

# Teachers' Understanding Of 21st Century Skills In Kindergarten Schools With The Implementation Of The *Kurikulum Merdeka* In Medan City

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**Abstract.** The implementation of the *Kurikulum Merdeka* as an embodiment of this century's learning should actualize 21st century skills in learning, starting from planning, process, to assessment. Teachers as the spearhead of successful learning and education are expected to understand 21st century skills. This study examines teachers' grasp of 21st century competencies, including critical thinking, creativity, communication, cooperation, and digital skills in learning which are part of the skills of this century. This is a quantitative descriptive study. The population under examination was all Kindergarten schools in Medan City. The sample in this study was 10 Kindergarten schools in Medan City that had implemented the *Kurikulum Merdeka* although at different stages, namely the *mandiri belajar* stage and the *mandiri berubah* stage. The data collection technique was carried out by filling out an online questionnaire about 21st century skills. This research instrument's 21st century skills indicators are developed following organizational agreements that focus on the development of 21st century learning (P21). The results indicated that the understanding of kindergarten teachers in schools with the *Kurikulum Merdeka* showed an average value of 88% with a very good category. However, the critical aspect shows a value below the average, which is 80% with a good category. Meanwhile, for the creative, cooperation, communication, and digital skills aspects, all are in the very good category with values, namely 88% (creative, communication, and digital skills) and 95% (cooperation). The cooperation aspect is the aspect that is most understood by teachers, and the critical aspect is the aspect that is least understood by teachers.

**Keywords:** teacher, kindergarten, 21st century skills, kurikulum merdeka

## 1 Introduction

Education systems around the world are increasingly recognizing the importance of equipping students with 21st-century skills. The acceleration of globalization and technological advances have fundamentally changed the skills needed to achieve success in today's modern society. The demands of 21st-century life require that education not only produce graduates with strong memorization skills but also those who can think, be skilled, collaborate with others to solve problems, communicate effectively, tolerate differences of opinion, and be knowledgeable about information, technology, and other fields [1]–[4], so that they survive in this century.

Changes in life in this century are also influenced by the fourth industrial revolution which has also changed the nature of work. As noted by [5], the integration of artificial intelligence, robotics, and automation has created a demand for job skills that prioritize adaptability, critical thinking, and teamwork over routine task execution. Therefore, educational institutions must adapt their curricula to prepare students for a future workforce that values creativity and collaborative problem solving.

Skills of this century are broadly categorized into cognitive, interpersonal, and intrapersonal competencies [6]. Critical thinking, problem solving, and digital literacy are cognitive skills which are fundamental to navigating the complexities of a knowledge-based economy. Interpersonal skills, such as teamwork, communication, and cultural awareness, enable individuals to collaborate effectively in a diverse global environment. Intrapersonal skills, including adaptability, emotional intelligence, and resilience, prepare students to manage change and overcome challenges. Education systems around the world are increasingly recognizing the importance of equipping students with 21st century skills. Cognitive, interpersonal, and technological competencies are essential to thriving in a dynamic, interconnected world. These skills are not only critical to individual success but also essential to national economic growth and innovation, especially in a rapidly evolving global landscape [7].

Liu et al. [8] underline that effective education in the digital era must combine these competencies with technological fluency, and [5] suggest that educational frameworks should integrate these skills with academic subjects or learning activities in schools. These competencies are essential for driving innovation, advancing economic development, and addressing global challenges such as climate change and social inequality. By embedding these skills into the education system, institutions can contribute to the development of a resilient, innovative workforce that is able to drive societal progress. The integration of these 21st-century skills should start from the earliest education, namely Kindergarten. The demands of the 21st century have an impact on learning including at the early childhood education level [9]

Changes to the national education system or curriculum, including the *Kurikulum Merdeka*, are the answer to the challenges and changes that have occurred in Indonesia, which are intended to make education in Indonesia even better [10]. According to the Indonesian Ministry of Education and Culture's Director General of Teachers and Education Personnel, "teachers and education personnel must make many changes, innovations, and creativity." Every effort is made to prepare for the twenty-first century. The *Kurikulum Merdeka* is considered relevant to 21st century learning [11]. Therefore, The *Kurikulum Merdeka* is described as a novel paradigm in education designed to address the difficulties of the 21st century.

