

Implementation of Reflective Learning Logs in Supporting Students' Learning Development

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Abstract. *This study describes the implementation of reflective learning logs based on Learning Outcome Design (LOD) at SMA Negeri 1 Purwokerto and explores perceived and observed developments in students' learning. A qualitative descriptive, implementation-focused design involved three subject teachers, fifteen Grade XI students, and one principal. The six-month intervention used structured learning logs as the principal reflective tool, complemented by reflective discussions, think-pair-share, peer feedback, and portfolio review. Data were generated through observation, interviews, documentation, and focus group discussions and analyzed using Miles and Huberman's interactive model, with source and method triangulation and member checking. Findings show implementation through outcome-oriented preparation, guided log writing, progressive scaffolding, differentiated support, and teacher facilitation. Participants and classroom evidence indicated developments in conceptual explanation, critical examination of information, metacognitive awareness, and learning autonomy. Structured reflection also helped students connect new knowledge with prior experience and evaluate progress against explicit learning outcomes. These findings represent qualitative patterns of perceived and observed development rather than evidence of causal effectiveness.*

Keywords: *Reflective Learning Logs, Learning Outcome Design, Qualitative Description, Metacognition, Learning Autonomy*

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INTRODUCTION

Education is the cornerstone of developing high-quality human resources capable of competing in an era of rapidly advancing globalization (Cong, 2025; Zaakiyyah, 2024; Malik, 2018). An effective education system does not merely focus on the transfer of knowledge from teachers to students; rather, it must also foster critical, analytical, and reflective thinking skills essential assets for students to tackle future challenges. Meaningful learning requires active student engagement to understand, analyze, and evaluate every learning experience they undergo so that they can construct knowledge independently (Lee & Hannafin, 2016; Nafi'ah & Faruq, 2025; Rob & Rob, 2018).

The paradigm shift in learning from teacher-centered to student-centered has become an unavoidable necessity for creating a generation capable of lifelong learning. Students' ability to reflect on their own learning processes is key to successfully achieving expected competencies

while fostering independent learning. Students with metacognitive awareness tend to achieve better academic performance compared to those who rely solely on cognitive abilities (Fedinafaliza et al., 2020). Awareness of the thinking process and the ability to evaluate the learning strategies they use enable students to continuously improve and enhance the quality of their learning. The importance of developing students' self-reflection skills has spurred various innovations in the learning methods and strategies implemented in educational institutions.

Reflective learning, as one of the innovative learning approaches, offers a solution for developing students' reflective thinking skills through a process of deep reflection on their past learning experiences (Colomer et al., 2020; Guo et al., 2024; Howlett et al., 2016; Bass et al., 2017). This approach encourages students not merely to passively receive information, but to actively question, analyze, and evaluate what they have learned and how they learned it. Through systematic reflection, students can identify strengths and weaknesses in their learning process, thereby enabling them to formulate more effective improvement strategies for future learning (Fauzi & Al-Zainuri, 2024). The reflection process helps students build connections between new knowledge and prior experiences or knowledge, fostering a deeper and more meaningful understanding.

The ability to reflect on learning experiences also contributes to the development of metacognitive skills, which are crucial for long-term academic success. Students who are accustomed to reflecting will more easily recognize their own learning styles, understand their preferences and barriers to learning, and develop strategies tailored to their individual characteristics. Reflective learning also fosters the development of critical thinking skills, as students are trained to question assumptions, evaluate evidence, and consider various perspectives when understanding a concept. Effective implementation of reflective learning requires a structured and purposeful instructional design so that the reflection process can take place optimally and have a positive impact on improving students' skills (Porntaweekul et al., 2016; Cajiao & Burke, 2016; Chen et al., 2019; Song, 2021; Antonio, 2020).

Learning Outcome Design serves as a systematic framework for designing clear, measurable, and competency-based learning objectives that students must master by the end of the learning process. This approach emphasizes the importance of formulating specific and observable learning outcomes, thereby making it easier for teachers to design appropriate learning activities and evaluate student achievement objectively (Colomer et al., 2020; Ridwanullah et al., 2026). According to Molderez & Fonseca (2018), Learning Outcome Design ensures that every learning activity has a clear purpose and contributes directly to the achievement of the established competencies. Clear learning objectives help students understand what is expected of them, allowing them to direct their learning efforts in a more focused and efficient manner (Mitchell & Manzo, 2018).

