

Assessment Models In Deep Learning At School

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ABSTRACT

Deep learning in elementary schools emphasizes students' active engagement in constructing meaningful understanding through critical thinking, problem-solving, collaboration, and reflection. To achieve these goals, an assessment model capable of evaluating both the learning process and outcomes authentically and comprehensively is required. This conceptual article aims to analyze various assessment models relevant to supporting deep learning in elementary schools, including formative assessment, authentic assessment, project-based assessment, portfolio, and performance rubrics. This study employs a qualitative approach using a literature review (conceptual study) method. Data were collected from scholarly articles, research findings, and policy documents related to the Merdeka Curriculum and 21st-century learning assessment. The data were analyzed qualitatively and descriptively through processes of reduction, categorization, and synthesis to identify patterns in the application of assessment models within the context of deep learning in elementary schools. The findings reveal that integrating multiple assessment models plays a crucial role in realizing deep learning. Formative assessment helps teachers monitor students' learning progress and provide continuous feedback; authentic and project-based assessments encourage the application of knowledge in real-life contexts; portfolios support self-reflection and track competency development; and performance rubrics ensure objectivity and transparency in evaluation. The integration of these five assessment models strengthens students' learning motivation, higher-order thinking skills, creativity, collaboration, and reflection. This study concludes that assessment should not merely serve as a tool for measuring learning outcomes but should function as an integral part of the learning process, acting as assessment as learning. Therefore, elementary school teachers need to design assessments aligned with the principles of the Merdeka Curriculum, as the integration of deep learning and authentic assessment is key to developing reflective, creative, and competitive learners who meet the demands of 21st-century education.

Keywords: *assessment, deep learning, authentic assessment, elementary school*

I. INTRODUCTION

The 21st-century education paradigm demands learning that focuses not only on the acquisition of factual knowledge but also on the development of critical, creative, collaborative, and communicative thinking skills (4Cs). In this context, deep learning has emerged as an approach that emphasizes the active involvement of students in constructing meaningful knowledge. Through deep learning, students do not merely memorize information, but understand concepts holistically, relate them to real experiences, and are able to reflect on and apply them in everyday situations.

In Indonesia, the implementation of the Merdeka Curriculum is an important momentum in realizing deep learning in elementary schools. This curriculum emphasizes flexibility, contextuality, and strengthening the Pancasila learner profile as the main orientation of learning. However, to ensure that learning is truly meaningful and has an impact on the development of 21st-century competencies, an assessment system that is in line with the characteristics of deep learning is needed.

In practice, learning in elementary schools still largely relies on traditional assessment models such as multiple-choice or short-answer tests that assess low-level cognitive aspects (C1-C2). This type of assessment model is less capable of capturing students' thinking processes, social skills, and reflective abilities, which are at the core of deep learning. As a result, teachers often only obtain a partial picture of students' abilities, rather than a comprehensive understanding of their learning processes and outcomes (Pratiwi & Suryana, 2022).

In contrast, authentic and formative assessment models provide a great opportunity to comprehensively assess deep learning. Authentic assessment allows students to demonstrate critical, creative, and collaborative thinking skills through tasks that are relevant to real life (Wiggins, 1998). Meanwhile, formative assessment provides space for teachers to give continuous feedback, so that students can monitor and improve their own learning process. Research by Widiastuti (2021) proves that project-based authentic assessment can improve the creativity and collaboration skills of elementary school students, while Rahmawati (2020) found that portfolio-based formative assessment provides a more complete and reflective picture of learning development.

Furthermore, the application of project-based assessment, portfolio, and performance assessment rubrics plays an important role in bringing to life the principle of assessment as learning—that is, assessment that not only measures results but is also an integral part of the learning process. Through process- and product-oriented assessment, students are trained to think at a higher level (higher-order thinking skills), make decisions, collaborate, and engage in self-reflection. All these elements are in line with the main objective of deep learning, which is to build sustainable competencies, not just short-term academic achievements.

