International Journal of Social Science, Educational, Economics, Agriculture Research and Technology (IJSET) | ISSN (e) : 2827-766X
Volumes 4 No. 6 (2025)

RELEVANCE OF INDEPENDENT CURRICULUM POLICY TO 21ST CENTURY EDUCATION IN SCIENCE LEARNING IN ELEMENTARY SCHOOLS

Indah Pujiastuti[1], Siti Inganah[2]
[1]Program Studi Magister Pedagodi, Universitas Muhammadiyah Malang
[2] Program Studi Magister Pendidikan Matematika, Universitas Muhammadiyah Malang
Email:, indahpujiastuti044@gmail.com, inganah@umm.ac.id.

Received : 22 March 2025
Revised : 29 March 2025
Accepted : 12 April 2025
Published : 16 May 2025
DOI : https://doi.org/10.54443/ijset.v4i6.752
Publish Link : https://www.ijset.org/index.php/ijset/index

Abstract

This study aims to analyze the relevance of the Independent Curriculum policy to the needs of 21st-century education, especially in learning Natural Sciences (IPA) at the Elementary School level. 21st-century education emphasizes the importance of developing critical thinking skills, creativity, communication, and collaboration (4C), which is in line with the spirit of the Independent Curriculum. The study used a qualitative method with a literature study approach from various scientific literature sources. The results of the study show that the Independent Curriculum focuses on developing student competencies through differentiated learning, project-based learning, and strengthening the Pancasila Student Profile. This curriculum provides flexibility for educational units to adjust the learning process to the needs and context of students, which is in line with the demands of the 21st century. In the context of science learning, the integration of science literacy, local potential, and contextual learning in the Independent Curriculum can improve the relevance and quality of education. Thus, the Independent Curriculum is considered relevant and effective in preparing students to face global challenges in today's digital era.

Keywords: ***Independent Curriculum, 21st Century Education, Science Learning, Pancasila Student Profile, Science Literacy.***

INTRODUCTION

Education is a step to advance a nation and create a superior generation. Education is a human effort to foster personality in accordance with the values in society or as an effort to help students to develop and improve knowledge, skills, values, attitudes and behavioral patterns that are useful for life. Education is to humanize young people. Education does not eliminate dignity and honor as a human being, but rather to grow and enhance the quality and essence and dignity of humans. Therefore, education is influenced not eliminated, because nothing is lost in the education process.(DANU Education 2022).

In this 21st century, students must strive to have various abilities or competencies, called 21st Century Skills, an educational concept better known as 21st Century Learning or 21st century learning. According to (Herlambang, 2018), 21st century skills need to be possessed by every student. These skills can improve the quality of education and create superior human beings, so revitalization in education is needed so that education can successfully create superior people and have 21st century skills. 21st century skills specifically also arise because of the reality of global education that has not fully accommodated the needs of digital era education output. The learning paradigm that is formed in general is to compete. Educators who unknowingly teach and educate them like to compete but forget about cooperation. For example, the academic ranking, accelerated learning classes, and the rise of favorite schools are still in effect. Creating a competitive mindset only makes students smarter in the cognitive realm. So that they forget the culture of cooperation and collaboration. This is contradictory to the 21st century picture that individuals live in an environment full of technology use, where there is easy access to abundant information, new communication and collaboration patterns. So to support success in the digital era, a skill base is needed in the digital era, including critical thinking skills, problem solving, communication, and collaboration.(Kasse and Atmojo 2022).

The above reality requires educators to present collaborative learning content to truly prepare students to face the

reality of the 21st century. This 21st century learning content is then known as the term 4C (Communication, Collaboration, Critical Thinking and Problem Solving, and Creativity and Innovation). Conceptually, educators are professional workers with the capacity of quantity and quality who are able to answer all challenges and educational needs. The demands of professionalism of 21st century educators are not on the ability of educators to know and be proficient in everything, but educators have the expertise to find out together with their students, become role models of trust, openness, and perseverance to their students to face the reality of 21st century digital life.(Kasse and Atmojo 2022).In the 2013 curriculum, 21st century skills have been widely applied, namely in the application of the concept of 21st century skills and the adoption of two other main concepts, namely authentic assessment and the use of a scientific approach.(Aprilia 2021). This scientific approach aims to accustom students to think scientifically. In learning, this approach has five steps, namely: asking, observing, collecting data/exploring, communicating and associating. While for authentic assessment, the aim is that the assessment of student learning outcomes can be carried out effectively by paying attention to aspects of skills, knowledge and attitudes.