Well-designed learning outcomes also facilitate the development of authentic and comprehensive assessments to measure students' competency achievement across various aspects cognitive, affective, and psychomotor. Transparency in learning objectives creates a more structured learning environment and gives students a sense of ownership over their own learning process (Novrizal & Muhammad, 2025). Students can monitor their progress toward established goals and adjust their learning strategies as needed to achieve the expected learning outcomes. Integrating Learning Outcome Design with various innovative learning approaches can optimize the effectiveness of the learning process and significantly improve the quality of student learning outcomes (Nasution et al., 2024).

The combination of reflective learning and Learning Outcome Design creates a powerful synergy for improving the quality of learning and developing students' various abilities in a holistic manner (Solihudin & Chamalah, 2025; Nariswari et al., 2025). Reflective learning provides students with the space to engage in deep reflection on their learning process, while Learning Outcome Design offers a clear structure and direction regarding the competencies that must be achieved. These two approaches complement each other because structured learning

outcomes provide a clear focus for the reflection process, while reflection helps students understand to what extent they have achieved those learning objectives.

Students are not only required to achieve the established competencies but also to understand how they achieved them, what helped or hindered the process, and how they can improve their learning strategies in the future. The implementation of reflective learning based on Learning Outcome Design enables more meaningful learning because students are actively engaged in constructing their own knowledge with clear guidance (Ilma et al., 2025). Teachers act as facilitators who design learning experiences that enable students to achieve learning outcomes through a continuous process of exploration, reflection, and self-evaluation. This integrative approach also supports the development of self-regulated learning skills, enabling students to plan, monitor, and evaluate their learning processes independently (Panggabean & Misykah, 2025; Afiah et al., 2024).

The synergy between reflective learning and Learning Outcome Design has the potential to result in a comprehensive improvement in students' abilities, encompassing conceptual understanding, critical thinking, problem-solving, and independent learning. The reality of learning in various educational institutions shows that many students still struggle to develop higher-order thinking skills and independent learning which are the primary goals of modern education. Conventional teaching methods, which still dominate classroom practice, tend to position students as passive recipients of information without providing sufficient opportunities to develop reflective and self-evaluation skills (Arnold, 2022). Teachers often focus too much on covering a dense curriculum, thereby neglecting the importance of deep and meaningful learning processes for students.

Many of the assessments used also remain oriented toward the ability to recall and understand factual information, without measuring students' critical, analytical, and reflective thinking skills. This situation results in students being inadequately trained to evaluate their own learning processes, identify effective strategies, and make continuous improvements to their learning approaches. A lack of self-reflection also contributes to low intrinsic motivation among students because they do not understand the relevance and significance of what they are learning to their own lives. Students tend to study to meet external demands, such as exams or assignments, without a deep awareness of the importance of learning for their personal development. The gap between the ideal goals of education and actual learning practices in the classroom calls for innovation and a paradigm shift in the design and implementation of the learning process.

Initial observations indicate that students' ability to understand concepts in depth still needs improvement, particularly in applying what they have learned to solve contextual problems. Many students are able to memorize definitions and formulas but struggle when asked to explain concepts in their own words or apply them in situations different from those taught in class. Students' critical thinking skills are also still limited, as evidenced by their tendency to accept information without questioning its validity or seeking alternative perspectives. Students rarely ask questions that demonstrate deep thinking or a high level of intellectual curiosity about the material being studied.

Students' independence in learning is also a serious concern, as most students remain heavily reliant on direct instruction from teachers and lack the initiative to seek out additional learning resources or explore topics on their own. Students' ability to plan learning strategies, monitor their understanding, and engage in self-assessment remains very limited, making it difficult for them to learn effectively without intensive guidance. Students' motivation to learn also tends to be external driven by the desire to earn good grades or avoid punishment, rather than by an intrinsic desire to understand and master the material. These various indicators point to the need for learning interventions that can develop students' abilities in a more comprehensive and in-depth manner.

