Explorations in English Learning

Exploring Students' Self-Regulated Learning Strategies in Online Learning

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Abstract One of the impacts of the COVID-19 pandemic on higher education is the acceleration of online learning. Consequently, there has been a drastic change in the interaction patterns between students, instructors, and learning resources. Students must be more independent and creative in seeking, processing, utilizing various learning resources, and addressing learning challenges. In such situations, self-regulated learning (SRL) skills are crucial. However, SRL strategies in the context of online learning in Indonesia still need a comprehensive exploration. This study aims to explore students' SRL strategies and its components among Indonesian students in online learning context, employing the Online Self-regulated Learning Questionnaire (OSLQ) (Barnard et al., 2009). The questionnaire was translated into Indonesian and piloted on a limited scale before being distributed to the main respondents of 236 students from various universities on Lombok Island. Descriptive statistics and Exploratory Factor Analysis (EFA) were used to address the research questions. Statistical analysis shows that students employ a variety of SRL strategies, but only 'environment structuring', which involves efforts to condition time and place for a comfortable and conducive online learning environment, was used most frequently. Additionally, EFA revealed five components of SRL strategies, with only one component being dominant. The implications for practice, particularly in the context of ongoing and post-pandemic education scenarios, are discussed, emphasizing the need for adaptive, technologically supported learning strategies that accommodate the dynamic nature of online education.

Keywords Self-regulated learning, online learning, Indonesian higher education, exploratory factor analysis. learning strategies

INTRODUCTION

In recent years, the landscape of higher education has experienced a transformative shift, driven by the rapid expansion of digital technologies and the widespread adoption of online learning. This transformation was dramatically accelerated by the COVID-19 pandemic, which compelled educational institutions worldwide to transition to remote learning environments virtually overnight (Pokhrel & Chhetri, 2021; Xu et al., 2022). The pandemic's disruption of traditional classroom structures not only altered teaching modalities but also reshaped the way students engage with instructional content, interact with instructors, and manage their learning processes. In this context, self-regulated learning (SRL) has emerged as a central focus of research on online education, highlighting its role in enabling learners to effectively navigate the autonomy and complexity inherent in virtual learning environments (Xu et al., 2022; Irfan et al., 2023).

SRL refers to the active, constructive process whereby learners set goals, monitor and regulate cognitive and metacognitive strategies, manage their motivation, and adjust behaviours to achieve

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their learning objectives (Zimmerman, 2013; Liem & Martin, 2020). The shift to online learning, with reduced direct supervision, fewer in-person interactions, and a greater need for independent task management, has made SRL skills particularly crucial for academic success (Wong, et al., 2019; Irfan et al., 2023). Empirical evidence indicates that students with strong SRL skills are more likely to engage in effective learning behaviors such as goal setting, environment structuring,time management, and self-evaluation, which are associated with improved academic performance in online contexts (Xu et al., 2022; Irfan et al., 2023). Despite the growing body of international research on SRL and online learning, there remains limited exploration of how these strategies manifest in specific cultural and educational contexts such as Indonesia. Research conducted in Indonesian higher education contexts suggests that students encounter unique challenges in balancing autonomy with motivational and environmental factors during online learning (Mairi, 2025). Moreover, local studies on SRL profiles highlight variability in metacognitive, motivational, and behavioural dimensions, pointing to the need for deeper investigation into how Indonesian students regulate their online learning experiences (Satianugraha, 2024).

Within the broader literature, interventions that support SRL, such as instructional scaffolding, self-assessment, and adaptive technologies, have been shown to enhance learners' engagement and regulation capabilities in online environments (Irfan et al., 2023; Xu et al., 2022). Recent research also explores how technological applications, including artificial intelligence tools, can facilitate SRL by providing adaptive feedback, real-time monitoring, and personalized learning supports (Albelbisi & Yusop, 2025). These developments underscore the dynamic interplay between learner strategies and digital environments in shaping SRL outcomes.

Understanding the dimensions of SRL strategies in online learning environments is therefore essential for promoting student success, particularly as education systems continue to integrate online and blended modalities beyond the pandemic (Pokhrel & Chhetri, 2021). A comprehensive analysis of SRL components can offer insights into how learners orchestrate their cognitive, metacognitive, and motivational processes to meet the demands of virtual learning. In the Indonesian context, such insights are particularly valuable for informing pedagogical practices and institutional policies aimed at enhancing learner autonomy, engagement, and academic achievement in online education.