The Merdeka Belajar curriculum is here as an answer to the tight competition for human resources globally in the 21st century. Lukum in(Amalia 2022)states that there are still three important competencies in the 21st century, namely thinking, acting and living competencies. Thinking competencies include critical thinking, creative thinking, & problem solving. Acting competencies include communication, collaboration, digital literacy & technological literacy. While living competencies in the world include initiative, self-direction, understanding the world and social responsibility. These competencies should be applied to 21st century learning because in this era it will require innovative and creative people to be able to adapt quickly. This is what must be a crucial concern for the government of the Republic of Indonesia to be able to immediately provide adequate facilities and infrastructure in facing global developments, especially the era of society 5.0. Curriculum development is one of the good steps in shaping students' character later to face this era.

This independent curriculum was created as an effort to restore learning, due to the learning crisis in Indonesia that has been going on for a long time and has been exacerbated by the Covid 19 pandemic. This has an impact on changes in education, such as the implementation of distance learning (PJJ). In addition, there is learning loss or learning lag The Education and Development Forum (2020) in(Andriani et al. 2021)namely the loss of previously learned competencies in students and being unable to complete learning in class. Then there is also a learning gap or learning gap that has indeed occurred before the pandemic, but has increased due to the pandemic, this gap is seen in the use of learning platforms in 3T areas and urban areas. With the emergence of this independent curriculum, it is hoped that it can overcome these problems and make education in Indonesia recover and be able to form superior students.

Natural Science is one of the sciences that is very important for human life, especially in Elementary School, this is because the materials in science learning are useful for providing direction to children to respond to various phenomena that occur in the natural life around them or their environment. In addition, Science Learning in Elementary School can develop students' skills and scientific attitudes(Nurrahman et al. 2022). This independent curriculum was created with various considerations, then is this independent curriculum in accordance with 21st century learning, 21st century learning is technology-based learning to meet the challenges and demands of the millennial era, where 21st century learning is a demand that must be met in order to achieve maximum learning and meet the challenges in the 21st century. Therefore, the author conducted research on the relevance of the independent curriculum policy to 21st century learning.

RESEARCH METHODS

The author uses qualitative research methods in his research. This research focuses on studying social phenomena.(Dr. JR Raco, ME 2010) method is defined as a research method aimed at exploring and understanding a social or humanitarian problem. In conducting this research, the author uses a literature study, namely a study that aims to collect various data and information needed for research, researchers conduct literature reviews from various literature sources such as scientific articles, educational journals, books, and other sources of information that can be accounted for.

According to Zed in (Melfianora, 2019) searching for various information from the library is not the main thing in preparing a research framework. There are several things that are most important in carrying out research activities, including the formulation of the problem, the main theory that we use as a basis for answering a problem, analyzing data, and how to make conclusions.

Determining the topic in a problem or phenomenon is the most important thing in this research. Determining this topic is related to educational policies and innovations. Second, researchers search for information

about the problem. Third, determine the focus of the research from the information. Fourth, collect various data sources from books, journals, articles and other sources. Fifth, researchers read these sources and explore the reading results to the maximum to find information that supports the research. Sixth, researchers make notes about the information. Seventh, Process the notes and research data by analyzing them to get a conclusion. The last step is to compile a report according to the systematics.

RESULTS AND DISCUSSION

1. 21st Century Learning

Learning is defined as a process in teaching and learning carried out by educators, this activity aims to help students in learning and developing the abilities possessed by each student. In learning there are learning resources and learning is also influenced by the learning environment. Gagne (1977) in(Warsita et al. 2008)learning is a series of external activities that are designed to support the internal learning process. So, this learning is a series of learning processes built by teachers or educators. Learning has the goal of improving students' moral and intellectual development. Current learning must be able to adapt and develop 21st century learning skills, including problem-solving skills, critical thinking, fostering creativity, and of course must be able to master learning materials well.