Efforts to address these various learning challenges require an approach that not only changes the methods of delivering content but also shifts the paradigm regarding how students should learn and what role teachers should play. The implementation of reflective learning based on Learning Outcome Design offers a comprehensive alternative solution for simultaneously developing students' various skills. This approach provides a clear structure through well-defined learning outcomes, while also giving students the space to develop metacognitive awareness through a systematic reflection process.

Students will be trained not only to achieve learning objectives but also to understand how they learn, which strategies are effective for them, and how they can continue to improve the quality of their learning. A reflection process integrated with clear learning outcomes will help students develop a deeper understanding of the material, enhance their critical thinking skills, and foster independent learning. Teachers will serve as designers of learning experiences that facilitate the attainment of competencies through exploration, experimentation, and reflection, rather than merely as conveyors of information. Assessments will be designed to measure not only the attainment of competencies but also the development of students' reflective and metacognitive abilities. The implementation of this approach is expected to create a learning ecosystem that supports students' development as active, reflective, and independent learners.

The need to examine reflective learning based on Learning Outcome Design is especially relevant because existing studies often address reflective learning or outcome-oriented design separately, while less is known about how the two are implemented together in Indonesian secondary-school classrooms. This gap is primarily an implementation question rather than an effectiveness question: it concerns how teachers organize the approach, how students engage with reflective learning logs, what challenges emerge, and what developments participants and classroom evidence indicate during implementation. Accordingly, this study aimed to describe (1) the implementation of reflective learning logs based on Learning Outcome Design, (2) the challenges and adaptive strategies encountered during implementation, (3) perceived and observed developments in students' conceptual understanding, critical thinking, metacognitive awareness, and learning autonomy, and (4) the mechanisms participants associated with these developments. The study therefore does not seek to establish causal effectiveness; rather, it provides a practice-near qualitative account that can inform subsequent evaluative or mixed-method research.

METHODS

This study used a qualitative descriptive, implementation-focused design to provide a direct, low-inference account of how reflective learning logs based on Learning Outcome Design (LOD) were applied in a natural school setting, the challenges encountered, participants' perceptions of observed developments, and the mechanisms they associated with the learning process. Qualitative description was selected because the research questions required a practice-near description of procedures and experiences rather than an interpretation of the essence of lived experience, as in phenomenology, or the construction of individual life stories, as in narrative inquiry. Although the study was bounded to one school, it was not designed as an explanatory case study; SMA Negeri 1 Purwokerto functioned as the implementation setting for an intensive descriptive inquiry. The study was conducted during the even semester of the 2024/2025 academic year over six months. The school was selected purposively because it had implemented reflective learning practices and demonstrated institutional commitment to instructional innovation. Participants were selected purposively and consisted of three subject teachers who implemented the approach, fifteen Grade XI students representing different initial academic ability levels, and one school principal. Their inclusion enabled the study to examine implementation from the perspectives of instructional delivery, student engagement, and school-level support. Data were generated through participatory classroom observation, semi-structured in-depth interviews with teachers, students, and the principal, review of instructional documents and student work, and focus group discussions (FGDs). Documents included syllabi, lesson plans, LOD documents, reflective learning logs or reflection journals, assessment rubrics,

and student portfolios. The learning logs were treated both as a central component of the instructional approach and, together with other classroom products, as documentary data for examining how students articulated understanding, difficulties, learning strategies, and planned improvements.

The intervention centered on structured reflective learning logs integrated into LOD-based teaching and implemented by the three participating teachers throughout the six-month period. At the preparation stage, teachers formulated specific and measurable learning outcomes that included substantive competencies and reflective or metacognitive expectations, aligned learning activities with those outcomes, and prepared reflection guidance and assessment rubrics. During each learning cycle, students first engaged in subject learning activities oriented to the stated outcomes and then completed guided log entries. The prompts directed students to identify what they had understood, difficulties encountered, strategies used, connections with prior knowledge or everyday contexts, their progress toward the stated outcomes, and the next steps needed for improvement. In operational terms, the frequency of reflection was tied to the regular learning cycle rather than to a separate weekly quota: guided log writing was embedded as a recurring component of the cycle, while reflection time was systematically allocated in regular learning sessions, typically at lesson closure and at critical points when students encountered difficulty. This arrangement kept the logs integrated with subject instruction rather than treating reflection as a separate activity. The learning logs served as the principal recurring reflective tool, while small-group reflective discussions, reflective think-pair-share, peer feedback, and portfolio review were used as complementary techniques. Implementation progressed from simple and highly structured reflection to more complex and increasingly independent reflection.

