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INVESTIGATING STUDENTS' SELF-REGULATED LEARNING LEVELS DURING THE COVID-19 PANDEMIC

Baihaqi Siddik Lubis, Eko Febri Syahputra Siregar, Ismail Hanif Batubara

Universitas Muhammadiyah Sumatera Utara

Abstract--During the covid-19 outbreak, self-regulated learning was the primary goal of online education. The purpose of this study is to examine how students' universities self-regulate their learning levels during pandemics. The study employed a quantitative survey design. The subject was 344 students who answered a questionnaire regarding their universities' self-regulated learning levels. SPSS 22 for Windows will be used to analyze the data collected. (1) Student revenge occurred most frequently in the following cities, according to the findings. (1) The majority of student levies originated in Medan City and Deli Serdang Regency, whereas the average student originated in a village; (2) The primary factors supporting online learning during the covid-19 pandemic were network and device availability; and (3) Self-regulated learning levels at students' universities were moderate during the covid-19 pandemic. We suggest that students' university self-regulated learning levels remain within proportional boundaries. Students retain some control over their learning freedom during online learning.

Keywords: *Self-regulated Learning; domicile distribution; infrastructure; online Learning; Covid-19Pandemic.*

INTRODUCTION

Coronavirus (COVID-19) spread throughout schools and colleges, disrupting a variety of instructional and learning activities. Due to the rapid growth of covid-19, the Republic of Indonesia's Ministry of Education and Culture (Kemdikbud RI) developed a policy allowing students to attend school remotely (SFH). The educators', students', staff's, stakeholders, and community's health and safety become the impetus for this policy (Quezada, Talbot, & Quezada-Parker, 2020; Rasmitadila et al., 2020; Suryaman et al., 2020). Students who attend school from their homes (SFH) transition to online education. Throughout the epidemic, students are required to participate in both in-person and online studies. Instructors and students, on the other hand, can use e-learning to better their education. Lecturers deliver content in e-learning through e-modules, absences, discussions, quizzes, video learning, and evaluation.

Additionally, lecturers teach students using virtual media such as Zoom, Google Meet, and Whatsapp for a limited time. Numerous challenges face teachers and university graduates when it comes to online learning. Poor internet access is the fundamental reason for online learning limits (Sikirit, 2020). If there is a problem with the internet connection, pupils must work independently to learn the knowledge offered by their instructors. Additionally, support for online learning devices (Rasmitadila et al., 2020) and teachers' technological capabilities play a critical role in the effectiveness of online learning. According to El Firdoussi et al. (2020), students are unhappy with the learning supplied by their instructors amid the pandemic of online learning. Thus, self-regulated learning is a factor in pupils' academic performance (Boer, Donker-Bergstra, & M. Kostons, 2012). The success of online education is based upon the degree to which students self-regulate their learning (Sulisworo et al., 2020).

Self-regulated learning is a cognitive technique for active learning that enables individuals to be aware of their capabilities and circumstances, manage their learning, and initiate the learning

process (Chu, Li, & Yu, 2020; Jansen, van Leeuwen, Janssen, Jak, & Kester, 2019; Wan Yunus, Bissett, Penkala, Kadar, & Liu, 2021). Furthermore, Huang & Lajoie (2021) argue that self-regulated learning affects anticipation and tactics to acquire difficult-to-understand knowledge.

According to experts, self-regulated learning is crucial for academic success. Steffens (2006) feels that college students who have learning freedom are better able to self-regulate academically. Guo, Lau, & Wei (2019) assert that the achievement gap between high- and low-achieving students highlights the importance of self-regulated learning and motivation tactics. According to Zimmerman (2015), metacognitive, motivational, and behavioral processes that influence the personality of knowledge and ability requirements, such as goal setting, planning, learning strategies, self-recording, and self-teaching, all contribute to improving self-regulated learning. Boekaerts wishes students to acquire the necessary knowledge, talents, attitudes, and learning environments to engage in self-regulated learning (Boekaerts, 1999, 2017).

