addition, learners prefer learning with face-to-face (offline).

With regard to the ease in the use of technology, the results of qualitative research are descriptive of (Wargadinata, W., Maimunah, I., Dewi, E. & Rofiq, 2020) in Malang shows that online learning is most effective in the beginning of the pandemic covid-19 is WhatsApp. The application WhatsApp is rated easy, simple, and does not require packet data quota that large. Through WhatsApp, online learning can take place optimally because students and professors can communicate and share PowerPoint files, Microsoft Word files, JPG, Voice Notes, Videos and links to other learning sources.

Learning Model that can be applied in the pandemic covid-19 is learning through a network system, such as e-learning prepared by the college through the campus website or by using the online application (Sintema, 2020). Learning design instructional integrated based on the approach constructive can be done by utilizing online social media, such as blogs, wikis, photo sharing, video sharing, instant messaging, and social networking sites that can be accessed by learners or educators (Saekhowa, 2015).

Today in the era of the industrial revolution 4.0, the application of information technology in all fields, including the field of education. Policy management education in Indonesia has encouraged all levels of education, especially higher education to take advantage of advances in digital technology and computing education the era of the industrial revolution the fourth. Some efforts can be done according to Syamsuar & Reflianto (2018) is the suitability of the curriculum and policy in education, the readiness of Human Resources (HR) in utilizing Information and Communication Technology to optimize the ability of learners and develop value-the value (character) of learners and the readiness of facilities and infrastructure-based learning digital.

Cognitive load in Online Learning in The Pandemic Covid-19

Instruments cognitive load in this study used to classify respondents into 3 (three) categories, namely cognitive load categories of low, moderate and high. Based on the results of this study, it is known that the majority of respondents have the cognitive load in the moderate category (73,1%). It

means the cognitive load is perceived by the respondents in online learning in the pandemic covid-19. The findings of this study are similar with the results of the research (Tejamukti, 2017) prove most of the respondents have the cognitive load in solving mathematical problems a moderate level (68%). The high and low cognitive load received by the learners when doing the learning activities will affect the ability of the learners in understanding the information (Tejamukti, 2017). If the cognitive load of learners including the moderate category, then the level of students' understanding of the material presented teachers and performance of learners in learning is not yet optimal.

Cognitive load theory is distinguished into 3 (three) namely cognitive load intrinsic (Intrinsic Cognitive Load / ICL), the cognitive load extraneous (Extraneous Cognitive Load / ECL) and the cognitive load germane (Germane Cognitive Load / GCL). According to the third type of cognitive load, the majority of respondents have ICL the moderate category (66,8%), the ECL moderate category (71,8%) and all respondents (100%) has a GCL category. More research data is known, only 13.9% of respondents with ECL low, meaning that only a small fraction of the respondents who have had performance good learning. In addition, a small proportion of respondents (14,2%) have an ECL high, meaning there are still respondents who have performance learn bad. The higher the ECL, the performance of learners in learning is getting worse, and the higher the GCL then the performance of learners the better.

ICL and ECL is the cognitive load that is associated with the element interactivity in learning, while the GCL is the cognitive load associated with the mental effort that is relevant to understanding. Principles in application of learning, ICL must be managed as well as possible, the ECL must be suppressed as low as possible and the GCL should be increased (Jong, 2010).

The results of research conducted by (Juanengsih, N., Rahmat, A., Wulan, A.R. & Rahman, 2018) presented data on the level of cognitive load with the details of ICL, ECL, and GCL. Average ability to process information students by 91,12 (ICL low) with the value of the average business mental of 61,31 (ECL high), while the average learning result 37,39 (GCL low). The results of the statistical test known correlation to the ability to process information by mental effort inversely (negative correlation), which means the ability to process information can reduce the mental effort in the lecture of cell biology. High ECL and low GCL provides implications for the need for improved instructional strategies to reduce cognitive load of students.

The theory of cognitive load was developed based on the human cognitive system (J. Sweller, 2010). Three assumptions are developed, namely : 1) working memory (working memory) has limited capacity to process new information or more complex information, 2) the long-term memory (long term memory) have a capacity not limited to, 3) learning is to build knowledge through schema acquisition and automation (Sweller, J., Ayres, P., Kalyuga, 2010). The learning process done well and in harmony can build human cognition, including working memory and long term memory as its main memory. For learners who do not have initial knowledge sufficient to recognize and process new information or complex, the ability of working memory to organize knowledge is becoming increasingly low. Consider the capacity of working memory, then the learners will learn new material or complex, preferably facilitated by a learning design that minimizes cognitive load in working memory.