Numerous studies have been undertaken to analyze 21st-century abilities in education [12], [13] which emphasize that 21st century skills can be integrated through various programs that vary in stimulating critical thinking, creativity, collaboration and communication skills, for example campus teaching activities for students and learning that integrates technology. This integration brings its own challenges, one of which is teacher readiness. Yurt [6] said that teachers need to be given professional training programs to develop 21st century skills in learning. The role of educators is very important, because they act as mediators in adapting the curriculum and teaching practices to integrate these dynamic competencies effectively. Teachers should be the first priority to master 21st century skills before their students [14]

Teachers as educators in schools must have the best competence in their fields. The progress of a country is in the hands of teachers. In preparing a strong, creative, innovative, competitive and intelligent millennial generation, of course, Teachers are required that possess an exceptional mindset by implementing a curriculum aligned with 21st-century standards [15].

Preparation of teachers to master 21st century skills begins when they are still prospective teachers [16]. It is so important for teachers to understand this century skills. Therefore, this study was conducted to determine how teachers, especially early childhood education teachers, understand 21st century skills that should be integrated into the current independent curriculum. This is a novelty in research related to teachers and 21st century skills, especially in early childhood education.

## 2 Research Method

This is a quantitative descriptive study. Quantitative research is research that uses a certain population or sample, data collection using instruments, data analysis quantitatively or statistically, while while descriptive strategies are used to describe or analyze research results but are not used to draw further conclusions. [17]. Therefore, quantitative descriptive study focuses on actual problems and phenomena that are happening, and presents research results in the form of meaningful numbers. The instrument employed in this study was a questionnaire assessing early childhood education instructors' comprehension of 21st-century abilities.

**Table 1.** Instrument Grid

| <b>Instrument</b>  | <b>Rated aspect</b>      | <b>Grid</b>   |
|--|--------------------------|---|
| Teachers' Understanding of 21st Century Skills Questionnaire | Critical Thinking Skills | <ul style="list-style-type: none"> <li>a. Reason effectively</li> <li>b. Think systematically</li> <li>c. Making considerations and decisions</li> <li>d. Solving problems</li> </ul>                     |
|  | Creativity               | <ul style="list-style-type: none"> <li>a. Think creatively</li> <li>b. Work creatively</li> <li>c. Bring out innovation</li> </ul>  |
|  | Collaboration            | <ul style="list-style-type: none"> <li>a. Cooperation in a group</li> <li>b. Responsibility as a team member</li> <li>c. Contributing to the team</li> <li>d. Respecting diversity in the team</li> </ul> |
|  | Communication            | <ul style="list-style-type: none"> <li>a. Expressing opinions</li> <li>b. Listening and understanding words</li> <li>c. Communicating for various purposes</li> </ul>                                     |

The questionnaire data was evaluated using descriptive techniques, specifically computing the proportion of observed results and then interpreting them using the following categories.

**Table 2.** Categorization of Percentage Results

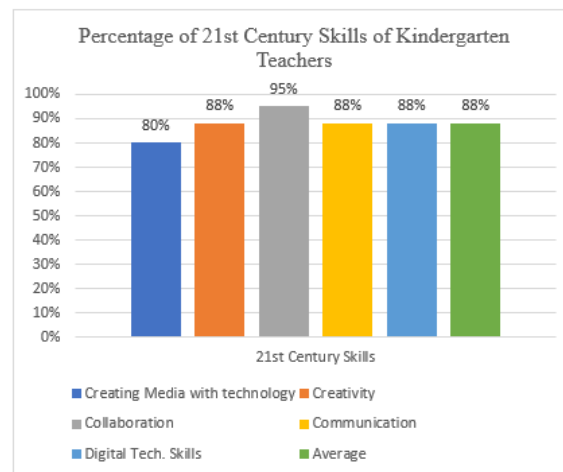
| Percentage | Category   |
|------------|------------|
| 86 – 100%  | Very good  |
| 76 – 85%   | Good       |
| 60 – 75%   | Sufficient |
| 55 – 59%   | Poor       |
| ≤ 54%      | Very Poor  |

Source: [18]

### 3 Result and Discussion

Teachers play a crucial role in ensuring the successful implementation of the autonomous curriculum. Teachers play a role in planning, implementing, and evaluating. Therefore teachers should comprehend the *Kurikulum Merdeka* as a model for 21st century learning.