Thus, the assessment model in deep learning in elementary schools must be able to reflect the integration of knowledge, skills, and attitudes. Assessment is no longer seen as the final stage of learning, but as a pedagogical tool that helps teachers understand students' thinking processes and helps students understand themselves as learners. Therefore, it is important to examine various relevant and effective assessment models to be applied in the context of elementary schools, so that learning is truly in line with the spirit of the Merdeka Curriculum and is able to shape students who are reflective, creative, and globally competitive.

Based on this background, this study focuses on answering two main questions: what is the role of assessment in supporting deep learning in elementary schools, and what assessment models are relevant to integrate into deep learning in elementary schools?

The purpose of this study is to provide a comprehensive conceptual review of various assessment models that elementary school teachers can use to strengthen the implementation of deep learning, while also providing direction for the development of

assessment strategies that are in line with the principles of the Merdeka Curriculum and the learning needs of the 21st century.

II. LITERATURE REVIEW

A. The Concept of Deep Learning in Elementary Schools

Deep learning is an approach that emphasizes the active involvement of students in higher-order thinking, problem solving, and reflection on learning experiences. According to Marton and Säljö (1997), deep learning differs from surface learning in that it focuses on students' efforts to understand the meaning and relationships between concepts, rather than simply memorizing information. In the context of elementary schools, this approach allows students to relate the material to real life and develop 21st-century skills such as critical, creative, collaborative, and communicative thinking (Trilling & Fadel, 2009).

In Indonesia, the concept of deep learning is in line with the spirit of the Merdeka Curriculum, which emphasizes independent learning, self-reflection, and the formation of the Pancasila Student Profile. Students are not only expected to achieve academic results, but also to demonstrate strong character, values, and social skills. Therefore, the assessment system used needs to support a meaningful, adaptive, and holistic competency-oriented learning process.

B. Assessment Paradigms in 21st Century Learning

Assessment in modern education no longer functions solely as a tool for measuring learning outcomes (assessment of learning), but also as part of the learning process itself (assessment for learning and assessment as learning) (Earl, 2013). This new paradigm positions assessment as a means to help students understand their strengths and weaknesses and encourage reflection to improve learning outcomes.

In the context of deep learning, assessment needs to be authentic, formative, and process-oriented. According to Wiggins (1998), authentic assessment evaluates students' abilities through real-world tasks that require the application of knowledge in relevant contexts. Thus, assessment not only measures final results but also evaluates how students think, collaborate, and make decisions.

Black and Wiliam (2018) add that formative assessment provides continuous feedback so that teachers can adjust their learning strategies according to students' needs. This approach makes assessment a bridge between teaching and learning, allowing students to develop according to their potential.

C. Assessment Models in Deep Learning

1) Formative Assessment

Formative assessment helps teachers identify students' learning progress on an ongoing basis and provide constructive feedback. In deep learning, this assessment allows teachers to assess critical thinking, reflection, and conceptual understanding skills (Hidayat, 2021). Research by

Febriyanti & Wardana (2023) shows that diagnostic-based formative assessment in elementary schools can improve the adaptation of teachers' learning strategies according to students' needs, thereby strengthening their intrinsic motivation and active participation.

2) Authentic assessment

Authentic assessment is considered most relevant to supporting deep learning because it assesses students in real situations that require the integration of knowledge, skills, and attitudes. Wiggins (1998) asserts that authentic assessment reflects students' competencies as a whole. Fitriyah et al. (2022) found that the application of project-based authentic assessment in elementary schools increased students' creativity and collaboration, while Siregar & Lestari (2021) showed that project-based assessment fostered students' responsibility and reflective abilities.

3) Project-Based Assessment

Project-based assessment is a form of authentic assessment that allows students to plan, implement, and evaluate learning activities through real projects. According to Widiani (2022), this assessment not only measures the final results but also the collaboration and innovation processes that occur throughout the activities. Research by Puspitasari & Handayani (2021) proves that project assessment in the Merdeka Curriculum increases student engagement as well as critical and creative thinking skills.

