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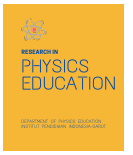

ARTICLE

Analysis of the Implementation of the *Kurikulum Merdeka* in High School Physics Learning Activities

Iklimah Badriah[*,1] and Rizal Adimayuda[2]

[1]SMA PGRI Garut
[2]SDepartment of Physics Education, Institut Pendidikan Indonesia
[*]Corresponding author. Email: iklimah.badriah12@gmail.com

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Abstract

The implementation of the *Kurikulum Merdeka* presents challenges for educational units that adopt it. In physics learning, students often engage in projects that start with problem-solving. Therefore, this study aims to understand the implementation of the *Kurikulum Merdeka* in high school physics learning activities. This research uses a qualitative descriptive method with a case study approach, utilizing questionnaires and interviews for data collection, and data analysis through questionnaires. Interview data is analyzed using thematic analysis. The sample is selected using purposive sampling with participants spread across 4 schools, 4 physics teachers, and 160 students offline. The results of the questionnaire data show that students agree with the *Kurikulum Merdeka* from the aspect of using teaching tools, with 92% agreeing and 8% strongly agreeing; however, textbooks and worksheets are rarely used. From the aspect of project strengthening of the *Pancasila* student profile, 87% agree and 13% strongly agree. Interview results reveal that students do not fully understand the physics concepts within the projects. From the aspect of learning outcomes, 91% agree and 9% strongly agree. In contrast, interview results with teachers indicate that teaching tools are created according to the school's conditions. Furthermore, the implementation of *Pancasila* student profile in the context of physics learning is not directly related to the physics subject but is mandatory for educational units. Learning outcomes in physics involve spirituality, independence, teamwork, global diversity, and critical thinking.

Keywords: Kurikulum Merdeka, Students' perceptions, Teachers' perceptions, Physics learning activities

1. Introduction

The *Kurikulum Merdeka*, inaugurated by Indonesian Ministry of Education, was formerly known as the prototype curriculum. It aims to provide an enjoyable learning environment for both teachers and students. In the context of the *Kurikulum Merdeka*, teachers and students can alternately introduce innovations and present materials to students (Devian, Desyandri, and Erita 2022). For the *Kurikulum Merdeka* to function effectively, it requires a unified vision and aligned perceptions between teachers and students. The syllabus should be gradually implemented and evaluated when issues arise. This aims to ensure that progress benefits students, teachers, and connected organizations.

In implementing the *Kurikulum Merdeka*, student projects must be created or completed as part of the curriculum. Through these projects, students can develop their skills and potential. The project activities are one implementation phase where both conceptual and contextual phases can be completed. Using a formal condition and a learning structure that is more adaptable to the school's conditions, students are given extensive learning opportunities in this practice. Schools can adjust time allocation to increase activities that promote active learning and enhance various competencies within students. The implementation of the practice is an application of learning that responds to students' interests, learning preferences, and capacities to deliver quality education. The learning process must be planned following several stages: a) adapting the curriculum to students' strengths and weaknesses, b) modifying the curriculum and learning strategies according to students' needs through school planning and strategy, c) determining what teachers need to do to meet students' needs, and d) regularly analyzing and evaluating the effectiveness of the school's plan.

Moreover, the implementation of the *Kurikulum Merdeka* aims to address the learning crisis (learning loss). These activities encourage students to discuss with peers, produce a product or activity related to a project, and teach problem-solving to achieve good results, providing meaningful learning experiences. Despite the positive goals of implementing the *Kurikulum Merdeka* through certain activities, it presents challenges and issues for educational units adopting it. In practice, the dissemination of the new learning paradigm appears uneven. This is evident from teachers' lack of understanding of the new learning paradigm and their low curiosity, even indifference, towards the *Kurikulum Merdeka* being promoted by the government. Additionally, teachers' competence in designing teaching materials or modules for the *Kurikulum Merdeka* is still low due to the lack of training on its implementation (Saputra, Sukariasih, and Muchlis 2022). Project-based learning is a suitable model for teachers in the *Kurikulum Merdeka*, but its implementation requires diligence and time (Dewi 2022). This situation is similar across various subjects, including science and physics.

