



Analysis Effectiveness of Implementation Assessment as Learning on Metacognitive Skills

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ABSTRACT

Objective: This study aims to determine the most effective application of assessment in improving metacognitive skills in the learning process.

Method: The method used is a literature review. A literature review is defined as an investigation of scientific articles, books, and other sources related to a particular problem, field of research, or theory to provide an overview, summary, and evaluation of scientific work. This research method uses several steps, including (1) topic identification about Assessment as Learning and metacognitive skill; (2) search and select appropriate articles by Scopus and Google Scholar; (3) analyze and synthesize literature; and (4) text organization.

Results: Assessment as learning can be applied using self-assessment, peer assessment, making portfolios and rubrics, as well as group discussions and the teacher. This approach can also be designed online or offline. Self-assessment and peer assessment are more effective in improving metacognitive skills in learning. **Novelty:** This study can provide an overview assessment design by actively involving learners to improve metacognitive skills, which can help realize the achievement of learning objectives.

INTRODUCTION

Assessment is a process for obtaining information in any form that can be used as a basis for making decisions about students concerning curriculum, learning programs, school climate, and school policies. Assessment is the process of collecting, interpreting, and using evidence to make decisions about student achievement in education (Brown, 2019; Hammerstein et al., 2021; Namoun & Alshantiti, 2021; Puspita & Wrahatnolo, 2023; Schildkamp, 2019; Supena et al., 2021; van Gaalen et al., 2021). Thus, a good assessment is needed to achieve learning objectives. Two types of assessment can be used, namely the Assessment of Learning (AoL) and the Assessment for Learning (AfL). AoL is used to determine the level of achievement of learning outcomes, while AfL, or what is known as formative assessment, is used to improve the learning process (Ayuningtyas, 2018). This formative assessment can be used to improve the learning process by the teacher or Assessment for Learning (AfL) and improve the learning process by students or Assessment as Learning.

Assessment as Learning can strengthen and expand the role of formative assessment in learning by emphasizing the role of students not only as contributors but also as a link between the assessment process and learning. The application of "Assessment as Learning" (AaL) is an approach in the process of evaluation and learning that places students as active actors in measuring their progress and achievements. This approach emphasizes the critical role of assessment as a tool for continuous learning, not just as a tool for ranking or evaluating students. An example of applying this approach is by using self-assessment and peer assessment (Ebrahimi et al., 2021; Pantiwati, 2017;

Zheng, 2017; Mellinger, 2019). Self-assessment is a formative assessment technique in which students assess their strengths and weaknesses individually based on criteria that have been made to improve the quality of their learning.

Meanwhile, peer assessment can be expressed as a process that allows a student to provide an assessment of the work of other students by providing feedback and scores. Peer assessment is a test given to students and then corrected by friends with predetermined guidelines. Another application is by making portfolios (Abdullah, 2017) and rubrics as well as group discussions and teachers. A portfolio is defined as the collection of products that students produce during the learning process, and it creates opportunities for students, as well as their peers, families, and teachers, to observe and evaluate changes over time. Portfolios are also considered very important in terms of providing direct evidence for the quality of instructional media and classroom activities created by teachers (Akleh & Wahab, 2020; Namaziandost et al., 2020; Topping, 2023; Walland & Shaw, 2022). Applying this approach can help students become more aware of their strengths and weaknesses, as well as give them opportunities to make improvements and corrective actions. Assessment as learning focuses on and emphasizes assessment as a process of Metacognition (knowledge about one's thinking processes) for students.

Metacognition is the ability to realize and know the cognition process that occurs in oneself and is the ability to direct the cognition process that occurs in oneself. Metacognition also plays a role in realizing obstacles in solving a problem. In general, there are two primary components of Metacognition, namely metacognitive knowledge and metacognitive skills or cognitive control (Hota et al., 2022; Jia et al., 2019; Ramadhanti & Yanda, 2021). In this case, metacognitive skills are vital in preparing to learn from something, monitoring increased learning outcomes, and correcting what has been learned in solving a problem (Azizah & Nasrudin, 2018). Metacognitive skills can also be defined as mental abilities that are consciously regulated, controlled, and examined for their thought processes.