This century skills are something that must be understood and implemented in 21st century learning. Aspects of this century skills that need to be understood and implemented by teachers are critical, creative, collaborative, communication, and digital skills. The teachers observed had at least six years of teaching experience. Some of them are even active as driving teachers. Data on teachers' 21st century skills were collected based on the results of filling out the questionnaire, then summarized and presented to see the extent of early childhood education teachers' understanding of 21st century skills. The following are the results of the data recapitulation on the understanding of 21st century skills of early childhood education teachers in schools with *Kurikulum Merdeka* in Medan City.

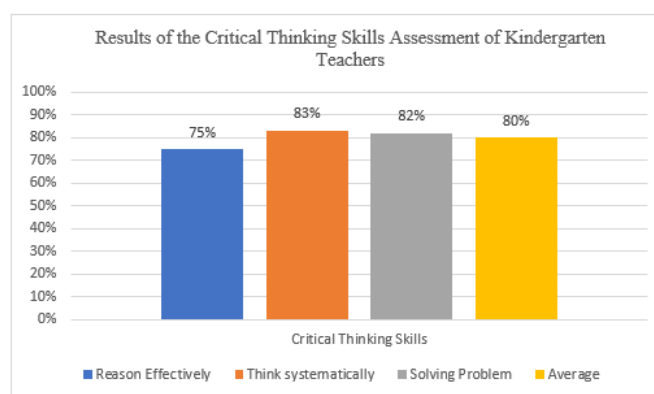


**Fig 1.** Percentage Graph of Understanding of 21st Century Skills of Kindergarten Teachers in Schools with *Kurikulum Merdeka*

Based on the graph shown above, kindergarten teachers have an average mastery of 21st century abilities with the implementation of the independent curriculum is 88%, still below

average, which is 80% for critical. The creative, communication, and digital skills parts have a very good understanding rate of 88%, which is comparable to the typical teacher. The aspect of cooperation shows the highest understanding, which is 95% in the very good category.

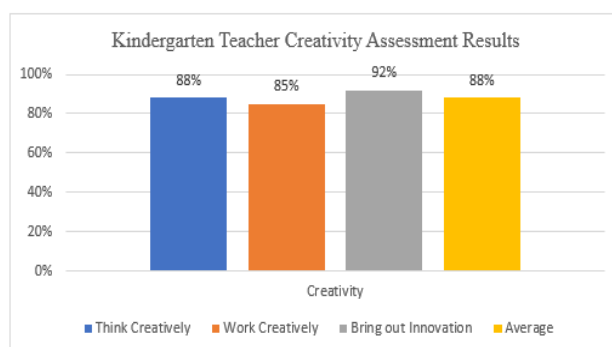
Critical thinking skills show the lowest percentage among other 21st century skills. The critical thinking skills assessed consist of several aspects, namely effective reasoning, making assessments and decision-making, and solving problems. The graph below shows detailed assessment results.



**Fig 2.** Critical Thinking Skills Assessment Results Graph (Percentage) Kindergarten Teachers in Schools with Independent Curriculum Implementation

The graph above demonstrates that in the critical thinking skills of Kindergarten Teachers, the aspect of effective reasoning ability is below the average critical thinking ability, which shows a value of 75% with a sufficient category. Meanwhile, for the ability to assess and make decisions, as well as solving the second problem is not much different, which shows a value of 82% and 83%, where both are above the average value of critical thinking ability and are in the good category.