This study seeks to contribute to this emerging area of research by examining the SRL strategies employed by Indonesian university students within online learning environments. By utilizing the Online Self-Regulated Learning Questionnaire (OSLQ**)** developed by Barnard and colleagues (2009) and adapted into Indonesian, this research aims to identify the most frequently used SRL strategies and uncover the underlying components of SRL among students on Lombok Island. The findings are expected to provide practical recommendations for educational design and institutional support mechanisms that foster effective self-regulated learning in the digital era.

METHOD

Research Instrument

This study is quantitative research utilizing a questionnaire as the instrument, involving 236 students from both private and public universities located on Lombok Island. The questionnaire used is the Online Self-Regulated Learning Questionnaire (OSRLQ) developed by Bernard et al. (2009) which has been validated in several countries (Vilkova & Schheglova, 2021; Fung et al., 2018). Previous studies have reported high levels of validity and reliability, with Cronbach's alpha ranging from $\alpha = 0.87$ to 0.96 (Bernard et al., 2009). The questionnaire consists of 24 items using a Likert scale with five response options ranging from Strongly Disagree, Disagree, Neutral, Agree, to Strongly Agree. The OSRLQ encompasses six constructs of SRL, including goal setting, environment structuring, task strategies, time management, help-seeking, and self-evaluation.

Respondents

After the questionnaire validation process was completed, the questionnaire was distributed to the main study respondents. To maximize respondents, the questionnaire was distributed online to university students on Lombok Island by leveraging the network of lecturers at various universities and asking them to distribute the questionnaire to student study groups and the courses they teach. A total of 272 respondents completed the questionnaire, coming from 5 public and private universities on Lombok Island. Out of these, 36 respondents (13.2%) stated that they had never participated in online classes, so their responses could not be included in the analysis. Thus, there were 236 respondents reported in this article.

Research Procedure

The research began with the adaptation of the questionnaire, including the translation which was conducted by the research team, with the principal investigator fully responsible for translating the questionnaire items. The translation was not carried out lexically but meaningfully. Considering that the study aims to determine the frequency of using SRL strategies in online learning, the response format was changed to frequency responses with four options (Never, Rarely, Often, Always), and the neutral option was removed. Meanwhile, other team members reviewed and provided feedback and revisions on the translation results. After the translation process was completed, the next step was a review of the questionnaire by experts to assess the accuracy and appropriateness of the SRL constructs and their descriptive items. Following revisions based on expert feedback, a pilot test was conducted with a limited sample of 36 students to test the psychometric properties and obtain feedback from respondents regarding the structure, language, and quality of the questionnaire items.

The results of the pilot test were used as a basis for revising the questionnaire before it was used for field data collection.

Reliability Test Result

The reliability test results from the pilot phase showed high outcomes, indicated by a Cronbach's Alpha coefficient ($\alpha = 0.906$). This indicates that each item in the translated version of the OSRLQ significantly contributes to forming the SRL construct in online learning. Meanwhile, the validity test for the questionnaire construct using the Kaiser-Meyer- Olkin (KMO) coefficient showed moderate results with a value of 0.56. This means that the extraction of the SRL construct in online learning with a sample of 36 students is considered relatively adequate to explain the SRL constructs in the questionnaire. This could be due to the small sample size. Therefore, a sufficient number of samples is needed to obtain a higher KMO value. With the main study sample consisting of 236 respondents, the reliability and validity analysis results showed satisfactory value improvements with a Cronbach's Alpha coefficient ($\alpha = 0.911$) and KMO test = 0.894. Thus, it can be said that the Indonesian version of the OSRLQ is a reliable and valid instrument for measuring the frequency of SRL among students in online learning and forming SRL components. Table 1 below shows the main flow of the research method.