Teachers initially provided intensive scaffolding through guiding questions and examples and gradually reduced support as students became more familiar with the process; differentiated assistance was maintained for students who required additional support. Across the three participating Grade XI subject classes, the same core implementation logic was maintained: teachers communicated the intended learning outcomes, facilitated subject-specific learning activities, guided students to record reflection in the learning logs, used feedback or reflective discussion where appropriate, and connected the reflection to subsequent learning decisions. The substantive content, examples, and wording of prompts were adapted to the material taught by each subject teacher, while the reflective functions of identifying understanding, difficulties, strategies, progress, and next steps remained consistent. Teachers reviewed log entries and portfolios using rubrics that considered both achievement of the intended learning outcomes and the quality of students' reflection. This sequence allowed the researchers to examine how the logs were integrated with learning outcomes, feedback, and subsequent learning decisions across the participating classes. Data analysis employed the interactive analysis model of Miles and Huberman, consisting of data collection, data reduction, data display, and iterative conclusion drawing and verification. Analysis was organized around four domains aligned with the study objectives: implementation procedures, implementation challenges and adaptations, perceived and observed developments in students' abilities, and mechanisms participants associated with those developments. Claims about student development were based on convergence across interview accounts, observations, reflective learning logs, portfolios, and FGD data and were interpreted as qualitative patterns rather than causal estimates of effectiveness. Credibility was strengthened through source triangulation across teachers, students, and the principal; method triangulation across observations, interviews, documents, and FGDs; and member checking by reconfirming data and interpretations with informants. These procedures were used to ensure that findings remained grounded in participants' accounts and classroom evidence.

RESULTS AND DISCUSSION

Implementation of Reflective Learning Logs Based on Learning Outcome Design in the Classroom

Based on the results of observations and interviews, the implementation of reflective learning based on Learning Outcome Design begins with a preparatory phase that involves teachers in designing learning outcomes that are specific, measurable, and oriented toward the development of students' holistic competencies. One subject teacher stated,

"We design learning outcomes not only for cognitive aspects, but also to integrate reflective skills as part of the competencies students must master."

This design process requires teachers to conduct an in-depth analysis of core competencies, the characteristics of the material, and students' prior knowledge profiles. Findings from focus group discussions (FGDs) with teachers revealed that collaboration among teachers and intensive discussions are key to ensuring the validity of the Learning Outcome Design that is developed. Documentation of lesson plans shows that teachers develop comprehensive assessment rubrics to measure both the achievement of substantive competencies and the development of students' reflective skills.

Across the three participating Grade XI subject classes, reflective learning logs were systematically integrated as the principal recurring reflective activity within the learning cycle. Observation results showed that the core reflective procedure was maintained across classes, while teachers adapted examples and prompts to the subject matter. Complementary techniques included small-group reflective discussions, reflective "think-pair-share" activities, peer feedback, and portfolio assessment. One student remarked,

"At first, I was confused about how to fill out the reflection journal, but with the teacher's guiding questions, I came to better understand what I had learned and the challenges I faced."

This is consistent with the findings of Evendi & Verawati (2021), who state that guiding questions appear to trigger metacognitive thinking and encourage students to identify their learning strategies. Observations of reflective discussions show that teachers act as facilitators who ask probing questions to encourage students to think more deeply. Reflection time was systematically allocated in each observed learning session, most commonly at the end of the lesson and also at critical points when students encountered difficulties. Thus, the implementation followed the rhythm of the regular learning cycle rather than a separate fixed weekly reflection schedule.

The dynamics of teacher-student interactions during the facilitation of reflection demonstrate a transformation in the teacher's role from a knowledge transmitter to a learning facilitator. Results from interviews with teachers reveal their efforts to foster a safe and supportive classroom climate. One teacher explained,

"I try to make students feel comfortable sharing their thoughts and admitting their difficulties without fear of being judged."

