



## Development of authentic assessment of 21st-century skills in Kurikulum Merdeka

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### ABSTRACT

Kurikulum Merdeka has impacted educational progress in Indonesia, and authentic assessments are needed to ensure holistic and relevant evaluation of student learning progress. This research aims to analyze the importance of developing authentic assessments of 21st-century skills in implementing Kurikulum Merdeka in elementary schools. This research method uses the Systematic Literature Review (SLR) research method; the SLR stages consist of planning, implementation, and reporting. After searching on Google Chrome and the Google Scholar site, 24 articles were obtained relating to the discussion of authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. The 24 articles were then analyzed based on the criteria for determining the quality of the study material so that ten articles were obtained. Based on the results of the criteria analysis. The analysis involved identifying 21st-century skills essential to developing and understanding the benefits and challenges of implementing authentic assessment in learning. The results of this research show that the development of authentic assessment has an essential role in learning in elementary schools. Authentic assessment allows assessments that involve the application of students' knowledge and skills in real-life situations, creating a close connection between school learning and everyday life.

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### ABSTRAK

Kurikulum Merdeka telah memberikan dampak terhadap kemajuan pendidikan di Indonesia, pengembangan asesmen otentik diperlukan untuk memastikan evaluasi yang holistik dan relevan terhadap kemajuan belajar siswa. Penelitian ini bertujuan untuk melakukan analisis mengenai pentingnya mengembangkan asesmen autentik keterampilan abad 21 dalam konteks implementasi Kurikulum Merdeka di sekolah dasar. Metode penelitian ini menggunakan metode penelitian Systematic Literature Review (SLR), tahapan SLR tersendiri terdiri dari perencanaan, pelaksanaan dan pelaporan. Setelah melakukan pencarian pada google chrome dan situs google scholar, diperoleh 24 artikel yang berkaitan dengan bahasan asesmen autentik keterampilan abad 21 pada Kurikulum Merdeka di sekolah dasar. 24 artikel tersebut kemudian dianalisis berdasarkan kriteria penentuan kualitas bahan kajian sehingga diperoleh 10 artikel. berdasarkan hasil analisis kriteria. Analisis tersebut melibatkan identifikasi keterampilan abad 21 yang penting untuk dikembangkan, serta pemahaman tentang manfaat dan tantangan asesmen autentik dalam pembelajaran. Hasil dari penelitian tersebut menunjukkan pengembangan asesmen autentik memiliki peranan penting dalam pembelajaran di sekolah dasar. Asesmen autentik memungkinkan penilaian yang melibatkan aplikasi pengetahuan dan keterampilan siswa dalam situasi kehidupan nyata, menciptakan hubungan yang erat antara pembelajaran di sekolah dengan kehidupan sehari-hari.

**Kata Kunci:** Asesmen autentik; pendidikan abad 21; kurikulum merdeka

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## INTRODUCTION

Education is essential in shaping individuals ready to face future challenges and needs. One of the challenges individuals face in the current era of globalization is rapid and complex changes and very rapid advances in technology and information. To adapt quickly and successfully in this era, individuals must have the skills to follow the demands of the times (Alawi et al., 2022; Sumantri, 2019; Wahid & Hamami, 2021). 21st-century skills are increasingly necessary in preparing individuals to survive and thrive amid rapid and complex changes. 21st-century skills are a set of skills needed by individuals to be able to succeed in today's globalization and digital era; where these skills include the ability to think critically, creativity, communication, collaboration, problem-solving, master information technology and media, as well as social and cultural skills (Tight, 2021).

In education, 21st-century skills are also becoming increasingly important to be prepared early, especially at the basic education level. This is important to form qualified, superior, and competitive individuals because 21st-century learning teaches knowledge and skills essential to improving human resources quality (Mardhiyah et al., 2021). Skills in the 21st century can be integrated through learning and assessment, one of which is by applying authentic assessment because it can provide a comprehensive assessment of student progress (Sugiri & Priatmoko, 2020). The key competencies of 21st-century skills are the 4Cs: creative thinking, critical thinking and problem-solving, communication, and collaboration (Lengkong, 2023).