After the transition to the *Kurikulum Merdeka*, science or physics teachers have started using Project-Based Learning models, but not entirely. This is because, in the *Kurikulum Merdeka*, project-based learning and projects are separate, and their implementation is through a block system (Malikah et al. 2022). Although Project-Based Learning engages students and is compatible with problem-based learning, it still poses several challenges for teachers and students. In physics learning, students often undertake projects that start with problem-solving, leading to confusion (Fathurohman and Lutfi 2022).

Therefore, this research seeks to investigate how the *Kurikulum Merdeka* is implemented by physics teachers in physics learning. This is important because there is currently limited empirical data on its application in science education, such as physics. Additionally, this study aims to understand the implementation of as the Project to Strengthen the Profile of Pancasila Students in the context of physics learning. To understand the application of the Independent Curriculum in schools, particularly high schools, the researcher deems it necessary to conduct a study on the analysis of the implementation of the *Kurikulum Merdeka* in high school physics learning activities.

2. Literature Framework

2.1 Kurikulum Merdeka

The curriculum policy in the field of education was established by the Ministry of Education and Culture high schools concerning curriculum management. This syllabus is the final option and can be implemented in educational units. This policy was introduced due to the perceived decline in the quality of education. The Kurikulum Merdeka is a competency-based curriculum that supports learning initiatives through intra- and extracurricular activities. The *Kurikulum Merdeka* is a readjustment of policies where the essence of evaluation is increasingly overlooked. The concept of the Independent Learning Curriculum is to return the national education system to its core, providing schools with the freedom to interpret the curriculum's core competencies. The advantage

of implementing the Independent Curriculum is that it allows teachers to be creative and imaginative in the classroom. To challenge students, there are also class projects that they must complete. However, the lack of learning facilities and incomplete learning resources are significant obstacles for those implementing the *Kurikulum Merdeka*. Various academic activities and the *Kurikulum Merdeka* help train students' soft skills (Angga et al. 2022).

The *Kurikulum Merdeka* includes the Project to Strengthen the *Pancasila* student profile, developed by the government with the following vision: to create an advanced, sovereign, independent, and personality-rich Indonesia through the creation of hypothetical Indonesian students. In terms of human resources, this involves fostering leadership ethos aligned with *Pancasila* values in education, which are gradually being forgotten. *Pancasila* student profile projects can be implemented through school culture, intra-curricular, and extracurricular activities to achieve this vision. According to the strategic plan outlined in Minister of Education and Culture Regulation, the *Pancasila* student profile represents lifelong learners with noble character, international diversity, independence, teamwork, critical thinking, and creativity. These six components are viewed as mutually beneficial and enduring.

Furthermore, the *Pancasila* student profile project provides students with opportunities to investigate, solve problems, and make decisions from their environment within a structured timeframe to produce a product or activity. Project activities are interdisciplinary learning experiences, allocated 20%–30% of annual instructional time, used for character building through the P5 program. Projects offer students many opportunities to learn in formal settings, from their experiences, and in a more flexible and adaptable manner. According to Ministry of Education and Research, projects are interdisciplinary learning activities, such as extracurricular projects. The implementation of *Pancasila* student profile projects is separate from intra-curricular activities, with students addressing current important issues through practical actions taken to solve these problems. The content, activities, and timing of *Pancasila* student profile projects are systematic yet flexible. *Pancasila* student profile activities aim to develop skilled and personality-rich students in line with *Pancasila* norms.