The development of digital information is one of the characteristics of the 21st century. As the digital era develops, humans must be able to master life according to the demands of the times. According to BSNP in(JT Education, Azhar, and Arsih 2022)explains what the 21st century is. The 21st century is defined as a century of knowledge where information is spread very quickly and technology is developing rapidly. Central Statistics Agency (2020) in(Indarta et al. 2022)stated that from 2016-2023 internet usage has increased significantly in Indonesian society. The increase occurred in urban areas as well as in rural areas.

Along with the development and advancement of technology, every human being must prepare themselves for future conditions, especially children who will one day become the young generation who will continue the nation. That is why learning is needed that is in accordance with the demands of the times, namely learning with the characteristics of the 21st century. Learning in this century needs to be prepared carefully, this is to prepare the young generation who must be able to adapt to the progress of the times. In(Indarta et al. 2022)There are four principles in 21st century learning, namely:

1. Critical thinking and problem solving

   Every human being has the ability to think. Thinking is the most crucial thing, because in acting and doing all our life activities we are required to think. The ability to think rationally and directed and able to help someone understand the relationship between ideas or facts, this ability is the ability to think critically. A person will not be able to learn well without good thinking. Critical thinking will have a positive impact on our lives, because we are required to think further in anything. This will certainly be a positive thing for our lives and will bring us to success.
2. Communicate

   Communication is a process of speaking between a human and another human. In carrying out communication activities, humans can carry out this communication in an intrapersonal or group context. According to Robinson (2022) in(Watyana 2022), the most important thing in education is the relationship between learners and students. If the relationship between the two is not good, then the learning process will not occur. In the learning process, students must be able to communicate well with guidance and training given by the teacher. Students need to be accustomed to communicating both about lessons and other things. When students use good language in communicating, it will have a positive impact on the students themselves and vice versa.
3. Creativity and innovation

   Innovation is an inspiration or something new that humans create in improving quality. This innovation is related to creativity, because in general when we do an innovation it can also bring up various new views, interesting ideas and so on. Innovation is a new view, goods, events, and methods that are done are new things for a person or group.
4. Collaboration

   Collaboration is a process of activities carried out by working together. Students need to learn how to collaborate well, whether with family, friends, or the community. Based on research, a person will tend to be active in collaboration or cooperation activities. Students who learn by working together with their groups tend to be more active and able to understand the material well compared to learning materials presented in other forms.

2. Independent Curriculum

Curriculum is a set of educational programs planned and implemented by an educational institution to achieve pre-designed educational goals.(Nurul et al.2022.)explains that the curriculum has several dimensions, namely the curriculum as an idea, plan, process and result. The curriculum is the most crucial thing in education, this curriculum is used as a reference in the implementation of education.

After we know what 21st century learning is. Of course, we cannot deny that learning is related to the curriculum, because learning is a depiction of the process components in the curriculum. During this pandemic, various changes have occurred in our lives, especially in the field of education. Before the pandemic, the learning process was carried out offline and has now changed to online learning. This is certainly a problem in education, the occurrence of a learning crisis that causes learning loss and learning gaps due to the pandemic. Simplifying and improving the curriculum is one effort to overcome the problem of learning loss and learning gaps due to the pandemic. This is also done so that education can adapt to current developments and needs. In overcoming the education crisis during the Covid-19 pandemic, a flexible, easy-to-understand curriculum is needed, and of course a simple curriculum.

The Independent Curriculum is one of the curricula launched by Mr. Nadiem Makarim at this time, this is an effort to overcome learning loss and learning gap. The government provides freedom to all levels of education in using a curriculum, an institution can freely choose which curriculum it will use, be it the independent curriculum, emergency curriculum, or the 2013 curriculum. This independent curriculum design is one of the various curriculum options available. This independent curriculum is one of the curricula that is able to overcome the education crisis and is able to adapt to the times. Plate (2012) in(Oktaviani and Wulandari 2019)said that education is said to have failed if the curriculum used is unable to adapt to the development of the times. Therefore, the curriculum needs to be assessed in terms of its technical aspects, and we can use it according to the demands of the times.