Authentic assessment is considered appropriate for measuring 21st-century skills because the assessment tasks not only describe real-life situations or reality but also encourage learners to have critical and creative thinking skills that are part of the competencies that must be possessed in the 21st century (Rivalina, 2020). Authentic assessment is a complete and tangible assessment of student learning outcomes that include knowledge, attitudes, and skills, both in the process and the output of learning activities (Hairida et al., 2021). Thus, authentic assessment can be used as an option to evaluate student learning progress objectively because, in these assessments, student performance is measured throughout the learning process. Therefore, the process requires teachers to create learning focusing more on activities, innovation, and students' skills.

However, the facts on the ground, especially those that occurred in the *Kelompok Kerja Guru* (KKG) in Gondang District, as many as 52% were classified as unprepared to implement authentic assessments in Kurikulum Merdeka due to a lack of understanding of the assessment. In comparison, 48% of them were ready to apply authentic assessments with the provision of understanding that had been possessed both through workshops and socialization that had been attended (Rosidah et al., 2021). In addition, teachers also experience other problems. Namely, teachers have difficulty implementing authentic assessments oriented to 21st-century competencies (Wahyuni et al., 2021). Kurikulum Merdeka is a curriculum concept that allows elementary schools to develop relevant, adaptive, and strengthened 21st-century skills. In this context, authentic assessment is essential as an assessment method that can measure the 21st century skills needed by learners.

Previous research has provided a general overview of how authentic assessment is implemented in Kurikulum Merdeka. Shows that the teacher has understood and mastered the concept of authentic assessment. As for preparing it, teachers have a high rating scale. This evidence is shown through the results of the questionnaire instrument created by the service team. His research further stated that some teachers were ready to implement Kurikulum Merdeka. This was explained previously; it was known that teachers' understanding of authentic assessment in the Gondang sub-district teacher working group stated that 48% understood, 36% did not understand, and 16% did not understand (Rosidah et al., 2021). This research explains the importance of authentic assessments in implementing an independent curriculum.

Unlike previous research, this will provide an overview of the development of authentic 21st-century assessments in Kurikulum Merdeka. 21st century skills are an essential foundation in supporting excellent and practical learning. Authentic 21st-century assessment will help prepare students to face challenges and succeed in a future full of dynamics and complexity. Therefore, authentic 21st century assessments are needed to ensure holistic and relevant evaluation of student learning progress. Based on the background described earlier, this study aims to analyze the importance of developing authentic assessments of 21st-century skills in implementing Kurikulum Merdeka in elementary schools as a reference or scientific addition for teachers in developing authentic assessments oriented toward 21st-century skills. The analysis involves identifying crucial 21st century skills to develop, as well as an understanding of the benefits and challenges of implementing authentic assessment in learning.

## LITERATURE REVIEW

### Merdeka Curriculum in 21st Century

The curriculum as an educational plan consists of three main components: objectives, learning materials, development of the learning process, and development of evaluation content. This curriculum component requires the foundations for creating a new curriculum or updating the old curriculum. Curriculum development has four foundations: philosophical, psychological, sociological, scientific, and technological. Likewise, in the 21st century, the Indonesian government developed an independent curriculum for students and university students so that children can freely develop their talents. Apart from that, learning now adapts more to discussions in class to solve problems, thus honing children's critical thinking skills (Rosidah et al., 2021).

Freedom of learning in 21st-century learning aims to integrate various learning abilities and visions into the learning process. This is reflected in the learning structures of the 21st century that describe the knowledge, skills, and expertise relevant to the lives of learners. Every ability in the context of the 21st century requires developing knowledge and understanding of academic subjects. The goal is for learners to think critically, communicate effectively, address problems, and collaborate. To realize ideal 21st-century learning, several supporting frameworks are needed, including (1) standards and assessments, (2) curriculum and instruction, (3) professional development, and (4) learning environment (Achmad et al., 2022).