Observations showed that the reflective questions posed by teachers were open-ended and non-judgmental, encouraging students to think divergently. Scaffolding techniques were used adaptively, with intensive support in the early stages that was then gradually reduced as students developed their ability for independent reflection (Kuncoro & Turahmat, 2025). Results from focus group discussions (FGDs) with students revealed that teachers also encouraged peer feedback through peer reviews of reflection journals, thereby facilitating collaborative learning. Differentiation in facilitating reflection was implemented by taking into account the diversity of students' learning styles and ability levels.

The challenges that arose during implementation reflect the complexity of the shift in the learning paradigm. From interviews with teachers, time constraints were identified as the main obstacle. One teacher stated,

"We feel pressured to cover the dense curriculum material while also setting aside time for reflective activities that require deep engagement."

Teachers' limited understanding of effective reflective learning practices also poses a significant obstacle, particularly for teachers accustomed to a teacher-centered approach (Maulana et al., 2026). Findings from focus group discussions with students revealed resistance during the early stages of implementation, as some students felt uncomfortable with the demands of metacognitive thinking. One student acknowledged,

"At first, I wasn't used to being asked to explain my thought process because, up until then, I had only focused on whether an answer was right or wrong."

Students with low academic ability struggle to engage in deep reflection due to their limited ability to express their thoughts.

Various adaptive solutions and strategies have been developed to address these barriers. Observations show that teachers overcome time constraints by restructuring learning activities to embed reflection within the substantive learning process. Teachers developed structured yet flexible reflection templates to guide students in focusing on key aspects without spending excessive time. According to interviews with the principal, teachers' capacity building is carried out through professional learning communities where teachers share experiences and learn from one another. Student resistance is addressed through a phased approach that gradually builds familiarity with the reflection process. One teacher explained,

"We start with simple, structured reflection activities, then move on to more complex ones."

Differentiated reflection strategies were developed to accommodate the diversity of student abilities, with intensive scaffolding for low-ability students. The documentation shows that the development of clear reflection assessment rubrics helps teachers evaluate the quality of reflections more objectively.

Perceived and Observed Developments Associated with Learning Outcome Design-Based Reflective Learning Logs

A recurring pattern in interviews and classroom observations was the development of students' conceptual understanding during implementation. Students were increasingly observed explaining concepts in their own words rather than only repeating textbook definitions. This pattern was also described in student interviews. One student stated,

"Now I can explain concepts using examples from everyday life, rather than just memorizing definitions."

Analysis of the students' portfolios showed more frequent use of relevant and varied concrete examples, which was interpreted as evidence of increasingly flexible conceptual understanding across contexts. Interview accounts similarly indicated that the reflection process helped students identify gaps in their understanding and seek clarification. Reflection journals also showed more explicit connections across topics rather than treatment of each topic as an isolated entity. Classroom observations documented instances in which students applied concepts to unfamiliar problems and formulated alternative solutions. These patterns are interpreted as qualitative indications of development during implementation rather than as measured gains attributable solely to the intervention.

The development of critical thinking was another recurring pattern across the data sources. These observations are theoretically consistent with the cognitive constructivist perspective, which proposes that flexible understanding and knowledge transfer can develop through reflection that encourages conceptual elaboration, schema integration, and active reconstruction of meaning across contexts (Huda & Djono, 2025). Results from FGDs indicated that students had become more accustomed to questioning information rather than accepting it immediately. One student stated,

"Now I don't just accept information at face value, but look for evidence and consider various perspectives."

Analysis of reflective group discussions suggested more developed argument analysis, including the identification of premises and conclusions and consideration of logical coherence. Observations also documented students considering multiple perspectives and acknowledging that an issue may require evaluation from more than one viewpoint. Teachers reported that repeated evaluation of information sources and evidence supported these practices. Student portfolios further showed attempts to integrate information from multiple sources. Conceptually, these patterns align with the Higher Order Thinking Skills (HOTS) framework, in which analysis, evaluation, and synthesis represent higher-level cognitive activity supported by sustained reflective practice and intellectually challenging dialogue (Umi, 2020). These findings should be read as observed qualitative patterns, not as statistically measured improvement.