Independent curriculum is a curriculum that focuses on a competency, because of that students are more focused on studying material concepts. This independent curriculum is a continuation and development of the 2013 curriculum. In this curriculum, educational units have the right to organize learning activities that are adjusted to the needs and context of the learning material of students. At the elementary school level there are several changes in subjects, for example science and social studies lessons which were initially studied separately are now combined between the two subjects. The curriculum is an important aspect in learning, because this curriculum will be a reference in carrying out other educational activities.

In implementing this independent curriculum, readiness is very necessary. Readiness is the main thing for an educational institution in innovating and implementing new change activities. However, the main readiness does not lie in the aspect of infrastructure alone but must pay attention to other aspects, one of which is leadership that is able to adapt to new things. This readiness requires effort and time to be able to adjust to new policies. In addition, the focus of the learning process in this independent curriculum is more emphasized on student character, this is related to the independent curriculum which has the aim of making the profile of Pancasila students as one of its goals.

3. Science Learning in Elementary School

Science (science) is part of our life and our life is part of science. The 21st century is marked by the rapid development of science and technology in the fields of life in society, especially information and communication technology. In terms of process, science has various scientific abilities such as (a) identifying and determining fixed or independent variables from other variables, (b) determining what needs to be measured and obeyed, (c) observation skills, using as many senses as possible, not just sight, collecting relevant facts, looking for similarities and differences, and classifying them, (d) skills in interpreting observations, each type of observation can be correlated, (e) skills in determining patterns in a series of observations and making conclusions, (f) the ability to predict what will happen based on observations, (g) skills in using tools or materials and the reasons for using these tools(Jannah and Atmojo 2022).

PScience learning (science) to develop thinking skills lies in the ability to formulate hypotheses that facilitate the development of various thinking skills. This ability should not be developed through scientific studies without experimentation or practice. Science learning begins with the ability to pay attention to "direct experience" and "indirect experience" which is the first general science skill. To explain natural phenomena, there are seven main skills that need to be mastered, namely: (1) Explain nature carefully. (2) Recognizing and formulating causal questions about nature (3) compiling, generating and formulating alternative hypotheses and

theories; (4) Produce logical predictions. (5) Design and run controlled experiments to test hypotheses. (6) Collect, organize, and analyze experimental data and related correlations. (7) make and use rational conclusions(Jannah and Atmojo 2022).

Natural Science is one of the sciences that is very important for human life, especially in Elementary School, this is because the materials in science learning are useful for providing direction to children to respond to various phenomena that occur in the natural life around them or their environment.The objectives of science learning according to(Nurrahman et al. 2022)to understand the natural environment; have the skills to gain knowledge in the form of scientific process/method skills; have a scientific attitude in understanding the natural environment and solving the problems faced.

DIn the process of learning science, sometimes it feels difficult to be observed by students because the learning media used is too boring or is outdated. Therefore, educators usually use various approaches and learning media that are adjusted to science learning to attract more students' attention. The learning media that are commonly used to get the attention of students in junior high schools are very diverse, such as audio media, visual media, audio-visual media, and various media. The definition of learning media itself is one of the methods or tools used in the teaching and learning process. This is done to stimulate learning patterns in order to support the success of the teaching and learning process so that activities can be carried out effectively.

4. Problems in Science Learning

Science learning in Elementary Schools (SD) has many problems, both from subject teachers, students, and the students' parents themselves.(Des, Gulo, and Muhid 2024)stated that students cannot think mathematically even though they are in high classes, students' ideas do not come out and become buried, students do not ask questions about the material explained by the teacher, the methods used by teachers are still old methods, and students' interests and abilities are not improving.

In the learning process, if teachers only use textbooks as media, students will feel bored and unmotivated in learning.(Winangun 2022). Furthermore,(Indrawati and Nurpatri 2022)stated the problem in science learning, namely the existence of teachers who do not understand the process of learning 21st century skills. Then, there are teachers who do not understand the purpose of implementing 21st century skills learning. This states that there is a problem, where teachers do not understand the process of learning 21st century skills. According to the Directorate General of Basic Education and learning 21st century skills are not yet known further by teachers in schools.