Thus, research is critical to determining the value of self-regulated learning by students during the covid-19 epidemic. The goal of this study is to thoroughly examine (1) the families of students who learned online throughout the pandemic; (2) the support for online learning facilities and infrastructure; and (3) the extent to which students self-regulated their learning.

RESEARCH METHOD

Research design

Because the phenomenon being examined is individual or group behavior related to self-regulated learning, this research used a quantitative survey method. The data collected in this study is numerical and will be examined using statistical techniques.

Participants

The research was conducted at Universitas Muhammadiyah Sumatera Utara. The population of this study is all students in Elementary School Teacher Education Program. The study sampled using a simple random sampling technique in which practically every member of the study population had an equal chance of being included in the research sample. According to a questionnaire distributed to 344 pupils, 14 were male, and 330 were female.

Procedures and Instruments of Research

This research instrument is a Google Forms-based online questionnaire that researchers distribute. It is simple to use and available to study participants regardless of their location. The questionnaire was constructed by combining data from relevant literature and creating a descriptor that the researchers would use to rank self-regulated academic learning learners. Linkert Scale was utilized in the questionnaire.

Additionally, the stage contains a questionnaire assessing validity and reliability. Validation and reliability tests are performed on questionnaires to ensure their high quality and the reliability of the data collected. The Formula Product Moment Correlation is used to determine the questionnaire's validity. Suppose $r_{count} > r_{table}$ at a significance level of 0.05 or 5%, the questioner's validity is established. The following formula is used to determine the validity and reliability of a questionnaire:

$$r_{xy} = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{\left\{N\Sigma x^2 - (\Sigma x)^2 (N\Sigma y)^2 - (\Sigma y)^2\right\}}}$$

Information
r_{xy}: Correlation coefficient between x and y
X: The value assigned to each item
Y: Item's total score

N: Number of samples

A reliability test follows valid questionnaire items. The rehabilitation test in the questionnaire is based on the alpha Cronbach formula. Alpha Cronbach devised the following formula:

$$r_{11} = \left[\frac{k}{k-1}\right]\left[1-\frac{\sum\sigma_b^2}{\sigma t^2}\right]$$

Information:
r_{11}: The questionnaire's reliability coefficient.
K: Numerous questions
$\sum\sigma_b^2$: Variance in the number of items
$\sum r^2$: Variance Total
The researchers used SPSS 22 for Windows to streamline questionnaire validity and reliability testing. The researchers will collect data from a representative sample of participants by administering verified and accurate questionnaire items.

Techniques for Data Analysis

After that, the quantitative data collected via questionnaires is categorized. Learning independence was classified as strong, moderate, or poor in this study. This data analysis activity makes use of Microsoft Excel and SPSS 22 for Windows.

FINDINGS AND DISCUSSION

Distribution of Students by Residence

Student distribution explains how student houses are distributed geographically by cities and districts. More precisely, inquire about the capital location of the hamlet, village, subdistrict, or region. These actions are taken to collect data, most notably to signal connections in the student area. The results of the student signal connection are depicted in Figure 4.2. The distribution of student domiciles based on available data is shown in Figure 1.