Developing an authentic assessment of 21st-century skills in primary schools is a complex challenge and demands deep attention from educators. One of the challenges is determining appropriate assessment methods to measure 21st-century skills accurately (Lathifah, 2023). Thus, the development of authentic assessment of 21st-century skills in the Merdeka Curriculum has a significant influence, especially in facilitating students to show their various skills because authentic assessment can assess knowledge and their attitudes and skills. Through authentic assessment, 21st-century skills are also able to assess the extent to which students have the skills needed in the 21st century known as 4C abilities: (1) creativity and innovation; (2) critical thinking and problem solving; (3) communication; and (4) collaboration (Ningsih et al., 2021).

## METHODS

This research method uses the Systematic Literature Review (SLR) research method because this method refers to specific research methodologies or research and development carried out to collect and evaluate relevant research on the topic of focus (Eryc, 2022; Rikmasari, 2022). The stages of a separate SLR consist of planning, implementation, and reporting. The three stages are described in more detail in Figure 1 below.



**Figure 1. Stages of Systematic Literature Review**  
 Source: (Agustiono et al., 2021)

At the planning stage, the researcher compiles research questions to maintain the research focus. The question preparation model uses OFTA principles, namely Object, Focus, Purpose, and Aspect (Amam & Rusdiana, 2022). The object of this research is the authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. In contrast, related research focuses on developing an authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. The purpose of this study is to determine the importance of developing an authentic assessment of 21st-century skills in the context of implementing Kurikulum Merdeka in elementary schools as a reference or scientific addition for teachers in developing authentic assessments oriented to 21st-century skills and for aspects studied, including the identification of 21st-century skills that need to be developed, benefits and challenges in implementing authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. Thus, the research question can be formulated in **Table 1** below.

**Table 1. Research Questions**

ID	Question	Protocol Review
RQ1	What skills are essential to develop in 21st century skills?	Identify 21st century skills that need to be developed.
RQ2	What are the benefits and challenges of implementing authentic assessment of Kurikulum Merdeka in elementary schools?	Outlining the benefits and challenges of implementing authentic assessment of 21st century skills

Source: Research Document 2024

Furthermore, sources relevant to the research context should be found to answer RQ1 and RQ2 questions. The source in this study is a national or international journal accredited by Sinta / Scopus, which discusses authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. The search process is carried out using search engines such as Google Chrome and Google Scholar sites. The search strategy for determining article quality is described in Table 2 below.

**Table 2. Criteria for Determining the Quality of Study Materials**

ID	Quality Assessment Criteria	Qualify	
		Yes (Y)	No (T)
QA1	Is the national journal accredited by Sinta/Scopus?		
QA2	Will the articles in the journal be published between 2019-2023?		
LAN	Is the article not a text of proceedings?		
QA4	Can the article be accessed through the Google Scholar site?		

Source: Research Document 2024

The following process is the reporting process, namely by collecting study materials or articles that follow the research context and can answer *research questions*. In the end, the collection of study materials will be analyzed based on the quality criteria of the materials to be used so that final materials will be obtained, which will be used as discussions about the importance of developing authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. This is an effort to document the results of research that has been done.

## RESULTS AND DISCUSSION

Based on search results that refer to the context of research and RQ using Google Scholar, various study materials have been obtained from the research results that have been carried out and published in various publishing media. The classification of study materials consists of the research title, author's name, publisher, published edition, and quality criteria for study materials (see **Table 2**). The classification of study materials is described in **Table 3** below.