In learning 21st century skills, it is necessary to develop students' creativity. The reason teachers do not understand enough about learning 21st century skills, at the beginning of the implementation of the 2013 Curriculum, especially authentic assessment, teachers felt confused because it was not explained in detail about this authentic assessment, but the more teachers learn and participate in teacher training, the more they understand and are clearer about authentic assessment. However, there are still some teachers who are still constrained in assessment.

5. Solutions to overcome problems in science learning

To overcome various problems in science learning, several solutions accompanied by the latest journal references are as follows:

1) Improving Students' Critical and Creative Thinking Skills
   The application of project-based learning models (PBL) can improve the creative character of students in science learning.(Sinta Dea et.al 2023)stated that the implementation of the PjBL learning model is able to improve the creative character of students.
2) Deep Understanding of Authentic Assessment
   Implementation of teacher professional competence in conducting authentic assessments is important for improving the quality of learning.(Pribadi et.al. 2021).
3) Implementation of Innovative Learning Models (STEM Education)
   The application of the Project Based Learning model in science learning can create interesting learning and improve students' skills.(Fitriani et al. 2023)
4) Support from Parents and the Surrounding Environment
   Parental involvement in accompanying children's learning at home has a significant impact on improving students' science learning achievement. Active parental involvement in accompanying children's learning at home has a significant impact on improving students' science learning achievement.

6. Relevance of Independent Curriculum Science Learning to 21st Century Learning

The relevance of Natural Science (IPA) learning in the Independent Curriculum to 21st century learning is very significant, because both emphasize the development of essential skills needed in the modern era.The Independent Curriculum is designed to provide flexibility to educators and students in the learning process, while 21st century learning emphasizes mastery of 4C skills: Critical Thinking, Communication, Collaboration, and Creativity.(Indarta et al. 2022). The Independent Curriculum encourages student-centered learning, enabling them to develop critical thinking skills, effective communication, collaboration, and creativity.This is in line with the needs of 21st century learning that requires students to be ready to face global challenges and ever-evolving technology. Scientific literacy is an important component in science learning, especially in the context of the 21st century. The ability of students to understand scientific concepts and apply them in everyday life is crucial.(Pertiwi, Atanti, and Ismawati 2018) emphasizes that scientific literacy is important for students to understand what they are learning and to be able to apply it in solving various problems in everyday life.

The Independent Curriculum provides space for the implementation of differentiated learning, which allows educators to adjust learning methods and materials according to the needs and potential of each student.(Sulistyosari, Karwur, and Sultan 2022)found that the implementation of differentiated science learning had a positive impact, both for teachers and students, by increasing student involvement and creativity in the learning process.

Integrating local potential in science learning can increase the relevance and relevance of learning materials to students' real lives.(Qomariyah and Setiawan 2022)shows that the integration of local potential in the implementation of the Independent Curriculum helps students understand the material in a real and factual way, and increases their involvement in the learning process. In the Independent Curriculum, science learning is integrated with social studies to become IPAS (Natural and Social Sciences), which aims to help students understand the surrounding environment holistically.(Tresnawati et al. 2023)

The Pancasila Student Profile explains the competencies and character that need to be built in each individual student in Indonesia in order to direct educational policies to be centered or oriented towards students (Rahayuningsih, 2021). With these efforts, the six dimensions of the Pancasila Student Profile can be formed in a complete and comprehensive manner, namely students who (1) believe in, are devoted to God Almighty, and have noble morals; (2) are globally diverse; (3) work together; (4) are independent; (5) think critically; and (6) are creative(Mulyani, Nurmeta, and Maula 2023). These six dimensions are expected to be possessed by all students. From the perspective of students, what abilities (character and competence) must be built with the aim of becoming a productive and democratic future generation in the 21st century. In meeting the challenges of the 21st century and becoming participants in the progress of the nation, ready to navigate every change such as the era of industry 4.0 and global development. The 21st century learning that is implemented can improve the quality of students from various aspects, such as skills, knowledge, attitudes and values that are beneficial for sustainable development. This 21st century learning is a part of this independent curriculum because the goal of the independent curriculum itself is to form the profile of Pancasila students.