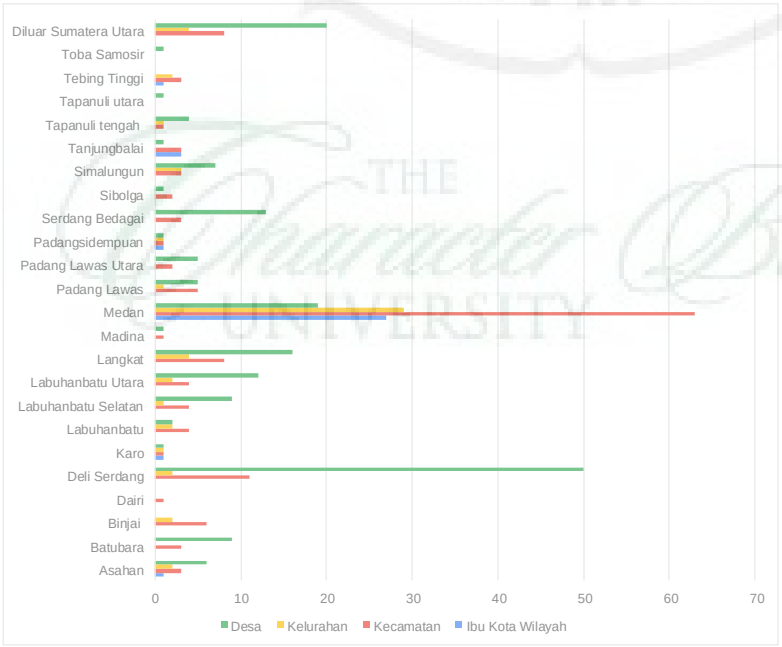

Figure 1. Student distribution by domicile

According to figure 1, students live in 23 districts/cities. The distribution of students by domicile begins in Medan, where 63 students are domiciled at the sub-district level, and concludes in the rural Deli Serdang Regency, where 50 students are domiciled. Additionally, 32 pupils traveled from areas outside North Sumatra. It is crucial to examine the student population dispersion because following the outbreak, education changed to online learning and many students returned to their hometowns. Additionally, other challenges in hamlet complicate the adoption of online schooling.

Infrastructure for Online Education

The availability of supporting infrastructures, such as learning gadgets, networks, and internet connections, affects online learning success. Students may encounter a variety of obstacles while pursuing an online education. The following data is provided in combination with the infrastructure for online learning support.:

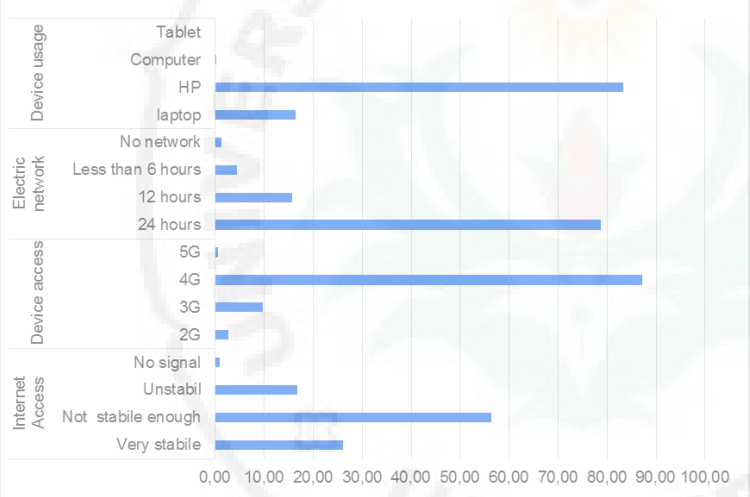

Figure 2. Infrastructure for supporting online learning

According to figure 2, up to 56% of students do not have consistent access to the internet for online learning. Around 26% of students have highly stable internet connectivity. Additionally, 83.33 percent of mobile phone usage is being spent on education.

The Questionnaire on Result Validity and Reliability

The result validity and reliability questionnaires are used to ensure the quality of research instruments and, as a result, the quality of data available to researchers. The following conclusions demonstrate that the validity and reliability tests are valid and reliable.:

Table 1. Test of Validity of self-regulated learning questionnaire

No	Indicator	Descriptor	r_{table}	r_{count}
1	Independence on others (IO)	Online education forces me to seek assistance from others.	0,235	0,301
		I attempt to answer each query following the settlement phase.	0,235	0,312
		I am pleased with the results.	0,235	0,371
2	Self-Confidence (SC)	I believe in my ability.	0,235	0,466
		I'm afraid to ask the question when I'm in problems.	0,235	0,407
		I am willing to engage in scientific discussions with my lecturer.	0,235	0,471