Table 1. Research method flow

Questionnaire Adaptation and Translation

- OSRLQ (Bernard et al., 2009) adapted into Indonesian
- Meaning-based translation by principal investigator
- Peer review and revisions by research team

Expert Review

- Experts assess construct accuracy and item appropriateness
- Revisions made based on expert feedback

Pilot Testing (n = 36)

- Conducted to test reliability, validity, and language clarity
- Reliability: $\alpha = 0.906$; KMO = 0.56 (moderate adequacy)
- Feedback used to refine questionnaire

Final Validation and Main Data Collection

- Revised questionnaire distributed via Google Forms
- Respondents: 272 (236 valid) from 5 universities on Lombok Island
- Data collected in July 2023

Reliability and Validity Analysis (Main Study)

- Reliability: $\alpha = 0.911$ (high internal consistency)
- Validity: KMO = 0.894 (excellent sampling adequacy)

Data Analysis

- Descriptive Statistics: frequency, mean, SD, variance
  - to identify SRL strategy use frequency
- Inferential Statistics: Exploratory Factor Analysis (EFA)
  - Principal Component Analysis with Varimax rotation
  - Components retained if eigenvalue > 1
  - Items with factor loading < 0.4 removed

Interpretation of Results

- SRL components and frequently used strategies identified
- Findings discussed in context of online learning in Indonesia

Data Analysis

The methods of analysis used are descriptive and inferential statistics. Descriptive statistics describe the characteristics of the data in relation to standard deviation, homogeneity, and data variance. Descriptive statistics are used to answer the first research question, which relates to the identification of SRL strategies and the frequency of its use in online learning. The inferential statistics employed include Exploratory Factor Analysis (EFA) to identify the factors that constitute SRL strategies based on the quantitative data obtained from the questionnaire items. The principal component analysis method and rotation technique using varimax with Kaiser normalization are applied. To determine the number of components to be extracted, the guideline used is to retain components with an eigenvalue greater than 1.

Subsequently, the score of each OSRLQ item is carefully examined, and using a threshold score of 0.4, items with scores below 0.4 are excluded from the components. If an item with a score above 0.4 appears in two components, or if a component consists of only one item, that component is also removed. The results of this factorial method were used to formulate the components of students' SRL strategies in the context of online learning.

FINDINGS

SRL Strategies and its Frequency of Use by Students

Table 1 below presents data on the average frequency of students' use of SRL strategies. Descriptive statistical analysis revealed that the overall mean score of all item from the OSRL constructs was M = 0.288, SD = 0.47. This finding indicates that the frequency with which students employ SRL strategies in online learning is generally low. Among the six subscales of the OSRLQ, the environmental structuring sub-construct had the highest mean score, M = 3.41, SD = 0.54. This suggests that the most frequently utilized SRL strategy by students in online learning is optimizing the conditions, atmosphere, time, and place for conducting online activities to minimize potential learning disruptions.

Conversely, the SRL strategy that students use the least is related to seeking help or learning support (help-seeking). This is reflected in the average score for this subscale, M = 2.6, SD = 0.59. Other sub-constructs, such as task strategies and goal setting, reported mean scores ranging from 2.7 to 2.8, which are relatively close to the overall average score for the SRL constructs.

This analysis highlights that while students actively engage in strategies to create a conducive learning environment, they tend to underutilize strategies related to seeking assistance and support. This finding prescribes the need for increased emphasis on promoting and facilitating help-seeking behaviours among students in online learning settings.

Table 1. Descriptive statistics of OSRLQ

Subscales	Range	Minimum	Maximum	Mean	SD
Goal setting	2.8	1.2	4.0	2.8	0.59
Environment structuring	3.0	1.0	4.0	3.4	0.54
Task strategies	2.7	1.2	4.0	2.8	0.61
Time management	3.0	1.0	4.0	2.7	0.69
Help seeking	2.7	1.25	4.0	2.6	0.59
Self-evaluation	2.5	1.5	4.0	2.8	0.59

Components of Students' SRL Strategies

Using Exploratory Factor Analysis (EFA), this study identified the dimensions of SRL strategies employed by students in online learning. Data was extracted using the principal component analysis method, with rotation techniques using varimax with Kaiser normalization, and examining eigenvalues exceeding 1. This analysis resulted in six component factors within the

OSRLQ. Subsequently, using a threshold score of 0.4, questionnaire items scoring below 0.4 were excluded from the components, items that loaded onto two components were also excluded, and if a component consisted of only one item, it was removed as well. This procedure resulted in five dimensions of SRL strategies remaining. Each dimension is described below.

