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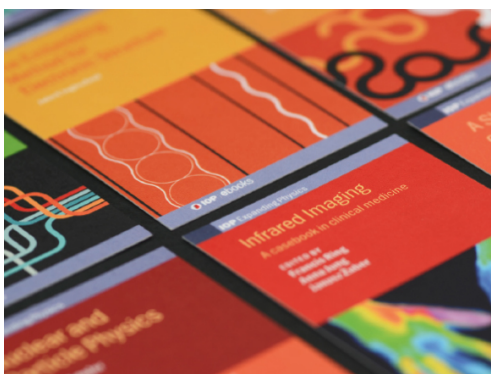
The role of information technology on the online learning success based on self-regulated learning data

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The role of information technology on the online learning success based on self-regulated learning data

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Abstract. Strategies in Covid-19 mitigation positively acquire changes in individuals' conduct. Teachers and students hurry to vary their interaction using online learning. In online learning, where learning control is higher in students, self-regulated learning or SRL becomes a fundamental issue to check. This research could be a quantitative descriptive study to elucidate how the SRL profile of scholars in Covid-19 emergencies. The information was gathered using Google Form. The SRL questionnaire covers four subscales: planning (5 items), monitoring (6 items), controlling (6 items), and reflecting (5 items). Profile of SRL is grouped at high, moderate-low, and low SRL compared to the common SRL of all students. However, students as an entire tend to own quite high SRL. So it is often expected that students won't encounter learning problems by using online learning.

1. Introduction

The COVID-19 pandemic in various countries has been responded by various parties quickly to reduce its impact; included in education. Indonesia has issued multiple policies within the implementation of learning as a rustic with a considerable population. All schools in Indonesia are encouraged to try and do distance learning by utilizing information technology.

The public gave mixed responses to this policy in a positive way. However, some areas face obstacles related to the availability of learning facilities. Telecommunication operators in Indonesia have prepared assistance for free bandwidth quota to be able to take part in online learning. With this good penetration of information technology [1], it is not supported by school policies in its use in learning [2].

It encourages the formation of behavior capable of self-regulation in managing information as a part of the training process becomes essential for college kids [3]-[6], including elementary students [7][8]. Self-regulated learning (SRL) refers to the deliberate and strategic adaptation of the training process to alter cognitive, motivational, and behavioral outcomes [9][10]. Policies during this emergency certainly bring changes in people's behavior. Educators and students hasten to be able to comply with the new interaction behavior of online learning. Various interaction applications begin to be learned quickly. They're employed in learning at the beginning of online learning adoption, like Moodle, Edmodo, Google Classroom, Schoology, Zoom, and others. There's high optimism within the implementation of this learning from educators. This optimism certainly also has implications for students' readiness to interact in education.



Many research results show that online learning fails because there's no social presence in the education. Students become burdened with academic assignments that sometimes exceed the burden when learning at school. This action is because educators don't measure this burden in an emergency. On the opposite hand, it's necessary to determine whether students have the flexibility to manage themselves.

The ability to manage oneself is essential to think about achieving learning goals. Students who have high skills in SRL will tend to be more successful in achieving learning goals. In online learning, where learning control is more elevated in students, SRL becomes a crucial issue to check. This research is a quantitative descriptive study to elucidate how the SRL profile of scholars in Indonesia in online learning in Covid-19 emergencies.

2. Literature Review

SRL development needs to be done through implementing strategies in learning. The idea of the concept of SRL refers to a learning process that changes cognitive abilities, motivation, and behavior [9][10]. This concept teaches self-management both cognitively and emotionally in order to achieve learning goals including competence [9][11][12]. In online learning, student focus becomes important, so SRL is a factor that determines learning success.

The process of self-regulation defined the activities of people in planning, monitoring those plans, making changes to remain on the right track, and reflecting on what works and what will be improved [13]. One in each of the instruments in SRL measurement is to use the Independent Regulatory Formative Questionnaire. This questionnaire measures the perception of students' level of proficiency in four essential components of self-regulation: Planning and articulating what students want to achieve; Immediately monitor progress and disturbances associated with student goals; Control change by implementing specific strategies when things don't go in keeping with plan, and Reflect on what works and what students can do better next time [9].