		I can communicate well with a large group of people.	0,235	0,489
3	Decipline (DC)	I have a specific time for learning.	0,235	0,327
4	Responsibility (RP)	I am willing to admit my faults.	0,235	0,349
		I am willing to face the danger associated with my faulty acts.	0,235	0,403
		I reviewed the materials that my lecturer had uploaded.	0,235	0,687
5	Initiative (IN)	I carry out research based on material acquired from books, journals, and the internet.	0,235	0,350
		I discuss my small note with my lecturer	0,235	0,586
		I create a summary of the information I've acquired.	0,235	0,612
		I have designed my efficient method of doing assignments without breaking some rules.	0,235	0,589
		When the instructor allows me to ask a question, I choose to keep silent.	0,235	0,342
		I offered to correct a friend's incorrect perception.	0,235	0,423
6	Self-Control (SFC)	I base my arguments on scientific evidence.	0,235	0,540
		I perform following the rules that regulate learning	0,235	0,599
		I faced trouble when I was unable to comprehend the material	0,235	0,467
		I am capable of overcoming issues on my own	0,235	0,630

Table 2. Test of reliability of self-regulated learning questionnaire

Reliability Statistics		
Cronbach's Alpha	N of Items	Category
,819	21	High

According to table 1, 21 of the 24 questionnaire questions are valid, while three are not: IO 3 (-0,021); DC 1 (0,122); and RP 1 (-0,038). The level of reliability is 0.819, which is considered high. Thus, researchers' use of questionnaires has been tested the validity and reliability.

Students' Self-Regulated Learning Levels

During the covid-19 outbreak, lecturers assessed students' self-regulated learning using online learning. As a result, researchers are interested in evaluating how much self-regulated learning pupils remembered after the covid-19 epidemic. A self-regulated learning study analyzes independence from others, self-confidence, discipline, accountability, initiative, and self-control in students. The following table summarizes the findings from an assessment of data about the individual components of student self-regulated learning.:

Table 3. Descriptive Analysis of Self-Regulated Indicators

No	Aspect	N	Mean	Std. Deviation
1	Independence on others	344	8,77	1,304
2	Self-confident	344	10,36	1,808

3	Dicepline	344	2,83	0,731
4	Responsibility	344	9,40	1,586
5	Initiative	344	16,14	2,714
6	Self-control	344	11,08	1,886
Mean			9,76	1,67

Table 3, the mean of the initiative is higher than the mean of discipline, and the standard of discipline is lower than the mean of the enterprise. Following that, the researchers classified the score component of students' self-regulated learning. The next step is to ascertain the frequency and proportion of student self-regulated learning elements stated in Table 4.

Table 4. Categories of students' self-regulated learning

Independence on Others		Self-confident		Discipline		Responsibility		Initiative		Self-control		Category
F	%	F	%	F	%	F	%	F	%	F	%	
50	14,5	46	13,4	107	31,1	40	11,6	57	16,6	67	19,5	Low
264	76,7	257	74,7	180	52,3	219	63,7	227	66,0	198	57,6	Moderate
30	8,7	41	11,9	57	16,6	85	24,7	60	17,4	79	23,0	High

According to table 4, students' self-regulated learning is ranked by 76,7 percent in terms of independence from others in the moderate. Self-confidence increased by 74,5 percent in the moderate. In the intermediate category, the element of discipline increased by 52,3 percent. Responsibility by 63,7% in the moderate. The initiative's aspect by 66,0 percent in the moderate. Self-control by 57,6% in the moderate.

Distribution of Students' Self-Regulated Learning Indicators

The indicator distribution is used to determine the mean and standard deviation of descriptive statistics results. The following table 5 presents the descriptive statistics for self-regulated learning data from students.

Table 5. The result of descriptive Statistics of Student self-regulated learning

	Descriptive Statistics			
No	The Indicator Code of Self Regulated Learning	N	Mean	Std. Deviation
1	IOP_1	344	2,69	0,737
2	IOP_2	344	3,19	0,636
3	IOP_4	344	2,90	0,721
4	SC_1	344	3,17	0,699
5	SC_2	344	2,95	0,816
6	SC_3	344	1,90	0,593
7	SC_4	344	2,33	0,640
8	DC_2	344	2,83	0,731
9	RP_2	344	3,14	0,708
10	RP_3	344	3,11	0,714
11	RP_4	344	3,15	0,642
12	IN_1	344	2,99	0,720
13	IN_2	344	2,60	0,772
14	IN_3	344	2,86	0,736
15	IN_4	344	2,85	0,766
16	IN_5	344	2,79	0,636
17	IN_6	344	2,04	0,587