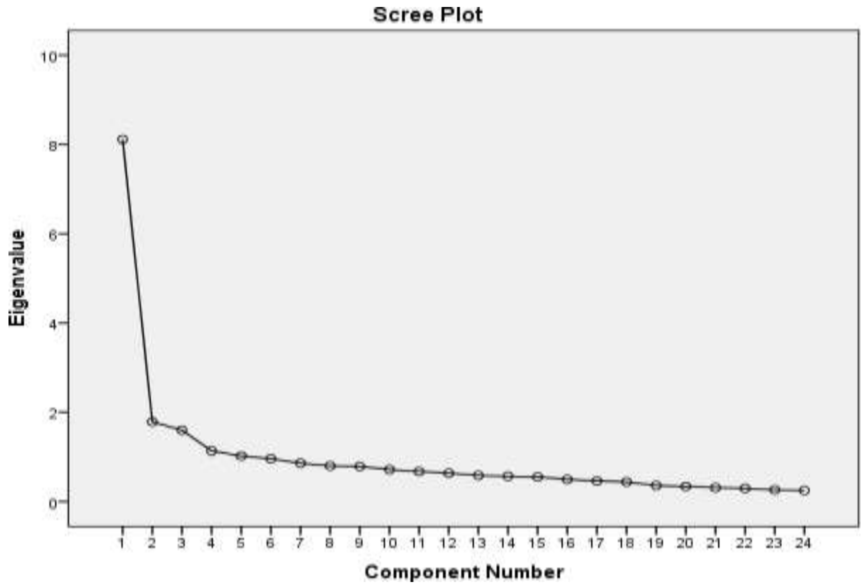

Figure 1. Scree Plot of components of SRL strategies

Component 1, consisting of eight items (items 1, 2, 3, 4, 12, 14, 15, and 16), is a combination of items from the goal setting scale (4 items), task strategies (1 item), and time management (3 items). This component can be referred to as 'setting up learning goals and managing online learning' and is defined as setting quality standards, short-term and long- term learning goals, evenly distributing study time throughout the day and striving to follow this study schedule regularly, as well as preparing to engage actively in online discussions by preparing questions before the class begins. For the student respondents in this study, there was no difference between conventional lectures and online learning in terms of learning/task quality standards. They set high standards and quality. Similarly, in managing study time, they were aware that more time is needed to carry out activities in online learning than they spend in offline learning.

Component 2, consisting of four items (items 18, 19, 23, and 14), is formed from items on the help-seeking and self-evaluation scales. This dimension can be described as ‘sharing learning gains and problems and finding solutions’ and can be defined as the effort to share experiences, results, problems, and the depth of mastery of learning material with fellow students and seek solutions for any online learning issues. This component suggests that students have the intention to engage in collaborative learning, an activity that has the potential to lead students to collaborative SRL or SSRL (Hadwin and Järvelä, 2013).

Component 3, consisting of four items (items 6, 7, 8, and 9), includes items on the environment structuring scale that can be conceptualized as efforts to find the best time and place for online learning to minimize potential learning disruptions. Students are aware that there are many potential disruptions in online learning. These disruptions can come from the environment or emerge as distractions from the online learning platforms they use. Disruptions can be technical, such as unstable internet connections, which interfere with the smooth process of online learning.

Components 4 and 5 each consist of 2 items. Component 4 is built from item 10 (i.e*., I try to make detailed notes in online lectures because notes are more important when studying online than in regular classes*), which is one item from the task strategies scale, and item 22 (i.e., *I ask myself a lot of questions about the lecture material during online lectures*), which is one item from the self-evaluation scale. This component can be conceptualized as ‘taking notes and evaluating learning’. Component 4, 'taking notes and evaluating learning', emphasizes the critical role of note-taking and self-evaluation in the online learning process. Students recognize the increased importance of detailed notes in online lectures, as these serve as essential references for review and comprehension. Furthermore, the act of self- questioning during lectures indicates their engagement in metacognitive activities, constantly assessing their understanding and identifying areas needing further clarification.