4) Portfolio

Portfolios serve to document students' learning progress continuously and encourage self-reflection (Rahmawati, 2020). Through a collection of works, learning journals, and reflection notes, teachers can comprehensively assess competency development. Nurhayati & Ramadhan (2021) found that the use of digital portfolios in Merdeka Curriculum learning increases student engagement and facilitates teacher feedback.

5) Performance Assessment Rubrics

Rubrics help maintain objectivity in assessing complex skills. Lestari & Wulandari (2022) showed that the use of analytical rubrics in project assessments can improve students' reflective skills, while Andriani et al. (2024) proved that SDG-based rubrics help clarify the direction of learning and the quality of teacher feedback. In the context of deep learning, rubrics guide students in understanding success criteria and increasing metacognitive awareness.

D. Integration of Assessment Models in Deep Learning

The integration of various assessment models results in a more holistic, adaptive, and meaningful assessment system. Formative assessment supports the continuous monitoring process, authentic and project-based assessments provide real-world contexts, portfolios support reflection, and rubrics ensure fairness and transparency in assessment (Black & Wiliam, 2018; Wiggins, 1998).

Through this integration, assessment not only evaluates what students have learned, but also how they learn. This is in line with the principle of assessment as learning, where the assessment process becomes part of a pedagogical strategy to foster independent learning, responsibility, and reflective awareness. Thus, an integrated assessment model becomes an important foundation in the implementation of deep learning in elementary schools and the strengthening of the The Five Principles (Pancasila) Student Profile.

E. Implications for Educational Practices in Elementary Schools

Research results show that the application of authentic, formative, and project-based assessment models can improve the quality of learning in elementary schools. Teachers are encouraged to act as learning facilitators and designers of contextual assessments. Schools need to provide system support, such as authentic assessment training and digital portfolio tools, while policymakers need to emphasize the importance of process assessment in the Merdeka Curriculum policy.

Thus, the literature shows that assessment models are a key element in the success of deep learning in elementary schools, as they not only measure learning outcomes but also shape students' character, thinking skills, and 21st-century competencies.

III. RESEARCH METHODOLOGY

This study uses a conceptual review approach based on literature studies. This approach was chosen because the focus of the study was not on collecting field data, but rather on examining theories, research results, and relevant education policies to obtain a comprehensive picture of assessment models that can support deep learning in elementary schools. A qualitative approach with a literature study allows researchers to examine various sources of information in depth and integrate them into a systematic analytical framework (Creswell & Creswell, 2018).

The data sources in this study came from secondary literature in the form of national and international scientific journals, reference books on assessment and 21st-century learning, Merdeka Curriculum policy documents, and research results published in the last five years. The literature was selected purposively, considering the relevance of the topic, academic credibility, and suitability to the learning context in elementary schools.

The literature collection process was carried out by searching online databases such as Google Scholar, DOAJ, ResearchGate, and national journal portals using the keywords "formative assessment," "authentic assessment," "project-based assessment," "portfolio," "performance assessment rubric," "deep learning," and "Merdeka Curriculum." The literature obtained was then identified, classified, and critically analyzed to find themes and patterns related to the application of assessment models in deep learning.

Data analysis was conducted using descriptive qualitative methods by examining the main ideas of each source, comparing the strengths and limitations of each assessment model, and synthesizing the results to formulate an assessment integration concept in line with the principles of deep learning and the requirements of the Merdeka Curriculum. This approach helps to produce a comprehensive understanding of how assessment can function not only as a tool for measuring learning outcomes, but also as an integral part of the learning process (Creswell & Creswell, 2018).

IV. RESULTS AND DISCUSSION

A. Formative Assessment

Formative assessment has been proven effective in improving student understanding because it allows teachers to provide immediate and continuous feedback. Black and Wiliam (2018) emphasize that formative assessment can improve the quality of student learning when used consistently. This finding is reinforced by research by Febriyanti & Wardana (2023), which shows that diagnostic instrument-based formative assessment in elementary schools helps teachers adjust learning strategies according to the needs of each student. Thus, formative assessment acts as a bridge between learning objectives and adaptive teaching strategies.