**Table 3.** Results of Study Material Classification

No	Heading	Writer	Publisher	Published Edition	QA			
					QA1	QA2	LAN	QA4
1	Authentic Assessment of the Merdeka Learning Curriculum in Islamic Religious Education Learning in Elementary Schools	Achmad et al. (2022).	Educational: Journal of Educational Sciences	2022. 4 (4): 5685-5699	Y	Y	Y	Y
2	Analysis of Teacher Readiness to Implement Authentic Assessment in the Merdeka Learning Curriculum	Rosidah et al. (2021)	JPD: Journal of Basic Education	2021. 12 (1): 87-103	Y	Y	Y	Y
3	Characteristics and Assessment of 21st Century Learning	Rosnaeni (2021)	Basicedu Journal	2021. 5 (5): 4334 - 4339	Y	Y	Y	Y
4	Analysis of Primary School Teacher Readiness in the Implementation of Kurikulum Merdeka	Heryahya et al. (2022)	JOEAI ( <i>Journal of Education and Instruction</i> )	2022. 5 (2): 548-562	Y	Y	Y	Y
5	<i>Development of Authentic Science Assessment Media Century skills-based for Elementary School Students</i>	Dwiyanti & Rahayuni (2020)	Journal of Basic Education Innovation	2020. 6 (1): 39-48	Y	Y	Y	Y
6	Systematic Literature Review: Development of Learning Assessment of the Merdeka Learning Curriculum at the Elementary School Level	Sayekti (2022)	National Seminar on Elementary School Teacher Education, University of Kuningan	2022. 23-28	T	Y	T	Y

No	Heading	Writer	Publisher	Published Edition	QA			
					QA1	QA2	LAN	QA4
7	Assessment of Elementary School Learning in Kurikulum Merdeka	Mujiburrahman et al. (2023)	PENAANDA: Journal of Elementary School Education	2023. 1 (1): 39-48	T	Y	Y	Y
8	Providing 21st Century Skills in Elementary School Learning	Masfufah (2022)	Edupena Journal	2022. 3 (2): 95-109	T	Y	Y	Y
9	The Role of Teachers in Giving Birth to the Golden Generation with 21st Century Skills	Mahanal (2014)	National Seminar on HMPS Education on Biology Education FKIP Halu Oleo University	2014. 1-16	T	T	T	Y
10	Analysis of student learning styles in terms of learning assessment of Kurikulum Merdeka	Wahyuningrum (2023)	JIPNAS: National Journal of Education	2023. 1 (1): 38-44	T	Y	Y	Y
11	<i>Assessment</i> as an evaluation tool in implementation Merdeka Learning Curriculum at SDN 01 Ngawonggo	Yunizar (2022)	<i>Proceedings Series of Educational Studies</i>	2022. 1 (1): 273-282	T	Y	T	Y
12	Implementation and Readiness of Social Studies Teachers for the Merdeka Learning Curriculum	Gunawan (2022)	COMPLEXITY: Journal of Management, Organization and Business	2022. 11 (2): 20-24	T	Y	T	Y
13	<i>The STEM Approach Using The Project Based Learning Model In Learning 21st Century</i>	Maryanti (2021)	Social, Humanities, and Educational Studies (SHES): Conference Series	2021. 2 (6): 478-482.	Y	Y	T	Y
14	<i>Characteristics of Learning Assessment Towards Implementation of Merdeka Learning Curriculum</i>	Pantiwati et al. (2023)	Journal of Research and Assessment of Educational Sciences: e-Science	2023. 7 (1): 115-128	Y	Y	Y	Y
15	<i>Assessing 21st century skills of fourth-grade student in STEM learning</i>	Nurlenasari et al. (2018)	Journal of Physics: Conference Series	2018. 1-7.	T	T	T	Y
16	<i>Development of 21st Century Learning Skills Assessment Instruments in STEM-Based Science</i>	Dewanti & Santoso (2020)	Prism Sains: Journal of the Study of Science and Learning of	2020. 8 (2): 99-111	Y	Y	Y	Y