Meanwhile, component 5 is built from one item on the goal setting scale (item 5) and one item on the help-seeking scale (item 20). This component can be labelled as ‘assuring learning quality and help searching’. Component 5 reflects the dual focus on maintaining high learning standards and seeking assistance when needed. Students set specific goals for their learning outcomes and are proactive in seeking help to address any gaps or difficulties they encounter. This component illustrates their commitment to achieving a high quality of learning while acknowledging the importance of external support in navigating the complexities of online education.

SRL is believed to enable students to effectively manage their own learning experiences (Jin et al., 2023). These processes are crucial for students to set and achieve academic goals, monitor their progress, and adapt their strategies to overcome challenges (Rice & Carter, 2016). In the context of online learning, where students often engage in independent and remote study, the ability to self-regulate becomes even more critical (Carter et al., 2020). The study found that the overall mean score for the use of SRL strategies was relatively low ($M = 0.288$, $SD = 0.47$), indicating that students' application of SRL strategies in online learning is not extensive. Among the subscales, environmental structuring emerged as the most frequently utilized strategy, with a mean score of = 3.41 ($SD = 0.54$). This high usage reflects students' efforts to create optimal conditions for online learning by selecting appropriate times, places, and settings to minimize disruptions. This finding aligns with the fundamental principle of environment structuring in SRL, which emphasizes the importance of establishing a conducive learning environment to support academic objectives (Fuzi, 2023).

Goal setting, another core SRL component, is essential in an online learning context where students need to maintain focus and motivation amid potential distractions (Yang, 2006). However, the mean scores for goal setting and other SRL strategies, such as task strategies and self-evaluation, were relatively modest, ranging from 2.7 to 2.8. These scores suggest that while goal setting and task management are practiced, they are not as prominent as environmental structuring in the students' SRL strategies. This finding hints at the need for greater emphasis on setting clear objectives and employing effective task strategies to enhance learning outcomes (Fuzi, 2023). Help seeking was identified as the least utilized SRL strategy, with a mean score of

=2.6 (SD = 0.59). This low frequency of help-seeking is consistent with findings from similar studies in other contexts, which highlight a tendency for students to underutilize support resources when faced with learning difficulties (Vilkova & Schheglova, 2021). In online learning environments, where immediate feedback from instructors is often absent, students may feel less inclined to seek help, possibly due to the delayed response times or the perceived inconvenience of reaching out for support (Dayimani, 2023). Addressing this gap could involve enhancing the availability and responsiveness of support resources, such as through more interactive platforms or increased availability of real-time assistance.

The study's findings related to the five components of SRL strategies also suggest the potential benefits of integrating technology-based strategies into SRL practices. Technology can facilitate goal setting, progress monitoring, and access to resources, thereby supporting students in their self-regulation efforts (Yu et al., 2022). For example, artificial intelligence applications can provide personalized feedback and recommendations tailored to individual learning needs, further enhancing the effectiveness of SRL strategies in online learning context (Jin et al., 2023).

Moreover, by incorporating elements such as goal setting, time management, interactive tools, and collaborative activities, students take charge of their learning process, monitor their progress, and adapt their strategies to achieve academic success. The synergy between effective course design, interactive technologies, and student engagement is pivotal in promoting SRL and enhancing the overall online learning experience.

CONCLUSION

This study aims to identify the SRL strategy components in online learning at higher education institutions on Lombok Island. This survey research yielded several interesting findings. Generally, students employ various SRL strategy categories, albeit with varying intensities. One of the most dominant strategy categories is environmental structuring, where students spend considerable time or focus on finding and utilizing a conducive time, condition, and atmosphere for online learning. Conversely, the least emphasized strategy is help-seeking. Another important finding is the EFA analysis, which divided SRL strategies into 5 components, while the original OSRLQ questionnaire contains 6 constructs. This indicates that SRL strategies used by students in Lombok are not applied linearly or sequentially but simultaneously by combining strategies from various SRL strategy categories at each SRL stage. This can be understood as this study is self-reported and only views SRL as a trait, a limitation of research relying on self-reported instruments (Panadero, 2017). To view SRL strategies cyclically, further research is needed that sees SRL as a series of learning events using observation techniques as a data collection instrument to clearly record the SRL strategy stages students undertake.

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