According to (John Sweller, 2010) there are two sources that cause the cognitive load in working memory, namely the complexity of the elements in the teaching material (intrinsic cognitive load/ICL) and the presentation of the teaching material (extraneous cognitive load/ECL). Second the cognitive load is accumulated in the working memory. ICL cannot be altered/conditioned because it is related with the complexity of interconnectedness of the elements in the material are natural (Kirschner, 2002). A material having ICL high or low, need to be adjusted with knowledge possessed before. As an overview on the curriculum education of Diploma III of Nursing, the placement of the skill courses at the semester continued and carried out gradually. For students level I Diploma III Study Program of Nursing, the material in the course of the Expertise of Nursing has ICL high, but for a student of level III this material has ICL low. Course level student I will acquire the basic courses first before skill courses the nursing.

ECL can be conditioned because it is very dependent on how the presentation of the material. The material is complex when presented in problem solving complex will be difficult to learn by students. This causes the ECL high. However, if the material is well presented and clear, for example

the presentation of the material accompanied with the provision of examples or guidance are carried out systematically, then the complex material can be easily studied due to the ECL low. If the accumulation of ICL and ECL is minimized, then the working memory will have a capacity for GCL. The capacity of the GCL is the capacity to think to understand the material and building it into knowledge that is structured (Sweller, J., & Chandler, 2000).

ICL is constant, can not be manipulated because it has become the character of the interactivity elements within the material. ECL can still be conditioned, such as by performing learning using the techniques of the presentation of the material is good, it can facilitate the understanding of the learners so that they can lower the ECL. Understanding of a material can easily occur if there is prerequisite knowledge that is adequate and can be called from long term memory. If the knowledge of these prerequisites can be present in the working memory automatically, then the ECL will be the minimum. The more knowledge that can be used automatically, the lower the cognitive load in working memory. In this case, the working memory capacity to be increased (Sweller, J., Ayres, P., Kalyuga, 2010)

Though on the material of which the burden of high intrinsic, or by other terms of the ICL material is high, but if the material can be presented well, then the cognitive processes in working memory will be running smoothly. On the contrary, even if the ICL of the material belongs to the category of light, but if the material is presented with is not good, like the material too much or the delivery of the material is not systematic, then the cognitive processes in working memory will run slowly or stop. GCL provide a space of cognitive processes that are relevant to the understanding of the material being studied and the process of building knowledge (acquisition scheme). If there is no capacity of thinking that is relevant to the understanding of the material, means that the working memory can not organize, build, code, elaborating or integrating the material that is being studied as the knowledge is stored properly in long term memory (J. Sweller, 2010). In other words, the material or the information presented can not be well studied. The information may be successfully stored in long-term memory, but it may be difficult to be called back or not integrated with the relevant knowledge. This resulted in a slow process of learning which is related in the next.

However, the constructive process in learning can be influenced by the motivation and attitude of students towards the studied material (Paas, F., Tuovinen, J. E., van Merriënboer, J. J. G., & Darabi, 2005). In the absence of motivation and a good attitude toward the learning process, although the material has been prepared and presented according to the characteristics of the learners, the learning outcomes may not be optimal.

Success or success in the process of learning can be achieved when starting with the preparation and selection of appropriate learning strategies. According to the implications of the theory of cognitive load, preparation of a plan of learning methods includes : 1) the need to understand the level of complexity of the material to be studied or the amount of information to be delivered, 2) the need to determine the level of initial knowledge of learners who will study some of the materials presented, 3) minimize the sum of ICL and ECL, and 4) facilitate the process which can improve the GCL, namely, to build a scheme of knowledge, and 5) establish the composition of a good scheme and facilitate the automation scheme through exercise.