From the description above, we can see that critical thinking in science learning enables students to have a deep understanding of problems, and draw conclusions to be able to solve social problems in a focused, evaluative, and wise manner to answer the challenges of the 21st century. Furthermore, the relevance of the independent curriculum to 21st century learning lies in the characteristics of the independent curriculum itself which prioritizes project-based learning. According to(Nurohmah, Kartini, and Rustini 2023)Project-based learning is able to provide opportunities for students to explore an issue or problem without any boundaries between lessons. This activity is in accordance with 21st Century competencies and the values or characters of the Pancasila student profile. This project-based learning in the independent curriculum is applied in regular learning and also when carrying out projects to strengthen the Pancasila student profile that discuss contemporary issues, and is carried out through a research process to answer interesting and complex questions for students.

21st century learning must enable future generations to develop technological advances. And learners can acquire 21st century skills. According to(Rahayu, Iskandar, and Abidin 2022)These skills consist of critical thinking skills in solving problems, innovating and being creative, and being able to communicate and collaborate well, research skills and information fluency, good decision making, digital skills and being able to operate technology. To carry out this 21st century learning, it must meet four principles. According to(Rahayu, Iskandar, and Abidin 2022)The four principles are 1) Instruction should be student-centered, namely a learning approach that focuses on students. 2) Education should be collaborative, students can collaborate with others 3) Learning should have, connecting learning with everyday life or with students' real lives and 4) Schools should

be integrated with society, namely facilitating students in engaging in their social environment.

Of the four principles are relevant to the independent curriculum because the independent curriculum policy also demands the creation of students who meet the profile of Pancasila students who meet all 21st century skills. And in this 21st century learning, the independent curriculum has fulfilled the four principles such as student-centered learning, being able to collaborate, connecting with real life and being involved in the social environment. In the independent curriculum, the curriculum design has also used this principle, and this independent curriculum uses constructive learning, namely constructing knowledge through real experiences and being able to connect with the social life of students. In addition, this constructive learning includes learning that is oriented towards students by providing opportunities for students to be active in class.

CONCLUSION

The Independent Curriculum is very relevant to the needs of 21st century education, especially in science learning in elementary schools. This curriculum emphasizes the development of 4C skills (Critical Thinking, Communication, Collaboration, Creativity) which are in line with the competencies needed in the era of globalization and digitalization. The Independent Curriculum provides flexibility for educators to adjust learning to students' needs through project-based learning and differentiated learning, which aims to form the Pancasila Student Profile. In science learning, the implementation of the Independent Curriculum encourages science literacy, critical thinking skills, and solving real problems around students, supporting their readiness to face future challenges. Thus, the Independent Curriculum serves as an answer to the challenges of the 21st century, improving the education crisis due to the pandemic, and strengthening the character and skills of students for global life.

REFERENCES

Amalia, Mila. 2022. "Inovasi Pembelajaran Kurikulum Merdeka Belajar Di Era Society 5.0 Untuk Revolusi Industri 4.0." *Seminar Nasional Sosial Sains, Pendidikan, Humaniora (SENASSDRA)* 1(1): 1–6.

Andriani, Wiwin, M Subandowo, Hari Karyono, and Wawan Gunawan. 2021. "Learning Loss Dalam Pembelajaran Daring Di Masa Pandemi Corona. Seminar Nasional Teknologi Pembelajaran." *Edudikara: Jurnal Pendidikan Dan Pembelajaran* 1(1): 485–501.

Aprilia, Tika. 2021. "Efektivitas Penggunaan Media Sains Flipbook Berbasis Kontekstual Untuk Meningkatkan Kemampuan Berfikir Kritis Siswa." *Jurnal Penelitian Ilmu Pendidikan* 14(1): 10–21. doi:10.21831/jpipfip.v14i1.32059.

Belajar, Teori, Robert M Gagne, D A N Implikasinya, and Oleh Bambang Warsita. 2008. "Teori Belajar Robert m. Gagne Dan Implikasinya Pada Pentingnya Pusat Sumber Belajar." XII(1).