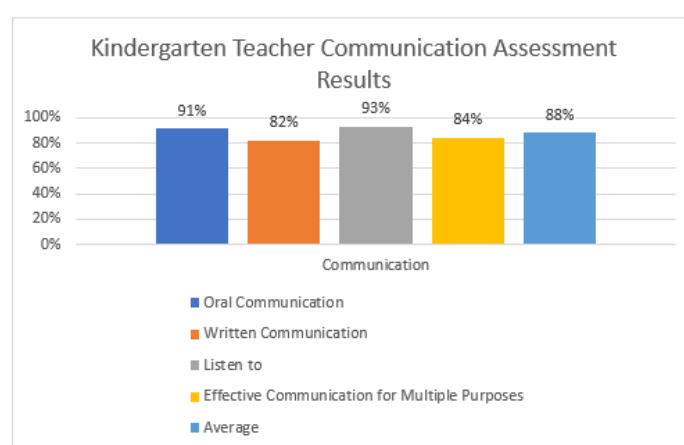
This century's skills require teachers to have critical thinking skills as well s creativity. In this study, the creativity assessed includes creative thinking, creative work, and creative attitudes, each of which has its own assessment indicators. The results of the assessment of kindergarten teacher creativity related to 21st century skills can be seen in the graph below.



**Fig 3.** Assessment Results Graph (Percentage) Creativity Kindergarten Teachers in Schools with Independent Curriculum Implementation

The creativity of kindergarten teachers in schools with *Kurikulum Merdeka* in Medan City showed an average value of 88%. The creativity in learning process assessed was divided into creative thinking, creative work, and creative attitudes. Creative thinking and creative attitudes showed values above the average for teacher creativity, namely 88% for creative thinking and 92% for creative attitudes. Both are in the very good category. Meanwhile, creative work showed a value of 85%. Although this value is still below the average teacher creativity, this creative work aspect is still in the good category.

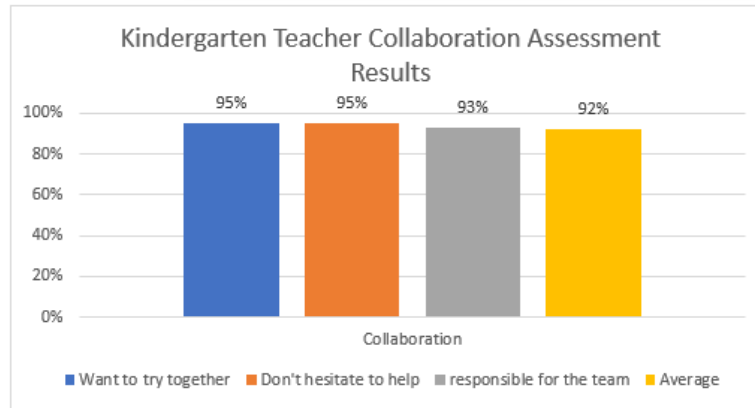
The third aspect of teachers' 21st century skills that was assessed was the communication aspect. This communication assessment consists of four indicators, including oral communication, written communication, listening, effective communication for various purposes. The assessment results can be seen in the graph below.



**Fig 4.** Assessment Results Graph (Percentage) Communication Kindergarten Teachers in Schools with *Kurikulum Merdeka*

Based on the graph above, the average communication skills of kindergarten teachers are very good with a score of 88%. As many as two aspects of communication skills, namely oral communication and listening, show values above the average of teacher communication abilities and are extremely good, namely 91% and 93%, exceeding the average. Meanwhile, the aspects of written communication and effective communication for various purposes are in the good category with scores of 82% and 84%, below the average communication skills of kindergarten teachers assessed.

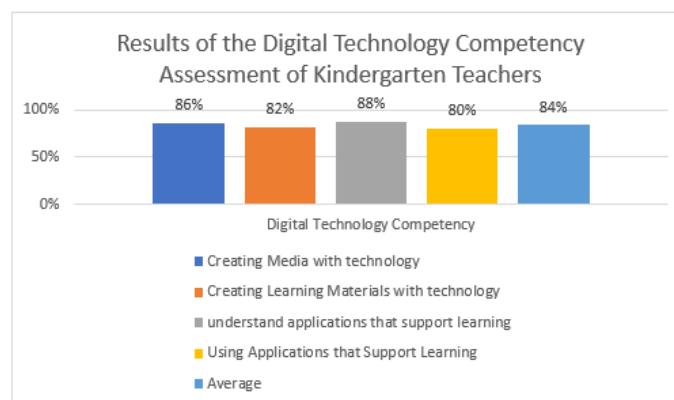
The next aspect assessed is the ability of kindergarten teachers to cooperate in schools with *Kurikulum Merdeka* aims to develop 21st century competencies. This ability to cooperate consists of three assessment indicators, namely wanting to work together, not hesitating to help the team, and responsibility for team tasks, in this case the context is in a teaching team or a team working at school. The results of the assessment of the ability of kindergarten teachers to cooperate are shown in the graph below.