Development in students' metacognitive awareness was a recurring pattern across the qualitative data sources. Students described becoming more aware of how they learned, which strategies they preferred, and when they needed assistance. One student explained,

"Now I have a better understanding of how I learn, which strategies work best for me, and when I need help."

A similar point was raised by Rustiyana (2025), who emphasizes students' capacity to monitor their understanding during learning. FGD data in the present study showed that students were increasingly able to identify their strengths and weaknesses, learning preferences, and conditions that supported their learning. Observations also documented more deliberate strategic planning, including setting learning goals and selecting strategies. Students described monitoring their progress and adjusting approaches when a strategy did not work as expected. Teachers likewise reported that repeated reflection supported students' practice of evaluating learning outcomes and identifying areas for improvement.

Greater learning autonomy emerged as a recurring perceived and observed development across the data sources. Interviews described more frequent student initiative in seeking additional learning resources rather than relying exclusively on teacher-provided materials. One student stated,

"Now I often look for additional videos or articles to deepen my understanding, rather than relying solely on the material provided by my teacher."

The ability to identify one's own learning needs can be supported by reflection that helps students recognize gaps in their knowledge (Ayunda et al., 2024). In the FGDs, students described a growing sense of ownership over learning and viewed achievement of learning objectives as a personal goal. Observations suggested greater internalization of responsibility for learning processes and outcomes. Portfolio documentation also showed students trying multiple strategies when they encountered academic difficulties, while teachers reported more deliberate time-management practices. These observations indicate a pattern of increasing autonomy during implementation without establishing a causal effect.

A comparative analysis of the qualitative data based on students' initial academic levels suggested diverse patterns of engagement and development. Students with high initial academic ability responded positively to reflective learning and were often observed engaging deeply with critical and metacognitive tasks. One teacher explained,

"High-achieving students are very enthusiastic about reflective learning; they often explore topics in greater depth than is required."

However, one challenge identified among some high-achieving students was a tendency to overthink, which could constrain spontaneity. Students with moderate initial academic ability showed relatively balanced development in conceptual understanding and learning independence according to FGD and observation data. Structured reflection appeared to help this group consolidate understanding. Students with lower initial academic ability experienced greater difficulty at the beginning, but observation data showed gradual development in

metacognitive awareness when additional scaffolding was provided. One student with low academic ability acknowledged,

"Reflection has made me realize that learning difficulties can be overcome with effort and the right strategies not because I'm stupid."

Perceived Mechanisms Through Which Reflective Learning Logs Based on Learning Outcome Design Support Learning

The findings suggest that a structured reflection process based on learning outcomes may support active knowledge construction. Student interviews described reflection as prompting more active sense-making rather than passive reception of information. One student explained,

"When asked to reflect on what I've learned, I think more actively and connect it to my own experiences."

Observations suggested that reflective activities guided by Learning Outcome Design helped focus students' attention on core concepts. Reflection journals showed that questioning during reflection sometimes brought discrepancies between prior understanding and new information to students' awareness. FGD data indicated that students attempted to integrate declarative, procedural, and conditional knowledge when explaining what they had learned. Teachers also perceived that linking new knowledge to personal experience made learning more relevant and engaging for students. These patterns are interpreted as participants' and researchers' accounts of possible learning mechanisms rather than proof of causal pathways.

Connections between new knowledge and students' prior experiences or prior knowledge emerged as a recurring explanatory pattern in the findings. Analysis of reflection journals shows that systematic reflection encourages students to explicitly identify the relationships between what they are currently learning and what they already know. One student stated,

"It becomes easier for me to understand new concepts when I connect them to what I've learned before."

Observation and interview data suggested that the bridging process during reflection helped students recognize links between academic concepts, real-world situations, and personal experiences. Participants also described analogical reasoning prompted by reflective questions as useful when moving from familiar to unfamiliar situations. Portfolio documentation showed that longitudinal reflections enabled students to trace changes in their understanding over time. These findings provide a qualitative account of how participants perceived knowledge connection to operate during the learning process.