18	SFC_1	344	2,30	0,654
19	SFC_2	344	3,20	0,719
20	SFC_3	344	2,78	0,808
21	SFC_4	344	2,80	0,724
	Mean		2,789	0,703

According to Table 5, the mean of all self-regulated learning indices for students is 2,789, with a standard deviation of 0.703. These findings imply that the general indication of self-regulated learning among students is moderate. Additionally, Table 5 indicates that IOP 2 and SC 1 are classified as high. The two indicators are "I make an attempt to answer each question in order of significance" and "I believe in my ability."

Discussion

The purpose of the student domicile distribution is to establish the specific location of each student's residence. The students' distribution by domicile is illustrated in this study, with students hailing from 23 districts/cities throughout North Sumatra and from beyond the province. Throughout covid-19, schools and universities temporarily abandoned traditional teaching and learning techniques in favor of online learning, resulting in the repatriation of many students to assist their families. According to this study's findings, the typical student comes from rural areas.

Due to the widespread use of covid-19, the educational system has changed away from face-to-face instruction and toward online education. According to Hamid, Sentryo, & Hasan (2020), supporting infrastructure is necessary to ensure online learning success. Successful online education requires supportive and adequate infrastructure, including internet access, device access, network connectivity, and device use. During the Covid-19 pandemic, not all locations, mainly rural places, had reliable internet connectivity. These are the result of geography, natural forces, and blackouts. Qualitatively, online education is unique from traditional classroom training. Students are missing out on established relationships and experiences in the classroom. While online education has several benefits, it also harms physical, mental, and social health (Alawamleh, Al-Twait, & Al-Saht, 2020; Chakraborty, Mittal, Gupta, Yadav, & Arora, 2020; Colao et al., 2020; Coman, Țîru, Meseșan-Schmitz, Stanciu, & Bularca, 2020; Ellis, Ginns, & Piggott, 2009).

The purpose of this study is to determine students' rank in self-regulated learning. The present study demonstrates that moderate categories dominated the six aspects of students' self-regulated learning (Independence from Others, Self Confidence, Discipline, Responsibility, Initiative, and Self Control), whereas initiative indicators dominated the high category. These findings suggest that children's degrees of learning freedom continue to be within acceptable ranges. Students retain some control over their learning freedom during online learning. Paechter & Maier (2010) researched the covid-19 outbreak and identified high category self-regulated learning. These findings indicate that self-regulated learning reduced in importance during the covid-19 pandemic.

Additionally, this study revealed that approximately 16% of these children had high exam scores. We suggest that these students can control the amount of self-regulated learning they engage in. This evidence demonstrates that online education continues to benefit students' ability to self-regulate their learning. Lecturers must consider this when designing online courses, as a high student autonomy results in complex learning challenges.

The students' self-regulated learning distribution score was moderate, although two of the twenty-one descriptor items had an average score in the high group. Both descriptors refer to attempting

to answer each topic sequentially and believing in the students' competence. All over this line, students' self-regulated learning is affected by supporting factors such as motivation and cognition (Finn, 2020), knowledge, skill dan attitudes (Boekaerts, 1999, 2017), metacognitive, motivation, and process of attitudes (Zimmerman, 2015). These demonstrate that students' self-regulated learning factors are so complicated, and students' self-regulated learning must be trained sustainably.

CONCLUSION

Based on the findings and discussion, the primary research can be concluded as follows. (1) The majority of students hail from Medan and Deli Serdang regency, while the average student hails from a village; (2) The primary factors supporting online education during the covid-19 outbreak are network and device availability; and (3) Student self-regulated learning is moderate during the covid-19 pandemic. This study shows that students' self-regulated learning levels remain within proportionate boundaries. Students retain some control over their self-regulated learning throughout online learning.

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