In online learning, self-regulation includes the ability to monitor thoughts, feelings, and behaviors to achieve learning goals. This activity is carried out using the online application and available features. Learning self-regulation supports students to have independence in online learning [14][15]. With good abilities in self-regulation, at this time the ability of individuals to be able to self-regulate themselves so that they can follow moral values in society [16] with the competences developed [17] in cyberspace. Aspects of SRL are metacognition, motivation, and social action. The stages of good self-regulation can encourage the achievement of the expected learning goals [18][19]. SRL may be in the style of cognitive regulation, motivation regulation, behavior regulation, and emotional regulation [9][20][21] when individuals interact with other students and teachers. This ability cannot be separated from the social support provided to them such as from teachers by providing an online environment that is socially relevant and supports the equivalent of SRL development.

3. Methodology

The research began on March 16, 2020, three days after the establishment of the WHO on the Covid-19 pandemic. Respondents selected unintentionally sampling at several schools (24 schools) have implemented online learning after the designation of this mode by the Indonesian Ministry of Education and Culture on March 15, 2020. School-level of respondents from levels 1st to 6th-grade students. The information was gathered using Google Form (from 16 to March 19, 2020) through headmasters who do online learning and are willing to volunteer for this data collection. The quantity of samples is 2,204 students. In the preliminary analysis, there have been invalid data (blank points, and extremely high or low score). Finally, the quantity of data was 2,154 students.

The instrument used was a questionnaire with a scale of 1 to five (from strongly disagree to strongly agree). the general SRL questionnaire was found to be highly reliable (22 items; $\alpha = .896$) as tested previously. the look subscale consists of 5 items ($\alpha = .632$), the monitoring subscale consists of 6 items ($\alpha = .704$), the controlling subscale consists of 6 items ($\alpha = .744$), and therefore the reflecting subscale content of 5 items ($\alpha = .682$).

There are two analytical techniques used, namely, descriptive statistics and Cluster Analysis. Descriptive data (average and standard deviation) explain the comparison of every factor profiles between schools. Cluster Analysis is employed to work out the grouping of scholars who supported SRL profiles.

4. Result and Discussion

Based on data obtained through the Google Form shared with students participating in online learning, SRL profiles in each aspect are as in Table 1.

Table 1. Descriptive (out of 100)

Aspects	N	Min	Max	Mean	STD
Planning	2154	28.00	100.00	77.0139	11.8757
Monitoring	2154	27.00	100.00	72.1031	12.1312
Controlling	2154	20.00	100.00	72.3426	10.0989
Reflection	2154	20.00	100.00	74.3008	9.7403

From the average grade, SRL students tend to be quite high. The assumption is that the cut off is 70. To be able to see more deeply the grouping of students' SRL profiles, cluster analysis is needed. Cluster analysis results by selecting 3 clusters (based on the Elbow technique), Table 2 shows the grouping that occurred.

Table 2. Final cluster centers

	Cluster		
	1	2	3
Zscore(plan)	0.78549	-0.13162	-1.28774
Zscore(monitor)	0.88331	-0.25469	-1.17006
Zscore(control)	0.77317	-0.14657	-1.22319
Zscore(reflect)	0.79552	-0.14897	-1.26333

The results of the conversion of Table 2 into an SRL grouping graph are Figure 1. From this figure, there are three groups with different characteristics. The ANOVA test for these three groups had significant differences.