The role of Learning Outcome Design in providing direction and focus for the reflection process was revealed through various data sources (Setiono et al., 2025). Results from interviews with teachers showed that the clarity of learning objectives articulated in the Learning Outcome Design provided reference points that allowed students to evaluate their progress. One teacher explained,

"Clear learning outcome design helps students understand what they need to achieve and how to reflect on their progress."

Analysis of lesson-plan documents showed that specific and measurable learning outcomes gave students concrete reference points for reflecting on what had been achieved and which strategies appeared useful. FGD data suggested that alignment among learning activities, reflective prompts, and assessment criteria helped students see relationships among the components of learning. Observations also indicated that explicit expectations were associated with greater clarity about what students were expected to accomplish (Tyaningsih et al., 2025).

The data suggested a complementary interaction between reflective learning and Learning Outcome Design. Observations showed that the experiential sequence of concrete experience, reflective observation, abstract conceptualization, and active experimentation

became more explicitly connected to learning outcomes when teachers used LOD as a reference point. Teachers described intentionally designed experiences as providing material for focused reflection, while reflection journals showed students directing attention toward aspects of experience that were relevant to stated outcomes. FGD data suggested that outcome-oriented reflection helped students articulate broader principles, and portfolio evidence documented attempts to apply reflective insights in subsequent learning activities. This interpretation describes an observed implementation pattern rather than a measured synergistic effect.

Participants described a notable shift in students' mindsets and attitudes toward learning during the implementation period. Interviews suggested movement from a fixed view of ability toward a growth-oriented view in which effort and strategy were considered important for improvement. One student shared,

"I used to think that if I couldn't do something, then I just couldn't, but now I believe I can improve through effort and the right strategies."

Participants' accounts suggested a shift in attribution from external factors toward greater recognition of the role of personal effort, strategies, and choices in learning outcomes (Wiratnraur et al., 2025). FGD data also indicated stronger expressions of intrinsic interest and curiosity during deeper engagement with the material. Observations documented greater confidence in attempting complex tasks after students experienced progress through deliberate effort. Interviews further suggested a movement from performance-oriented goals focused mainly on grades toward learning-oriented goals focused on understanding and personal growth. These patterns represent perceived and observed changes during the implementation period.

CONCLUSION

This study concludes that reflective learning logs based on Learning Outcome Design (LOD) were implemented through outcome-oriented preparation, guided and progressively scaffolded log writing, complementary reflective discussion, differentiated support, and facilitative teacher roles. Across interviews, observations, FGDs, learning logs, and portfolios, participants and classroom evidence indicated developments in students' conceptual explanation, critical examination of information, metacognitive awareness, and learning autonomy. Students also described becoming more able to connect new knowledge with prior experience, monitor their learning strategies, and evaluate progress against explicit learning outcomes. The findings further suggest that LOD provided a clear reference point for reflection, while the recurring learning logs helped make students' thinking processes visible to themselves and to teachers. Participants also described changes in learning dispositions, including greater emphasis on effort, strategy, intrinsic interest, and learning-oriented goals. However, these findings represent perceived and observed qualitative patterns within one school and should not be interpreted as evidence that the intervention caused improvement or as a quantitative estimate of effectiveness. The contribution of the study is therefore an implementation-focused account of how reflective learning logs can be integrated with LOD, the challenges involved, and the learning developments and mechanisms perceived by participants during implementation.

SUGGESTION

Based on these findings, schools may consider integrating reflective learning logs with clearly articulated learning outcomes as a strategy for supporting students' reflective, metacognitive, and independent learning processes. Teachers should receive continuing professional development on the design of reflection prompts, facilitation of reflective dialogue, differentiated scaffolding, and the use of rubrics for reviewing reflective work. Schools should also provide collaborative professional learning communities and sufficient flexibility within lesson organization so that reflection can be embedded without displacing substantive learning. Because this study used a qualitative descriptive design in one school, future research should evaluate effectiveness using designs capable of estimating change, such as pretest-posttest quantitative studies, comparison-group designs, or mixed-method approaches with larger and

more diverse samples. Longitudinal studies could also examine whether perceived developments in conceptual understanding, critical thinking, metacognition, learning autonomy, creativity, and problem solving are sustained over time and across educational contexts.

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