The influence of Self efficacy on Cognitive Load

The results of this study prove that there is a significant influence the level of self efficacy of respondents to rate the cognitive load of the respondents where the value of Sig. (2-tailed) is 0.048% ownership of < 0.05. As for the value of the degree/strength of the influence is 0.96, the means influence the level of self efficacy on the level of cognitive load of the respondents is very strong (Sarwono, 2015). The findings of this study aligned with the results of the research of (Vasilea C., Marhana A.M, Singera F.M & Stoicescua, 2011) which shows that there is a direct relationship between self efficacy academic and cognitive load in an academic environment. Self efficacy shows confidence in one's self to achieve goals on the basis of the work done yourself (Bandura, 2006). Self efficacy is associated with beliefs about what can be done by a person and the various efforts that have been made of a person in performing a task according to his ability. An optimistic attitude or a

strong belief in the ability owned by oneself, can boost morale and fighting power of someone, so that person will continue to strive to be able to achieve the expected goals.

Learners who have self-belief or self-confidence can increase aspirations for themselves. They can show the flexibility of greater strategic in finding solutions, achieving the performance of higher intellectual, and more accurate in evaluating the quality of their performance. Different with learners who do not have confidence, even to have cognitive abilities equivalent (Bandura, 2006)

Self efficacy can lead to differences in the way people act, as a follow-up of feelings and thoughts. Self efficacy is low be connected with the performance results in a low work, low self-esteem and negative thoughts about the development and achievement of one's personal. Self efficacy high leads to a sense of strong competence, it helps the cognitive processes and the appearance of performance in a variety of fields including academic achievement.

The results of other research, from (Sunawan, Yani S.Y.A, Kencana T.I., Anna C.T., Mulawarman, 2017) to 487 students Majoring in Guidance Counseling FIP Universitas Negeri Semarang showed that self efficacy affect the emotions of the academic (in the form of pleasure, anger, and boredom, and anxiety indirectly). Furthermore, emotions academic affect cognitive load, where the ECL is affected by pleasure, anger and boredom, ICL is affected by pleasure and anxiety, while the GCL is only affected by the pleasure of course. The pleasure mediates the self-efficacy with ECL in the negative, but mediate self-efficacy with ICL and GCL are positive. Anger mediates the self-efficacy with ECL in the negative. Boredom mediate self-efficacy with ECL and ICL in the negative.

Self efficacy have an impact on the emotions of academic students during the learning process. Learners who have a level of self efficacy high inclined can enjoy learning so that the emotional state of academic them is a pleasure. In these circumstances, learners will assess themselves able to study the course material given by teachers with good. The pleasure will encourage learners to optimize the utilization of GCL in following the learning. On the contrary on the learners who have self efficacy moderate /low, tend to be less/not enjoy the learning, in other words, feeling bored or angry. This will certainly have an impact on the increase in ECL.

The results of the analysis of the research data (Feldon, D.F. Franco, J, Jie Chao, Peugh, J, & Maahs-Fladung, C, 2018) explained that the cognitive load imposed on working memory can affect the confidence the motivation in this case self-efficacy. If students have a cognitive load that exceeds their working memory capacity, then despite the maximum mental effort exerted from students, it is not sufficient to achieve learning outcomes (Kirschner, 2002). ECL is too high can hinder learning, also related to the decline in persistence and motivation of students. Therefore, the educator is expected to reduce the ECL to increase the self efficacy of the learners, so that it can be beneficial to the process of knowledge acquisition.

CONCLUSION

The conclusion of this study is :

- a. The majority of respondents have the level of self efficacy is high enough (27,2%), a small proportion of respondents (1.6 percent) have a level of self efficacy is very high, and there is a 4.7% of respondents with the level of self efficacy is very low.
- b. Cognitive load overall of the respondents of the study, is dominated by cognitive load in the moderate category (73,1%).
- c. Most of the respondents have ICL in the moderate category (66,8%), the ECL in the moderate category (71,8%) and all respondents have the GCL in the moderate category (100%)
- d. There is a significant influence the level of self efficacy of respondents to rate the cognitive load of the respondents where the value of Sig. (2-tailed) is 0.048% ownership of < 0.05, with degrees or strong influence of the level of self efficacy of the respondents on the level of cognitive load that is very strong (of 0.96).

Recommendations

Expected educators/lecturers can optimize the ability of students, developing values/character that support to increase self efficacy of students and make improvements learning strategies to reduce

cognitive load of students. For other researchers, it can be followed up with research on the relationship of cognitive load to the learning style of learners.

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