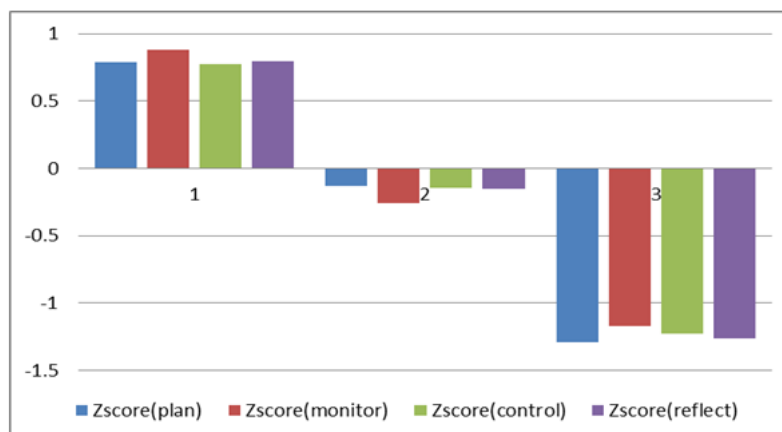


Figure 1. The clustering result

The number of members per cluster is 809 for group 1 (high SRL), 369 for group 2 (moderate-low SRL), and 976 for group 3 (low SRL). Group 3 becomes the most critical cluster to be addressed. SRL, both in online learning and not, refers to the flexibility to know and control the training environment. The flexibility of SRL includes the flexibility to line goals (Planning), self-monitoring (Monitoring), self-instruction (Controlling), and self-reinforcement (Reflecting) [9][11][12]. SRL cannot directly measure academic performance. SRL is more associated with mental abilities or skills in achieving a goal that may be related to various things. The rise of SRL is through a development process that arises from guided practice and feedback so that the behavior will change mental abilities with new skills and habits. In online learning, students who have superb SRL are better to house the training environment change that's different from their planet. With good SRL, students can find, choose, use, information from the web to resolve problems or achieve learning goals. The results show that primary students are grouped in three: high, moderate-low, and low of SRL. It implies that students generally still need assistance to boost their SRL. Some findings in online learning during Covid-19 mitigation show that teachers within the beginning adoption of online learning tend to grant higher assignments (academics presence) to every subject. This result will affect the workload of students. With inadequate SRL skills, they may need to encounter a flurry of online learning.

The ability of SRL will determine learning outcomes. Teachers and faculty policymakers must consider including the method of assisting in strengthening the SRL within the learning design. It's essential to see the strategies that encourage students to use when handling information in cyberspace. Activities to promote better SRL include explaining the advantages and importance of SRL, teaching SRL strategies explicitly, and identifying when and how to use SRL. Those are critical when they handle information from cyberspace [4][11]. The expectation of this activity is a rise in SRL in grade school students. Digital technology faced suddenly due to Covid-19's mitigation will affect students' daily activities.

Based on experiences in joining and conducting e-learning courses, there is a minimum of two critical points to enable learning to happen. Setting and informing explicitly the training objectives help the learners become attentive to what to attain by the tip of the training process. Also, asking the learners to put in writing their feedback is of significance. Through it, they'll self assess what they learned and achieved, describe how their feeling, inform what challenges or maybe difficulties they got during the training session. At the identical time, the teacher may also get the feedback to judge the program and measure the success or failure in facilitating the learners in achieving the objectives. The way teachers organize online learning can have a profound effect on the flexibility of scholars to become independent learners [22]. An influential think about online learning isn't only delivering content or problem-solving. The teacher should explicitly nurture students on the way to learn. These activities include determining a specific approach to an issue, conducting dialogue, both synchronous and asynchronous, to supply and evaluate shared ideas. When choosing a learning strategy, explain the rationale of why this approach utilized in online learning. Students in new learning materials generally don't know which procedure is best to use. They may lose motivation if not trained and encouraged [12]. Communication to know this online is essential. When techniques that are understood and learned are useful in a very particular activity, motivation and self-satisfaction will increase.

5. Conclusion

Profile of SRL elementary school students are grouped at high, moderate-low, and low SRL compared to the typical SRL of all students. However, students as an entire tend to own quite high SRL. So it will be expected that students won't encounter learning problems by using online learning. Teacher assistance in enhancing SRL has to be designed more clearly as a learning strategy. During this way, students can do the continuity of strong knowledge in online learning. Supported data obtained from cluster analysis, the in-depth analysis could also be applied by mapping students who endorsed the cluster of every school. From this new profile, policymakers can develop a school-based SRL improvement policy.

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