Des, Christiani, Marindra Gulo, and Abdul Muhid. 2024. "Efektivitas Pembelajaran Berbasis Crossword Puzzle Untuk Meningkatkan Kemampuan Berpikir Kritis (Critical Thinking) Pada Siswa : Literatur Review." 10(1).

Dr. J.R. Raco, M.E., M.Sc. 2010. "METODE PENELITIAN KUALITATIF: JENIS, KARAKTERISTIK, DAN KEUNGGULANNYA." *PT Grasindo*: 146.

Education, Learning, Yose Indarta, Nizwardi Jalinus, Agariadne Dwinggo Samala, Afif Rahman Riyanda, and Novi Hendri Adi. 2022. "EDUKATIF : JURNAL ILMU PENDIDIKAN Relevansi Kurikulum Merdeka Belajar Dengan Model Pembelajaran Abad 21 Dalam Perkembangan Era Society 5 . 0." 4(2): 3011–24.

Fitriani, Norma Shinta Andari, Sukamto Sukamto, Mudzanatun Mudzanatun, and Effendi Isnuryantono. 2023. "Penerapan Model Project Based Learning Dalam Pembelajaran IPA Kelas VI Di SD Negeri Gayamsari 02 Semarang." *JIIP - Jurnal Ilmiah Ilmu Pendidikan* 6(7): 4765–69. doi:10.54371/jiip.v6i7.2341.

Indarta, Yose, Nizwardi Jalinus, Waskito Waskito, Agariadne Dwinggo Samala, Afif Rahman Riyanda, and Novi Hendri Adi. 2022. "Relevansi Kurikulum Merdeka Belajar Dengan Model Pembelajaran Abad 21 Dalam Perkembangan Era Society 5.0." *Edukatif : Jurnal Ilmu Pendidikan* 4(2): 3011–24. doi:10.31004/edukatif.v4i2.2589.

Indrawati, Ena Suma, and Yeni Nurpatri. 2022. "Problematika Pembelajaran IPA Terpadu (Kendala Guru Dalam Pengajaran IPA Terpadu)." *Educativo: Jurnal Pendidikan* 1(1): 226–34. doi:10.56248/educativo.v1i1.31.

Jannah, Dewi Rahmawati Noer, and Idam Ragil Widianto Atmojo. 2022. "Media Digital Dalam Memberdayakan Kemampuan Berpikir Kritis Abad 21 Pada Pembelajaran IPA Di Sekolah Dasar." *Jurnal Basicedu* 6(1):

1064–74. doi:10.31004/basicedu.v6i1.2124.

Kasse, Fransiskus, and Idam Ragil Widianto Atmojo. 2022. "Analisis Kecakapan Abad 21 Melalui Literasi Sains Pada Siswa Sekolah Dasar." *Education and Development* 10(1): 124–28. https://journal.ipts.ac.id/index.php/ED/article/view/3322/2168.

Mulyani, Sri, Irna Khaleda Nurmeta, and Luthfi Hamdani Maula. 2023. "Analisis Implementasi Profil Pelajar Pancasila Di Sekolah Dasar." *Jurnal Educatio FKIP UNMA* 9(4): 1638–45. doi:10.31949/educatio.v9i4.5515.

Nurohmah, Ai Nurul, Dewi Kartini, and Tin Rustini. 2023. "Relevansi Kebijakan Kurikulum Merdeka Dengan Pendidikan Abad 21 Pada Pembelajaran IPS Di SD." *Jurnal Ilmiah Wahana Pendidikan, Februari* 9(3): 25. https://doi.org/10.5281/zenodo.7594483.

Nurrahman, Nazri, Sindy Meisyaroh, Vera Stela Sagala, and Arita Marini. 2022. "Keefektifan Media Pembelajaran Dalam Bentuk Permainan Papan Pada Ipa Di Sekolah Dasar." *Pendidikan Dasar Dan Sosial Humaniora* 2(2): 1–10.

Oktaviani, N, and I Wulandari. 2019. 3 Yogyakarta: K-Media *Problematika Penerapan Kurikulum 2013 Di Sekolah Dasar*. https://www.researchgate.net/profile/Isnaini-Wulandari/publication/339551635_Problematika_Penerapan_Kurikulum_2013_di_Sekolah_Dasar/links/5e588f85299bf1bdb840b8cf/Problematika-Penerapan-Kurikulum-2013-di-Sekolah-Dasar.pdf.