Furthermore, formative assessment in the context of deep learning not only serves to determine cognitive achievement but also to monitor the development of students' critical thinking skills, creativity, and collaborative attitudes. For example, teachers can use reflective questions, learning journals, or class discussions as forms of formative assessment that encourage students to relate concepts to their real-life experiences. This is in line with the results of Hidayat's (2021) research, which confirms that the application of reflection-based formative assessment can increase student engagement and deepen their understanding of concepts.

In addition, formative assessment provides opportunities for teachers to differentiate learning. Through analysis of assessment results, teachers can identify

students who need enrichment or remedial assistance, so that each child receives a learning experience tailored to their potential. A study by Suryani and Nugroho (2022) also shows that continuous formative assessment can increase students' confidence because they feel that their learning progress is recognized.

Thus, formative assessment is not merely an evaluation mechanism, but an integral part of the learning cycle that supports the achievement of the Merdeka Curriculum objectives. The application of varied, authentic, and context-based formative assessments can help elementary school teachers develop more meaningful, adaptive, and Pancasila-oriented learning.

Table 1
Formative Assessment Instruments in Deep Learning at Elementary Schools

Instrument	Purpose	Examples of Implementation in Elementary Schools
Reflective Questions	Exploring students' understanding and identifying learning difficulties	Teacher asks: <i>"What new things did you learn today?"</i> or <i>"Which part was the most difficult?"</i>
Learning Journal	Training students to express their understanding in their own words	Students write a short summary, and the teacher comments: <i>"Good, try connecting it to your experiences at home."</i>
Exit Ticket	Quickly checking understanding before ending the lesson	Students write a short answer: <i>"Give an example of a day-night event you have experienced."</i>
Group Discussion Rubric	Assessing students' collaborative skills and participation	Teachers assess indicators: cooperation (scores 1-3)
Concept Map / Mind Map	Assessing the relevance of concepts understood by students	Students create a simple concept map about the water cycle or the relationships between characters in a story

B. Authentic Assessment

Authentic assessment is highly relevant for assessing critical thinking and problem-solving skills because students are faced with real-life situations. Wiggins (1998) emphasizes that authentic assessment provides contextual learning experiences, so that the assessment results not only reflect academic abilities but also students' readiness to face life's challenges.

Research by Fitriyah et al. (2022) shows that the application of authentic assessment in the Merdeka Curriculum's Cultural Arts learning improves the creativity and collaboration skills of elementary school students. These findings are in line with the study by Siregar & Lestari (2021), which confirms that project-based assessment encourages students to integrate knowledge across subjects while fostering a sense of responsibility in completing group assignments. Thus, authentic assessment is not only oriented towards the final result but also assesses the thinking process, social skills, and attitudes that develop while students are working on the assignment.

In the context of elementary school, authentic assessment can be realized through various forms, such as art projects, simple research presentations, small entrepreneurial practices, and field observations related to learning themes. For example, in the theme "Surrounding Environment," students can be asked to identify waste problems in the school environment and design simple solutions, which are then presented in front of the class. This activity not only trains problem solving, but also strengthens the Pancasila learner profile, especially the values of mutual cooperation and creativity.

In addition, authentic assessment encourages teachers to become facilitators who provide constructive feedback throughout the process, not just at the final stage of assessment. This supports the concept of assessment for learning, which views assessment as an integral part of deep learning. With a more realistic learning experience, students will feel more motivated and confident in facing challenges, both inside and outside the classroom.

Table 2
Authentic Assessment Instruments in Deep Learning at Elementary Schools

Instrument	Purpose	Examples of Implementation in Elementary Schools
Project (Project-Based Assessment)	Training students to integrate knowledge and skills to produce products/works	Students create posters campaigning for school cleanliness or design simple tools from recycled materials
Case Studies	Developing analytical and real-world problem-solving skills	Students are asked to analyze waste problems in their surroundings and propose practical solutions
Performance Task	Assessing real-world skills in the context of learning	In the theme of "Healthy Food," students practice making simple, nutritious menus and explain their benefits

Presentation / Exhibition of Work	Developing communication, confidence, and idea-sharing skills	Students present the results of a small research project on types of medicinal plants in their home environment
Authentic Portfolio	Documenting the development of students' work and reflections over a period of time	A collection of short stories, drawings, or small reports compiled by students and displayed in the class "Learning Gallery"

C. Project-Based Assessment

Project-based assessment serves to foster students' independence in learning, collaboration, and creativity. Through projects, students are encouraged to integrate knowledge across subjects and produce tangible work. Widiana (2022) proves that project-based assessment in elementary science education can improve critical thinking skills while training students to be responsible in group work. In other words, project-based assessment not only evaluates the final product, but also holistically assesses the learning process.