No	Heading	Writer	Publisher	Published Edition	QA			
					QA1	QA2	LAN	QA4
	<i>Learning (Science, Technology, Engineering, and Mathematics)</i>		Mathematics and Science IKIP Mataram					
17	<i>The Effectiveness of Century Skill-based Authentic Science Assessment Media to Improve Critical Thinking Skills for Grade 4 Elementary School Students</i>	Dwiyanti et al. (2022)	PGSD UST International Conference on Education	2022. 3 (1): 38-42	T	Y	T	Y
18	<i>The 21st Century Skills of Elementary School Students in 3T Regions (Frontier, Outermost, and Least Developed Regions)</i>	Daga et al. (2022)	Journal of Education: Journal of Research Results and Literature Studies in the Field of Education, Teaching and Learning	2022. 8 (4): 817-830	Y	Y	Y	Y
19	<i>Components of Education 4.0 in 21st Century Skills Frameworks: Systematic Review</i>	González-pérez & Ramírez-montoya (2022)	Sustainability	2022. 14 (3): 1-31	Y	Y	Y	Y
20	<i>Discrepancy Between Perceived and Class Observation About the 21st Century Skills Implementation at Primary School</i>	Ningsih et al. (2021)	Acitya: Journal of Teaching & Education	2021. 3 (1): 1-16	Y	Y	Y	Y
21	<i>Authentic Learning for the 21st Century: An Overview</i>	Lombardi & Oblinger (2007)	Educause Learning Initiative	2007. 1-12	T	T	Y	Y
22	<i>The Assessment and Teaching of 21st Century Skills Project</i>	Erstad (2010)	Nordic Journal of Digital Literacy	2009. 4 (3-4): 204-211	Y	T	Y	Y
23	<i>E-Portfolio to Assess the 21st Century Skills of Students in Smart E-Learning Environment</i>	El-Senousy (2020)	International Journal for Quality Assurance	2020. 3 (1): 49-56	T	Y	Y	Y
24	<i>Using Classroom Assessment to Promote 21st Century Learning in Emerging Market Countries</i>	Price et al. (2011)	Global Learn Asia Pacific	2011. 1-11	T	T	T	Y

Source: Research Document 2024

After searching for study materials, 24 articles were obtained discussing authentic assessment of 21st-century skills in Kurikulum Merdeka in elementary schools. However, the 24 articles were then analyzed based on the criteria for determining the quality of study materials or those following QA1, QA2, QA3, and QA4, so ten articles were obtained based on the results of the criteria analysis. The results of the analysis of study materials based on criteria can be seen in **Table 4**.

**Table 4.** Results of Analysis of Study Materials Based on Criteria

No	Heading	Journal Index	Digital Object Identifier (DOI)
1	Authentic Assessment of the Merdeka Learning Curriculum in Islamic Religious Education Learning in Elementary Schools	Sinta 4	<a href="https://doi.org/10.31004/edukatif.v4i4.3280">https://doi.org/10.31004/edukatif.v4i4.3280</a>
2	Analysis of Teacher Readiness to Implement Authentic Assessment in the Merdeka Learning Curriculum	Sinta 4	<a href="https://doi.org/10.21009/JPD.012.08">https://doi.org/10.21009/JPD.012.08</a>
3	Characteristics and Assessment of 21st Century Learning	Sinta 5	<a href="https://doi.org/10.31004/basicedu.v5i5.1548">https://doi.org/10.31004/basicedu.v5i5.1548</a>
4	Analysis of Primary School Teacher Readiness in the Implementation of Kurikulum Merdeka	Sinta 4	<a href="https://doi.org/10.31539/joeai.v5i2.4826">https://doi.org/10.31539/joeai.v5i2.4826</a>
5	<i>Development of Authentic Science Assessment Media Century skills-based for Elementary School Students</i>	Sinta 3	-
6	<i>Characteristics of Learning Assessment Towards Implementation of Merdeka Learning Curriculum</i>	Sinta 3	<a href="https://doi.org/10.36312/esaintika.v7i1.1125">https://doi.org/10.36312/esaintika.v7i1.1125</a>
7	<i>Development of 21st Century Learning Skills Assessment Instruments in STEM-Based Science Learning (Science, Technology, Engineering, and Mathematics)</i>	Sinta 3	<a href="https://doi.org/10.33394/j-ps.v8i2.3041">https://doi.org/10.33394/j-ps.v8i2.3041</a>
8	<i>The 21st Century Skills of Elementary School Students in 3T Regions (Frontier, Outermost, and Least Developed Regions)</i>	Sinta 2	<a href="https://doi.org/10.33394/jk.v8i4.6239">https://doi.org/10.33394/jk.v8i4.6239</a>
9	<i>Components of Education 4.0 in 21st Century Skills Frameworks: Systematic Review</i>	Q1	<a href="https://doi.org/10.3390/su14031493">https://doi.org/10.3390/su14031493</a>
10	<i>Discrepancy Between Perceived and Class Observation About the 21st Century Skills Implementation at Primary School</i>	Sinta 4	<a href="https://doi.org/10.30650/ajte.v3i1.1402">https://doi.org/10.30650/ajte.v3i1.1402</a>