Pendidikan, D A N Unsur-unsur. 2022. "Pengertian Pendidikan, Ilmu Pendidikan Dan Unsur-Unsur Pendidikan." 2(1): 1–8.

Pendidikan, Jurnal Teknologi, Minda Azhar, and Fitri Arsih. 2022. "ETNO-STEM DALAM PEMBELAJARAN IPA : A." : 147–63.

Pertiwi, Utami Dian, Rina Dwik Atanti, and Riva Ismawati. 2018. "Pentingnya Literasi Sains Pada Pembelajaran Ipa Smp Abad 21." *Indonesian Journal of Natural Science Education (IJNSE)* 1(1): 24–29. doi:10.31002/nse.v1i1.173.

Pgmi, Dosen, Stkip Nurul, Huda Oku, Sumatera Selatan, Dosen Pgmi, F T K Uin, Imam Bonjol, and Sumatera Barat. "DALAM PEMBELAJARAN PENDIDIKAN DASAR Resti Septikasari Rendy Nugraha Frasandy PENDAHULUAN Sejalan Dengan Era Globalisasi , Ilmu Pengetahuan Dan Teknologi Yang Berkembang Sangat Cepat Dan Makin Canggih , Dengan Peran Yang Makin Luas Maka Diperlukan Guru Yan." : 107–17.

Pribadi, R A, S M Putri, and H Nuraeni. 2021. "Implementasi Kompetensi Profesional Guru Dalam Melakukan Penilaian Autentik Pada Peserta Didik Kelas 5 SD Negeri Cipocok Jaya 1." *Jurnal Pendidikan Tambusai* 5: 9150–57. https://www.jptam.org/index.php/jptam/article/view/2434%0Ahttps://www.jptam.org/index.php/jptam/article/download/2434/2125.

Qomariyah, Ismi Nurul, and Rudy Setiawan. 2022. "Al-Jahiz: Journal of Biology Education Research." *Al-Jahiz: Journal of Biology Education Research* 1(2): 1–8.

Rahayu, Restu, Sofyan Iskandar, and Yunus Abidin. 2022. "Inovasi Pembelajaran Abad 21 Dan Penerapannya Di Indonesia." *Jurnal Basicedu* 6(2): 2099–2104. doi:10.31004/basicedu.v6i2.2082.

Sinta Dea Kristiandari, Carolina, Christiyanti Aprinastuti, and Pendidikan Profesi Guru Prajabatan. 2023. "Upaya Peningkatan Karakter Kreatif Menggunakan Model Project Based Learning Pada Muatan IPA Bagi Peserta Didik Kelas V SD Kanisius Kadirojo." *Christiyanti Aprinastuti INNOVATIVE: Journal Of Social Science Research* 3: 5447–60.

Sulistyosari, Yunike, Hermon Maurits Karwur, and Habibi Sultan. 2022. "Penerapan Pembelajaran Ips Berdiferensiasi Pada Kurikulum Merdeka Belajar." *Harmony: Jurnal Pembelajaran IPS dan PKN* 7(2): 66–75. doi:10.15294/harmony.v7i2.62114.

Tresnawati, Septy Riza, Ishmatun Naila, Meirza Nanda Faradita[3], Muhammadiyah Surabaya, and Kata Kunci. 2023. "Analisis Pembelajaran IPA Kelas IV Sekolah Dasar Dalam Kurikulum Merdeka." *Jurnal Ilmiah Kependidikan* 10(3): 365–72. https://doi.org/10.30998/xxxxx.

Watimena, R.A. 2022. "Merancang Revolusi Pendidikan Indonesia Abad 21." *Rumah Filsafat* (February): 1–211.

Winangun, I Made Ari. 2022. "Analisis Problematika Proses Pembelajaran IPA Di Sekolah Dasar." *Edukasi: Jurnal Pendidikan Dasar* 3(1): 37. doi:10.55115/edukasi.v3i1.2294.