**Fig 5.** Assessment Results Graph (Percentage) Collaboration Kindergarten Teachers in Schools with *Kurikulum Merdeka*

Based on the graph above, the average cooperation ability of kindergarten teachers is very good with an average score of 92%. All aspects of cooperation, namely wanting to work together, not hesitating to help, and being responsible for the team, are above average. All are in the very good category. The kindergarten teachers with the implementation of the *Kurikulum Merdeka* that were observed were on average very good in teamwork at school.

In this study, in addition to critical thinking skills, creativity, communication, and cooperation, researchers also observed the digital technology skills of kindergarten teachers. These digital technology skills are related to the use of technology, especially in matters that support learning, such as creating learning media with the support of technology, creating learning materials with the support of technology, and understanding the benefits of several applications in supporting learning. The assessment of kindergarten teachers' ICT skills yielded the following results.



**Fig 6.** Assessment Results Graph (Percentage) Digital Technology Competency Kindergarten Teachers in Schools with *Kurikulum Merdeka*

Based on the graph above, the average digital technology skills of kindergarten teachers are good with an average score of 84%. In creating learning media by utilizing digital technology and understanding applications that support learning, these teachers are very good and above

average. However, for the skills of using digital technology in creating learning materials and using certain applications that support learning, it is still below average. However, their skills are in the good category.

21st century skills and *Kurikulum Merdeka* are two things that should be understood and applied by all teachers, from early infancy to higher education. Teachers as the spearhead of success, it is very important to have this century's skills, and apply them in the learning process that begins to use the *Kurikulum Merdeka*. It is hoped that youngsters will learn 21st century abilities to welcome Indonesia Emas in 2045.

Curriculum improvement from the 2013 curriculum to the *Kurikulum Merdeka* is a careful step in responding to changes in the era in the 21st century [11]. The development of science, knowledge, speed of information, technological explosion, and the needs of the times encourage changes in the curriculum. [19]. The *Kurikulum Merdeka* is a new paradigm in the world of Indonesian education that aspires to confront the needs of life in this century. This paradigm encourages the development of critical thinking skills, creativity, collaboration, communication, problem solving and digital literacy as a necessity in this century.

The *Kurikulum Merdeka* is prepared to meet the challenges and developments of the 21st century. Therefore, this curriculum concept promotes adaptability and lifelong learning. One of the most significant aspects of this worldview is : Improving 21st century skills: The *Kurikulum Merdeka* emphasizes on developing 21st century abilities, including critical thinking skills, creativity, collaboration, communication, problem solving, and digital literacy. Students are taught how to use this in numerous circumstances, including learning and daily life.

The study's findings indicate that kindergarten teachers with the *Kurikulum Merdeka* in Medan City are already in the good category in stimulating 21st century skills during the learning process. Starting from the learning plan prepared by the teacher. Although in the learning plan, the 21st century skills stimulation plan is not written explicitly. However, in its implementation, 21st century skills stimulation began to emerge, especially in critical and communication aspects.

When viewed from the understanding of kindergarten teachers in schools with this curriculum, the average is very good. However, seen from the average student achievement related to this century abilities, it is in the good category. Teachers as the spearhead of determining the quality of education and determining the success of education should be able to determine the right learning strategy in actualizing these 21st century skills in the *Kurikulum Merdeka*. Achieving this century's skills requires the application of the right learning strategy, according to the stages of development and characteristics of children, such as STEAM-based learning, Science Literacy, Higher Order Thinking Skills-based, and blended learning-based [9].