In an educational context, metacognitive skills play an essential role in helping students become more effective and independent learners. Metacognitive skills aim to improve student learning and understanding to help students achieve learning goals (Febriana & Mukhidin, 2019). As students develop metacognitive skills, they become more aware of how they learn, process information, and complete academic tasks. It has been proven from research results that metacognitive skills have a significant correlation with student learning outcomes (Kusuma & Nisa, 2018), which shows that there is a significant relationship between metacognitive skills and learning outcomes. Therefore, metacognitive skills are considered high-level thinking skills that need to be trained in learning.

Improving metacognitive skills can be done by applying AaL. The implementation of AaL will fit very well with the 21st-century learning paradigm. The paradigm in question is that there is a change in the learning paradigm from the teaching paradigm to the learning paradigm. Learning that was previously teacher-centered turned into learner-centered learning (Hokor & Sedofia, 2021; Kostadinovska-Stojchevska & Popovikj, 2019; McPherson, 2021; Sunzuma & Luneta, 2023; Zhang et al., 2021). In this article, a literature study will be carried out regarding the analysis of the effect of applying AaL on metacognitive skills using the literature review method.

RESEARCH METHOD

The method used in this study is the qualitative literature review method. A literature review is defined as an investigation of scientific articles, books, and other sources related to specific problems, areas of research, or theories so that they can provide an overview, summary, and evaluation of scientific work. Qualitative research mentions or justifies the importance of the research problem and uses the literature to support the findings (Creswell, 2012). This research method uses several steps, including (1) topic identification, (2) searching for and selecting appropriate articles, (3) analyzing and synthesizing the literature, and (4) text organization. The type of data used is secondary data. Secondary sources are sources of data obtained by reading, studying, and understanding through other media sourced from literature, books, and documents (Creswell, 2012). The steps of this method are shown in Figure 1.

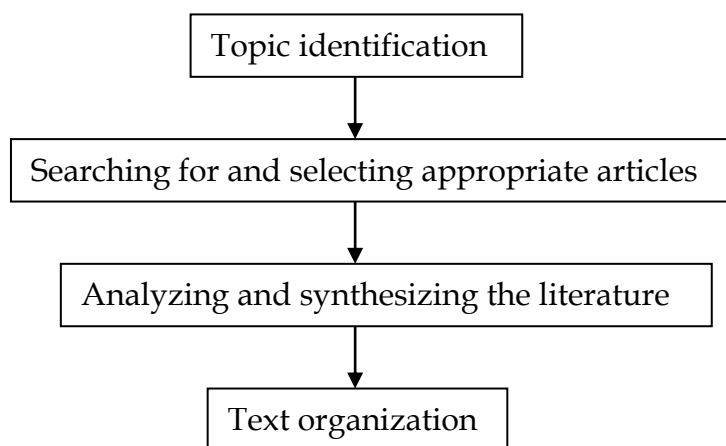


Figure 1. Research flowchart (Ramdhani et al., 2014).

RESULTS AND DISCUSSION

Results

Based on secondary data that has been collected from 15 articles, there are several points related to metacognitive skills and the implementation of Assessment as Learning. The data obtained is written in Table 1.

Table 1. Matrix of data search results from articles

Author(s)	Method	Result
Ebrahimi et al. (2021)	Quasiexperimental design	Results from the tests indicated that both self-assessment and peer assessment are effective ways to improve the autonomy and metacognition awareness of EFL learners in the completion of writing tasks.
Lee et al. (2021)	Mobile-based progressive peer feedback approach	The findings indicated that the proposed progressive peer feedback approach had a positive effect on the primary school students' creative art thinking. The experimental group students' metacognitive awareness was also significantly enhanced.
Lukitasari et al. (2021)	E-portofolio web based	The findings showed that project-based learning (PBL) enables the fostering of the student metacognitive ability that developed through e-portofolio-based documents that students conducted while fulfilling all project assignments.
Wafubwa & Csikos (2021)	The Teacher Assessment for Learning Questionnaire	The results of the model show that teachers evaluating skills are positively predicted by learning intentions, success criteria, and peer assessment. Monitoring skills are