Furthermore, projects provide space for students to plan, implement, and evaluate their own work, thereby fostering independence and reflective skills. Research by Puspitasari & Handayani (2021) shows that the application of project-based assessment in the Merdeka Curriculum encourages elementary school students to be more active in seeking information, discussing, and developing innovative solutions to everyday problems. This proves that project assessment can provide a deep learning experience that is relevant to real-life contexts.

In elementary school practice, projects can take various forms, such as creating simple learning media, conducting small research on the environment, campaigning for school cleanliness, and holding art exhibitions. For example, in the theme "Caring for the Environment," students can be asked to make recycled products from plastic waste. This project not only assesses science knowledge related to recycling but also collaboration skills, creativity, and environmental awareness.

Project assessment also requires the involvement of teachers as facilitators who provide guidance and feedback during the process. Teachers assess not only the final product but also the planning process, task distribution, conflict resolution, and group reflection. Thus, project assessment supports the goal of deep learning that emphasizes a balance between cognitive, affective, and psychomotor aspects.

Therefore, project-based assessment in elementary schools can be seen as an effective strategy for developing 21st-century competencies, namely critical, creative, collaborative, and communicative thinking. Furthermore, this assessment supports the achievement of the Pancasila learner profile, especially in terms of mutual cooperation, critical thinking, and creativity.

Table 3
Project-Based Assessment in Elementary Schools

Objectives	Project Form	Assessment Indicators
Developing environmental awareness and creativity	Making recycled products from plastic waste	a. Creative ideas for utilizing used items b. Neatness and functionality of products c. Teamwork
Training communication and critical thinking skills	Developing a healthy school campaign (posters, videos, or presentations)	a. Clarity of message b. Logical argumentation c. Presentation skills
Encouraging cross-curricular knowledge integration	Small research on types of medicinal plants in the surrounding environment	a. Completeness of observation data b. Simple analysis c. Report presentation
Strengthening artistic creativity and collaboration	Art exhibition with the theme "Natural Beauty"	a. Originality of work b. Expression of ideas c. Collaboration in exhibition preparation
Developing independence and responsibility in the learning process	Project to write and publish a simple short story book	a. Clear storyline b. Age-appropriate language c. Consistency in completing the project

D. Portfolio

A portfolio is an important tool for continuously monitoring student learning progress. Through portfolios, teachers, students, and parents gain a comprehensive picture of students' competency development, including cognitive, affective, and psychomotor skills. Portfolios not only contain a collection of students' best work, but

also record their learning process, mistakes, and improvements. Thus, portfolios reflect students' learning journey over time in a holistic manner.

Rahmawati's (2020) research shows that the use of portfolios encourages students to be more reflective about their learning process and increases their intrinsic motivation. This finding is reinforced by a study by Nurhayati & Ramadhan (2021), which found that digital portfolios in Merdeka Curriculum learning in elementary schools can increase student participation while making it easier for teachers to conduct formative assessments. This means that portfolios not only serve as archives of learning outcomes, but also as a medium of communication and reflection between teachers, students, and parents.

In practice, portfolios can take the form of work portfolios, which display students' work; process portfolios, which show the stages of skill development; and self- assessment portfolios, which contain students' reflections on their strengths and weaknesses. In elementary school, portfolios can be filled with various artifacts such as test results, written work, drawings, reflection notes, presentation recordings, and group projects.