The National Education Standards Agency identified learning principles that must be met in the 21st century education process, including shifting from teacher-centered to student-centered, one-way to interactive, isolation to a networked environment, passive to active-investigating, virtual/abstract to real-world context, personal to team-based learning, changing broad to typical behavior empowers attachment rules, from single sense stimulation to all-round stimulation, from single tools to multimedia tools, changing one-way relationships shifting to cooperative, from mass production to customer needs, changing single conscious effort to multiple, from one science and technology shifting to multiple disciplinary knowledge, centralized control to autonomy and trust, factual to critical thinking, and from knowledge delivery to knowledge exchange.



Critical aspects, are the aspects that appear the lowest, both in learning stimulation, student achievement, and teacher understanding. For student stimulation and achievement, critical thinking skills are sufficient. However, teacher understanding shows a good category.

Creativity is something that is identical to early childhood education. This creativity should be well owned by early childhood education teachers, well stimulated in learning, and understood and can be implemented by students. Based on the assessment result, teacher understanding regarding creativity is in the very good category, well stimulated, but student achievement is in the sufficient category.

Critical and creativity are included in Higher Order Thinking Skills (HOTS). Quoted from the opinion [20] that the application of Higher Order Thinking Skills (HOTS) is still rarely applied in early childhood education due to several reasons such as: (1) Teachers are not aware that early childhood has Higher Order Thinking abilities; (2) Teachers are never taught how to teach Higher Order Thinking Skills (HOTS) to early childhood; (3) Instead of training early childhood thinking skills, teachers focus more on providing information to early childhood, developing school preparedness and preparing youngsters for the next level of education; (4) Most curriculum teachers have the option to use it, but related assessments do not need or promote higher-order thinking abilities; and (5) Supervisors' expectations and evaluation criteria for instructors do not include promoting Higher Order Thinking Skills (HOTS) in early childhood.

Schools that become driving schools must automatically align with the concept of this-century learning [21]. Teachers, especially in schools with the *Kurikulum Merdeka*, starting from the level of early childhood education teachers, are advised to continue to actively participate in training related to 21st-century learning. Thus, teachers can create comfortable, independent, active, character-based, meaningful learning, to meet the challenges of implementing an independent curriculum.

In the 21st century, professional teachers must be more than just effective teachers. They must also be active learners and agents of change, able to build relationships and enhance learning quality in their schools, and able to develop good learning plans. Demographic changes have resulted in students in schools being more diverse in terms of culture, religion/belief, and language. Advancements in information technology, including the internet, have made it easier for teachers and students to acquire knowledge. Teachers must establish learning strategies that align with environmental development as 21st century teacher competencies and develop learning tools that are in accordance with the learning approaches and strategies required in the independent curriculum.

The curriculum is seen as a vital facet of learning in the school system. The *Kurikulum Merdeka* in Indonesia aims to create a globally competitive golden generation. This curriculum can enhance 21st century capabilities for Indonesia's Golden Generation by fostering student potential, character education, and collaboration among all stakeholders[22]. Teachers' understanding of 21st century skills is one of the keys to the successful implementation of the this curriculum in producing Indonesia's golden generation.

21st century teachers are not enough to just master the content in their field, they need to master technological skills well[23] because 21st century students are digital residents who are already very close to technology. For that, teachers need to prepare themselves not only through formal education, but also through various learning training, pedagogy, and other professional teacher preparation training.

## 4 Conclusion

The understanding of kindergarten teachers with *Kurikulum Merdeka* in Medan City is in the very good category (88%). The aspect of 21st century skills with the highest achievement is the cooperation aspect with a percentage of 95% (very good). The aspect with the lowest achievement is the critical aspect of 80% (good). The digital technology skills of teachers are in the good category with a proportion of 84%, and are still below the average ability of 21st century skills. Meanwhile, the achievement of creative and communication aspects is above average with a good category, with a percentage of 88%. Teachers' understanding of 21st century skills will help their implementation in the learning process. Teacher training will help improve and develop the quality of 21st century teachers that are in line with today's needs.

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