Author(s)	Method	Result
	(TAFL-Q)	positively predicted by classroom discussion and peer assessment. Planning skills, on the other hand, are positively predicted by feedback, peer assessment, and success criteria.
Mellinger (2019)	Integrated Problem and Decision Reporting (IPDR)	The results suggest that metacognitive activity is present in both translation tasks. However, the type of behavior changes throughout an eight-week period that includes training in medical translation.
Abdullah (2017)	Enhancing Metacognition Skills by Using Reflective E-portfolio	Students received an E-portfolio assignment. The e-portfolio was useful, helped deeper learning and understanding, increased their metacognitive skills, and connected their learning to the real world.
Pantiwati & Husamah (2017)	Schraw and Dennison MAI (Metacognition Awareness Instrument)	The result path analysis showed: 1) there are influences of self and peer assessment in active learning toward awareness of Metacognition and cognitive ability.
Zheng et al. (2017)	Web-based peer assessment	The results revealed that synchronous discussion between the assessors and assesses significantly improved the students' writing performance, mainly content writing skills, affective and metacognitive feedback quality, metacognitive awareness, and self-efficacy.
Siegesmund (2017)	Focus in deep review	Incorporating self-assessment into the classroom enhances their metacognitive skills and will help students move toward becoming self-regulated, lifelong learners capable of confronting any challenge.
General (2016)	Exploratory sequential mixed-methods design	Portfolio assessments were determined to have positive effects on attendants' metacognitive skills and attitudes towards the course, and the implementation positively affected their attitudes.
Cheng & Hou (2015)	quantitative content analyses and progressive sequential analyses	The findings show that the students mainly offer positive affective feedback but offer relatively less cognitive or metacognitive feedback. As the activity progresses, they increasingly display cognitive and metacognitive thinking in their feedback, as well as increased negative affective feelings.

Discussion

Implementing of Assessment as Learning

Assessment as Learning arises from the idea that learning is not just a matter of transferring ideas from someone knowledgeable to someone not knowledgeable but is an active process of cognitive restructuring that occurs when individuals interact with new ideas. Assessment as learning can strengthen and expand the role of formative assessment in learning by emphasizing the role of students not only as contributors but also as a link between the assessment process and learning (Brandmo et al., 2020; Ferreira et al., 2020; Gezer et al., 2021; Lui & Andrade, 2022; Schellekens et al., 2021; Tapingkae et al., 2020; Yan & Carless, 2022).

Self-assessment and peer-to-peer assessment are examples of Assessment as Learning. Self-assessment is a formative assessment technique in which students assess their strengths and weaknesses individually based on criteria that have been made to improve the quality of their learning (Andrade, 2019; Granberg et al., 2021; Han & Fan, 2020; Jamrus & Razali, 2019; Nsabayeze et al., 2022; Yan et al., 2023). Self-assessment is considered a valuable learning activity that encourages a deep learning approach. Self-assessment is essential to do in the learning process. The application of this technique can provide training for students in self-assessment. The application of this self-

assessment can also enable students to reflect on their learning progress through evaluation and increased self-awareness.

Peer assessment can be expressed as a process that allows a student to assess other students' work by providing feedback and scores. In general, peer assessment is a test given to students and then corrected by friends with predetermined guidelines (Mellinger, 2019; Zheng et al., 2017). In addition, peer assessment is also considered an alternative assessment procedure and has been recognized as an activity used by learners to assess each other's performance (Ebrahimi et al., 2021). The use of an e-portfolio improves students' development of metacognitive ability especially in implementing as well as evaluating (Gutiérrez-Santiuste et al., 2022; Händel et al., 2020; Karami et al., 2019; López-Crespo et al., 2022; Lukitasari et al., 2021; Segaran & Hasim, 2021; et al., 2021). In each phase of the projects, students actively discuss their project development with the lecturers as well as their peers to obtain success. E-portfolio has some benefits, especially in terms of sharing some information related to the source of learning among students (Lukitasari et al., 2020). During the learning activities, 56% of students reached the top category in development metacognition, and 44% of the others were in a low category. The applied e-portfolio can support students to be more active in planning project activities, discussing with groups and lecturers, and implementing and evaluating the project (Lukitasari et al., 2021).