In addition, technological developments have enabled the use of digital portfolios that are more interactive and easily accessible by teachers and parents. Through simple applications or online learning platforms, students can upload their work and receive feedback quickly. This is in line with the spirit of the Merdeka Curriculum, which encourages the use of technology in learning.

Thus, portfolios serve not only as documentation of learning progress, but also as a means of reflection, communication, and motivation. Their implementation in elementary schools can help shape students who are independent, reflective, and responsible for their learning process, while also supporting the achievement of the Pancasila learner profile.

Table 4
Types of Portfolios in Deep Learning at Elementary Schools

Type of Portfolio	Purpose	Examples of Implementation in Elementary Schools
Work Portfolio	To document students' best work to demonstrate competency achievement	A collection of the best short stories, drawings, daily test results with the highest scores, or student artwork
Process Portfolio	Showing the stages of student learning development over time	Story draft → teacher revision → final result; math worksheet → evaluation → improvement
Self-Assessment Portfolio	Encourages students to reflect on their learning strengths and weaknesses	Students write notes: <i>"I can read fluently, but I still find it difficult to understand the content of what I read."</i>

Reflective Portfolio	Encourages students to relate their learning experiences to their daily lives	Weekly learning journals contain students' experiences when trying out mathematical concepts in activities at home
Digital Portfolio	Facilitates access, communication, and interactive documentation of learning outcomes	Students upload their work, photos of activities, or presentation recordings to online learning platforms (Google Classroom, Seesaw, or Padlet)

E. Performance Assessment Rubrics

Performance assessment rubrics provide clear, objective criteria for assessing complex skills. Rubrics help teachers maintain consistency in assessment, reduce subjectivity, and encourage students to understand the quality standards they must achieve. Through rubrics, students not only know their final results, but also the specific aspects they need to improve in their learning process.

Research by Andriani et al. (2024) found that the use of a Sustainable Development Goals (SDGs)-based rubric in portfolio assessment can improve the quality of teacher

feedback while providing clearer direction for students in achieving specific competencies. These findings are in line with the study by Lestari & Wulandari (2022), which shows that the application of analytical rubrics in project assessments in elementary schools can foster students' reflective skills because they can assess their own progress based on measurable criteria.

In the context of deep learning in elementary schools, rubrics can be used to assess various activities, such as group discussions, presentations, small research projects, and artwork. For example, in assessing waste recycling projects, rubrics can include indicators of creativity, cooperation, relevance of solutions, and quality of the final product. Teachers can assess each aspect on a scale (e.g., 1–4) so that students understand the different standards between the categories of poor, fair, good, and excellent.

In addition to serving as an assessment tool, rubrics also function as a learning instrument. By distributing rubrics at the beginning of an activity, teachers provide clear guidance on learning expectations. This makes students more motivated and focused on the quality of the process, rather than just completing the task. In fact, rubrics can be used in self-assessment and peer assessment, which have been proven to increase students' sense of responsibility for their learning.

Thus, performance assessment rubrics are not only technical evaluation tools, but also pedagogical tools that support deep learning. The systematic application of rubrics helps teachers assess complex skills fairly and transparently, while providing meaningful feedback for students' overall development.

Table 5
Performance Assessment Rubric for Waste Recycling Project

Aspects Assessed	Very Good (4)	Good (3)	Fair (2)	Poor (1)
Creativity	Produces highly innovative products with original ideas, making optimal use of recycled materials	Products are fairly innovative with mostly original ideas	Products are not very innovative, ideas still imitate existing examples	Products show no creativity, only completely imitating others
Teamwork	Always actively collaborate, value peers' opinions, and share tasks fairly	Quite active in collaborating, occasionally values the opinions of friends	Not very active, often works alone, rarely values friends	Does not collaborate at all, refuses to contribute to the group
Relevance of Solutions	The product is highly relevant and can be used as a real solution for waste management.	The product is somewhat relevant and can be used, although it still needs improvement	The product is not very relevant and difficult to apply in real life	The product is not relevant and cannot be used as a solution
Product Quality	The product is very neat, strong, attractive, and in line with the project objectives	The product is fairly neat and attractive, although there are some minor flaws	Product is not neat, not durable, or not suitable for the purpose	The product is not neat, not attractive, and not suitable for the purpose

F. Assessment Model Integration

The integration of various assessment models supports deep learning in elementary schools because it creates a holistic and meaningful learning experience. First, formative assessment plays a role in fostering intrinsic motivation through the active involvement of students in monitoring and reflecting on their learning progress. When students receive immediate and continuous feedback, they are

encouraged to improve their learning strategies and strive to achieve learning objectives independently (Black & Wiliam, 2018).