Source: Research Document 2024



## **Authentic Assessment of 21st Century Skills in Kurikulum Merdeka**

Freedom of learning in 21st-century learning aims to integrate various learning abilities and visions into the learning process. This is reflected in the learning structures of the 21st century that describe the knowledge, skills, and expertise relevant to the lives of learners. Every ability in the context of the 21st century requires developing knowledge and understanding of academic subjects. The goal is for learners to think critically, communicate effectively, address problems, and collaborate. To realize ideal 21st-century learning, several supporting frameworks are needed, including (1) standards and assessments; (2) curriculum and instruction; (3) professional development; and (4) learning environment (Achmad et al., 2022; Rosidah et al., 2021).

A critical aspect of achieving the learning goals of the 21st century is *assessment*. The assessment or assessment of learning in the 21st century is authentic. In Permendikbud Nomor 104 Tahun 2014 pasal 1 ayat 2 explain “*penilaian autentik adalah bentuk penilaian yang mengharuskan peserta didik untuk menunjukkan sikap, menggunakan pengetahuan, dan keterampilan yang mereka peroleh dari proses pembelajaran dalam melaksanakan tugas dalam situasi nyata*”. Furthermore, Article 2 of the Minister of Education and Culture explains that authentic assessment is the primary approach to assessing learning outcomes by educators. This approach involves various assessment forms such as observations, field assignments, portfolios, projects, products, journals, laboratory work, performance, and self-assessment (Rosidah et al., 2021). Thus, the authentic assessment does not only focus on assessing the realm of knowledge, but the assessment covers three domains: knowledge, attitudes, and skills.

Authentic assessment is also a form of assessment in which learners perform, apply, or carry out tasks in real-life situations, not just through written tests at the end of learning (Yudha & Masrukan, 2014). In this case, authentic assessment assesses the expected behavior and attitudes, knowledge, and skills according to the targeted competencies. In addition, authentic assessment also pays attention to students' work processes and real-life contexts as an integral part of the learning process. The real-life in question can refer to the lives of students at school or life in society (Rosnaeni, 2021). Thus, authentic assessment oriented towards 21st-century skills is designed to prepare the younger generation (learners) to adapt quickly to the rapid flow of technological development. Therefore, teachers as a role that has the key to implementing it must master four learning skills (4C), namely: (1) *creativity and innovation*; (2) *critical thinking and problem solving*; (3) *communication*; and (4) *collaboration* by having the character of (1) lifelong learners; (2) apply a differentiation approach in learning; (3) creative and innovative; (4) conduct self-reflection; (5) collaborate on learning; (6) utilizing technology in learning; and (7) implementing learner-centered learning (Heryahya et al., 2022).