The effect of implementing Assessment as Learning on students' Metacognitive skills

Metacognition is closely related to constructivism in building students' knowledge. Metacognitive strategies can make students aware of learning and understanding the context being studied, with students developing executive control on learning strategies rather than passively responding to the learning environment (Dignath & Veenman, 2021; Hiver, Solarte, et al., 2021; Hiver, Whiteside, et al., 2021; Howlett et al., 2021; Teng et al., 2022; Wang et al., 2023). Metacognition is "people's awareness of their knowledge machine and how the machine works." Metacognition is knowledge about knowledge or knowledge about learning. Metacognition can be broadly defined as one's cognition or knowledge of one's way of thinking. The primary definition of Metacognition focuses on two separate but related aspects: (1) knowledge/awareness of cognitive processes and (2) control of cognitive processes or metacognitive skills. The first aspect can be divided into knowledge of cognitive experience (theory of mind/memory) and awareness of one's cognitive processes concerning tasks and other people.

Cognitive process control, or what is commonly called metacognitive skills, is the skill of a person knowing and understanding his learning process to achieve the desired learning achievement. This is reinforced by the argument, which states that metacognitive skills are students thinking to think. Through their metacognitive skills, students can control themselves in their learning process; thus, these skills can support student-focused learning (Khosravi et al., 2023; Liu, 2022; Wass et al., 2023). In practice, assessment as learning is an assessment model that focuses on students and emphasizes assessment as a metacognition process for students. Assessment as Learning is a process of developing and supporting students' metacognition because students are actively involved in the assessment process. In this case, students can monitor their learning, take advantage of feedback from teachers, themselves, and peers to determine the next steps, and set individual learning goals. Based on this literature review study, it shows that peer assessment and self-assessment are effective ways of metacognitive awareness. Development of metacognitive skills by students can be facilitated through a

variety of class-based student-centered strategies such as self-reflection sessions and peer assessment (Chen & Wang, 2019; Muchlis et al., 2020; Tachie, 2019). The use of peer assessments and self-reflection sessions is a good combination of learning strategies that accelerate the process of developing metacognitive skills among students.

Self-assessment can increase students' metacognitive awareness (Ebrahimi et al., 2021). On the other hand, self-assessment is a reflection tool (Siegesmund, 2017). Their research found that self-assessment rubrics trigger the synthesis process by providing students with metacognitive scaffolding in the form of descriptions of target performance and lower levels of performance. They encourage learners to carry out formative assessments of their performance, monitor and revise their level of attainment, and plan their learning based on target levels. In practice, students are given several criteria to assess their performance and think critically about their learning process (Andrade, 2019; Basri et al., 2019; Mandasari & Aminatun, 2020; Rajabalee & Santally, 2021; Shaw et al., 2020). Self-reflection sessions, especially among peers in the classroom, provide opportunities for students to develop soft skills of self-identification of gaps that must be filled in order to make progress in the zone of proximal development (ZPD).

ZPDs are clearly defined individual paths within a learning zone that provide an audit trail of the learner's progress toward learning goals (Vygotsky, 1978). In doing so, learners become aware of the gaps they have to close between where they are (current situation) and where they want to reach (learning outcomes) in their learning journey (Jivet et al., 2020; Kasneci et al., 2023; Ticheloven et al., 2021). Metacognition can also be activated by peer interaction. Peer interaction and feedback are effective in helping learners monitor their learning. Peer feedback provides opportunities for learners to demonstrate their current state of knowledge, reflect on their learning, and engage in self-monitoring (Larsen et al., 2020; Zhu & Bonk, 2019). Therefore, peer assessment is also an effective way to increase metacognitive awareness and learn more metacognitive strategies for better learning in learning.

CONCLUSION

Fundamental Finding: The implementation of assessment as learning through self-assessment and peer assessment can improve metacognitive skills. Self-assessment and peer assessment are a combination of good learning strategies to accelerate the process of developing metacognitive skills among students. **Implication:** This study aims to provide an overview assessment method by actively involving learners to improve metacognitive skills, which can help realize the achievement of learning objectives. **Limitation:** This research is limited to a literature review on improving metacognitive skills trained through the Assessment as a Learning method. **Future Research:** For further research, it can be discussed whether applying the Assessment as a Learning method can also improve other thinking skills, such as critical thinking skills, argumentation skills, or more.

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