Second, portfolio assessment and formative assessment train students to develop reflective skills. The process of documenting learning achievements in a portfolio allows students to see the development of their competencies over time, so that they learn to assess themselves critically. Rahmawati's (2020) research confirms that portfolios increase metacognitive awareness while strengthening students' intrinsic motivation to learn.

Third, authentic assessment and projects enable teachers to assess cognitive, affective, and psychomotor aspects in a balanced manner. Students are not only tested on their memorization of concepts, but are also encouraged to apply their knowledge in real-life situations, work together, and produce meaningful products. Fitriyah et al. (2022) show that authentic assessment in the Merdeka Curriculum enhances the creativity and collaboration skills of elementary school students. Similarly, Widiani (2022) found that project-based assessment can train critical thinking skills while fostering students' social responsibility.

Fourth, the integration of this assessment model can reduce the dominance of traditional tests, which tend to emphasize memorization and provide less space for higher-level thinking. With a more varied approach, students can develop the Pancasila learner profile, such as critical thinking, creativity, independence, and cooperation.

Thus, assessment is no longer seen as merely a final evaluation tool, but as an integral part of the in-depth learning process. Elementary school teachers are required to have the competence to design assessments that are varied, authentic, and contextual according to student needs. The ability of teachers to combine various assessment models will greatly determine the quality of the implementation of the Merdeka Curriculum as well as the achievement of national education goals.

Table 6
Integration of Assessment Models in Deep Learning at Elementary Schools

Assessment Model	Main Objective	Examples of Implementation in Elementary School Classrooms
Formative Assessment	Providing continuous feedback and fostering students' intrinsic motivation	Teachers give short quizzes after math lessons, then discuss common mistakes together so that students can immediately correct their understanding.
Portfolio Assessment	Encourages self-reflection and monitors learning progress on an ongoing	Students collect short stories every month; teachers provide progress notes, then students write self-reflections on their

	basis	progress.
Authentic Assessment	Assessing critical thinking and problem-solving skills through real-world contexts	In science class, students are asked to observe plants in the school environment and write reports based on real data.
Project-Based Assessment	Integrating cross-curricular knowledge through real work and collaboration	Students work in groups to create healthy living campaign posters that combine science (health), Indonesian language (persuasive text), and arts and culture (design).
Performance Assessment Rubric	Providing objective criteria and clear quality standards for complex skills	Teachers use the rubric when students give group presentations, with indicators for clarity of content, cooperation, and communication skills.

V. CONCLUSION

This study confirms that the assessment model has a strategic role in realizing deep learning in elementary schools, where assessment is no longer seen merely as a tool for measuring learning outcomes, but as an integral part of the learning process that shapes and enriches students' learning experiences. The integration of various assessment models—formative, authentic, project-based, portfolio, and performance assessment rubrics—provides a comprehensive picture of students' competency development while encouraging their active involvement in the learning process. Formative assessment helps teachers provide continuous feedback, while authentic and project-based assessments foster critical, creative, and collaborative thinking skills through contextual learning experiences. Meanwhile, portfolios and performance assessment rubrics strengthen self-reflection, transparency, and objectivity in assessment. These findings indicate that the implementation of process-oriented assessment can increase learning motivation, metacognitive awareness, and student responsibility for their own learning. In line with the principles of the Merdeka Curriculum, varied and authentic assessment models are effective tools for fostering Pancasila student profiles that are reflective, independent, creative, and collaborative. Thus, developing an assessment system that is integrated with deep learning practices is key to improving the quality of basic education and shaping competent students who are ready to face the challenges of the 21st century.

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