## **Development of Authentic Assessment of 21st Century Skills in Primary Schools**

The development of authentic assessment of 21st-century skills in primary schools is vital as it helps prepare learners for a competitive future. In a rapidly evolving world, learners need to be equipped with relevant skills required in real life. Authentic assessment enables learners to apply their knowledge and skills in real-life situations, such as through projects or field assignments. Thus, they can connect learning with their experiences and see how that knowledge and skills can be used in everyday life. Furthermore, research conducted by Dewanti & Santoso (2020) developed a 21st Century Learning Skills Assessment Instrument in STEM-Based Science Learning (Science, Technology, Engineering, and Mathematics), which produces valid, practical, and effective instruments so that they are suitable for use in learning, especially in assessment activities. The 21st-century skills assessment instrument developed has a positive influence because the rubric is arranged in detail, clearly, operationally, and measurably, making it easier for observers to provide assessments and opportunities for students to show their best abilities.

Furthermore, research conducted by [Dewanti & Santoso \(2020\)](#) developed a 21st Century Learning Skills Assessment Instrument in STEM-Based Science Learning (Science, Technology, Engineering, and Mathematics), which produces valid, practical, and effective instruments so that they are suitable for use in learning, especially in assessment activities. The 21st-century skills assessment instrument developed has a positive influence because the rubric is arranged in detail, clearly, operationally, and measurably, making it easier for observers to provide assessments and opportunities for students to show their best abilities. In addition, because the assessment approach is STEM-oriented, learners are motivated to express ideas and ideas on project tasks and gain more learning experience through several integrated disciplines. Thus, the development of authentic assessment of 21st-century skills in Kurikulum Merdeka has a significant influence, especially in facilitating students to show their various skills because authentic assessment can assess knowledge and the attitudes and skills they have. Through authentic assessment, 21st-century skills are also able to assess the extent to which students have the skills needed in the 21st century known as 4C abilities: (1) creativity and innovation; (2) critical thinking and problem solving; (3) communication; and (4) collaboration.

### **Challenges in Developing Authentic Assessment of 21st Century Skills in Primary Schools**

Developing an authentic assessment of 21st-century skills in primary schools is a complex challenge and demands deep attention from educators. One of the challenges is determining appropriate assessment methods to accurately measure 21st-century skills ([Lathifah, 2023](#); [Ningsih et al., 2021](#)). Skills such as creativity, collaboration, problem-solving, and communication cannot be measured by traditional written exams alone. Educators must find ways to observe and assess these skills authentically, engaging students in real-world situations that reflect real-world demands. In carrying out the principles of 21st-century education, there has been a change in human mindset from focusing on low-thinking skills to empowering high-thinking skills. This paradigm transformation challenges teachers in their mission to teach students to develop higher-order thinking skills. In addition, teachers face some other hurdles in implementing 21st-century education. This challenge involves teaching students with diverse backgrounds, language skills, teaching concepts, use of active learning methods, integration of technology in learning, new views on student abilities, learning choices, and academic responsibilities ([Abzar, 2024](#); [Ananda & Fadhilaturrahmi, 2018](#); [Irma Sari et al., 2021](#)).

Teachers must face these challenges without feeling unprepared to implement 21st-century skills to the best of their ability. As already stated, the principles of 21st century skills must be applied in all core subjects. Another challenge is changing the evaluation paradigm among students, teachers, and parents. Traditional education systems often focus more on academic assessments, such as test scores and report cards, rather than on 21st-century skills development ([Daga et al., 2022](#)). The future challenges of education require different perspectives, assessing learning success with digital media, defining student competency frameworks, homogenizing the skills teachers must possess to meet the demands of global and digital societies, and incorporating emerging and disruptive skills. Technology that helps achieve students' meaningful learning ([González-pérez & Ramírez-montoya, 2022](#)). Therefore, there is a need for better socialization and understanding of the importance of 21st-century skills in achieving success in the modern era. Teachers, students, and parents need to recognize that authentic assessment of 21st-century skills provides a more comprehensive picture of students' abilities and prepares them for the demands of an evolving world of work.

### **Discussion**

In formal schools, especially in elementary schools, learning has been required to apply the 4C (*Critical Thinking, Communication, Collaboration, Creativity*) abilities, where these four competencies are

competencies that must be possessed in the 21st century. Success in implementing these 4Cs depends on teacher performance in adopting appropriate teaching methods. However, the roles and responsibilities of non-formal educators are also crucial in familiarizing students to apply the 4Cs in everyday life because 4C skills need to be mastered and possessed by every learner in preparation for the challenges of the 21st century (Rosnaeni, 2021). Several developments regarding authentic assessment of 21st-century skills in elementary schools have been widely developed, one of which is in research conducted by Dwiyanti & Rahayuni (2020), which developed 21st Century Skill-Based Authentic Assessment Media in Elementary Schools. The development of authentic assessment media helps students know their development process and learning outcomes. The research results are in the form of authentic science assessment media that are valid and suitable for use. Then, the teacher's response to this assessment media is that it is easy to use in learning, and students are interested in it because the illustrations presented and discussions follow daily life.

Limited resources are also a challenge in developing authentic assessments of 21st-century skills in primary schools (Pratiwi et al., 2019). Teachers need access to technology and learning materials that support the development of these skills. However, not all schools have adequate access to these resources. Therefore, there needs to be support and investment from governments and educational institutions to ensure that all schools are adequately resourced to develop authentic assessments of 21st-century skills. Developing authentic assessments of 21st century skills in elementary schools is essential in preparing students to face the challenges of a competitive future. Authentic assessment allows students to apply their knowledge and skills in real-life situations, facilitating the connection between their learning and practical experience. Various development efforts have been made, including developing 21st-century skills-based authentic assessment media and STEM-based learning skills assessment instruments. Through this approach, students can more easily demonstrate their skills because authentic assessment assesses knowledge, attitudes, and skills.

This creates opportunities for students to develop critical skills such as creativity, critical thinking, communication, and collaboration. However, several challenges need to be overcome in developing authentic assessments of 21st century skills in primary schools. One of them is determining the appropriate assessment method to measure these skills accurately. Apart from that, limited resources in terms of technology and learning materials are also obstacles that must be overcome. Paradigm transformation in 21st-century education requires changes in thinking and evaluation patterns among students, teachers, and parents. Traditional education systems tend to focus more on academic assessments, so better socialization and understanding of the importance of 21st-century skills are needed to achieve success in the modern era. By addressing these challenges, the development of authentic assessments of 21st-century skills in primary schools can make a significant contribution to preparing young people to face a dynamic and challenging future.

## CONCLUSION

The development of authentic assessment of 21st-century skills in Kurikulum Merdeka in Elementary Schools has a crucial role in preparing the younger generation to face future challenges. Authentic assessment enables assessments that involve the application of students' knowledge and skills in real-life situations, creating a close link between learning in school and everyday life. The importance of developing authentic assessment lies in its ability to equip students with 21st-century skills, such as critical thinking, communicating effectively, and working together, to prepare them for an ever-changing and complex world. This is in accordance with the vision of Curriculum Merdeka to create relevant and meaningful learning that prepares students for success in the modern era that demands broader and deeper skills. However, developing authentic assessment also faces many challenges, including determining accurate assessment methods, facing limited resources, and changing the evaluation paradigm among students,

teachers, and parents. Therefore, educators must confront these challenges with creativity and innovation, support them with a deep understanding of 21st-century skills principles, and integrate authentic assessment into relevant and meaningful learning approaches. Thus, authentic assessment of 21st-century skills will help create learners ready to face challenges and succeed in the modern era, which is full of dynamics and complexity. Next, future research can focus on the implementation and forms of authentic learning assessment in Kurikulum Merdeka. Further evaluation of authentic assessment in the 21st century in the learning context could provide more comprehensive insight into the effectiveness of this assessment. Thus, future research can further contribute to developing and implementing this innovation in the authentic assessment of learning in Kurikulum Merdeka.

## AUTHOR'S NOTE

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