2.2 Physics teaching

Studying physics is a branch of science that deals with the physical properties of objects in nature, expressing them mathematically, and making them available for human analysis or understanding for the benefit of humanity (Raya, 2022). Science, including physics, requires pedagogical knowledge to employ various learning methods. Understanding concepts and practicing problem-solving in physics through scientific exercises is an essential part of physics education (Puspitasari, 2019). In the classroom, students focus more on conceptual understanding rather than problem-solving skills.

The goal of physics education is to help students master learning tools or their natural surroundings and understand the concepts they learn from textbooks. Conceptual understanding is defined as the ability of students to comprehend the material they receive in terms of theory and formulas and to modify the material in a way that is easy to understand (Diani et al. 2019). Therefore, the success of students in learning physics can be measured by their conceptual understanding. Once students have a good grasp of the concepts, they can explain the physical facts related to everyday life (Maulidiani Rahma et al., 2020). From this, it can be concluded that learning physics involves mastering physical concepts, laws, principles, and formulas, as well as studying the phenomena that occur within them.

2.3 Physics teaching in the context of the twenty-first century skills

Physics education in the Independent Curriculum uses a student-centric approach. In the teaching process, teachers must continuously vary their assessment methods to enhance learning outcomes, encompassing both cognitive and non-cognitive abilities. Another key element in improving educational quality is high student participation in the learning process. Project-based learning models allow students to independently build knowledge and skills. In the context of physics education,

this approach encourages students to develop conceptual understanding and problem-solving skills creatively, in line with the three universally recognized pillars of learning: learning to know, learning to relate to others, and learning to be oneself (Lidi et al., 2022).

Analyzing science textbooks, including physics, for measurement material reveals four critical thinking elements: 1) interpretation, 2) analysis, and 3) evaluation. These aspects are evident in the instructions and questions in the textbooks. The characteristics of critical thinking in these books include expressing opinions, identifying activities, evaluating activities, drawing conclusions, explaining, and correcting actions (Kurdiati 2023). Additionally, the Independent Curriculum features a project program to enhance the student profile (P5) in physics classes. It requires 70 hours, with recommended breaks for reflection and discussion about material preparation and reflections between teachers and students. The P5 activities focus on three aspects of the Pancasila student profile: 1) faith and devotion to God Almighty, 2) critical thinking, and 3) creativity (Roihanah et al. 2022). The P5 projects must align with themes set by the government, such as local wisdom, sustainable lifestyles, building body and soul, engineering and technology voices (Irawati et al. 2022).

When designing projects, several principles must be considered. First, projects should connect multiple perspectives and integrate knowledge content holistically. With a holistic perspective, students are encouraged to recognize connections between themselves, teachers, and the school. Second, learning activities should be based on real-world experiences, addressing local issues prevalent in various regions of Indonesia. One significant issue that can be analyzed holistically and is easily encountered by students in their surroundings is environmental issues (Saraswati et al. 2022).

Moreover, incorporating technology into education is crucial in physics education to facilitate learning anywhere, enhance learning experiences, and foster student independence. Technology engagement can be utilized through blended learning methods using various increasingly popular platforms (Fahlevi 2022). Additionally, developing students' character greatly contributes to the continuity of the physics learning process. There are 18 characters traits that students must learn, one of which is a sense of responsibility (Kusumastuti, Khoiron, Achmadi, et al. 2020). Achieving high-quality education requires a strong sense of responsibility for learning (Puspitasari 2019). Global character education is essential, particularly 21st-century skills, which are divided into four groups (Binkley et al. 2012). In 21st-century learning, there are four groups of skills:

1. **Ways of thinking**: In ways of thinking, there are three phases: creative and innovative thinking, critical thinking, and learning to learn. Creativity and innovation can logically be grouped together, originating from two different traditional streams. Critical thinking and problem-solving are more crucial to curricula in any part of the world. The operational definition of learning to learn and meta cognition is most commonly measured through think-aloud protocols given in one-on-one situations. Clearly, this methodology does not accommodate large-scale assessments. However, technology can be used to support and assess learning to learn, which includes self-assessment and independent learning. One interesting example of this is the eVIVA project developed at UltramLab in the UK.
2. **Ways of working**: Communication has become a cornerstone of assessment in reading, writing, graphics, listening, and speaking. However, assessments have not yet accounted for the various possibilities. Presentations using PowerPoint often include graphic displays that can convey messages more concisely than text alone. Videos also require a combination of communication forms in ways that have never been needed before in most people's capabilities. But, as discussed below, it is important to consider these changes. Collaboration presents different challenges for large-scale assessment. Essentially, school-level assessments focus on measuring individual performance.
3. **Tools for working**: In tools for working, there are two phases: information literacy, which includes research on sources and evidence, and ICT literacy.
4. **Living in the world**: Living in the world involves two phases. First, citizenship as an educational

goal, particularly in social studies, primarily focuses on knowledge about democratic processes. Citizenship as a competency, however, has grown in importance and implies certain challenges and measurements. Second, managing life and career is one of the skills needed to survive in the world. Measuring career preferences as part of career guidance has a long history, but there is no solid foundation for building life and career management skills. Fulfilling personal and social responsibilities is also one of the skills needed to survive in the world. This ability includes aspects of collaboration and teamwork, which are part of the skills in how we work. Personal social responsibility also encompasses cultural awareness and cultural competence. Previous discussions have established principles for assessing 21st-century skills, proposing ten skills and understanding what they are and what related certainties mean. Even so, there are many more skills. Since it is not enough to perpetuate static tasks in assessments, it is important to create transformative assessments to reflect the need for imagination to compete, connect, and collaborate. This can start happening without addressing some very critical challenges (Binkley et al. 2012).

3. Research Method

3.1 Research design

This research uses a descriptive qualitative research method with a case study approach. This method is chosen because the research explores the knowledge and preparation of schools in implementing the independent curriculum (Kurikulum Merdeka). Descriptive qualitative research aims to describe, explain, and identify empirical factors that influence a specific issue, such as phenomena, beliefs, or attitudes (Suardi 2017). Such case studies can elucidate occurrences or phenomena by describing the case at hand (Hodgetts and Stolte 2012). The purpose of case study research is to investigate issues and research problems that cannot separate a phenomenon from the context in which it is observed and occurs. The reason for choosing a case study approach is to allow the researcher to understand various facts from the event. The type of case study used here is an intrinsic case study. An intrinsic case study involves deeply studying a case that contains interesting elements worthy of exploration within the case itself (Yona 2006).

3.2 Participants and research instruments

The participants in this study include individuals and groups who serve as information sources for the research and provide relevant data. Specifically, there are 160 students and 4 teachers from both public and private high schools implementing the Kurikulum Merdeka in the city of Garut. Meanwhile, I developed two instruments for this present study. Firstly, I developed questionnaire to reveal how teachers and students implemented Kurikulum Merdeka in physics teaching. Secondly, I set several interview questions to know what students taught and understood in implemnting Kurikulum Merdeka in physics learning. All these data can captured in the Table 1, Table 2, and Table 3.

3.3 Data analysis

The data analysis method used for the survey results includes descriptive statistical analysis, which involves calculating averages or percentages (Saraswati et al. 2022). The analysis of questionnaire data is conducted with the assistance of Microsoft Excel. Meanwhile, the interview data is analyzed using thematic analysis (TA). TA is a method of systematically analyzing data by focusing on collecting codes and themes (meanings) and their relationship to the research questions to describe the phenomena occurring (Braun and Clarke 2012). There are several phases for conducting thematic analysis. There were three phases for this situation. Firstly, Phase of familiarization with the material, in this phase, the researcher repeatedly reads copies of the interview transcripts or listens to the audio recordings. Notes are made while reading or listening to highlight potentially interesting topics, which can be comments, transcript annotations, or underlined sections. Secondly, phase of coding, this phase

Table 1. The indicators of questionnaires

Facets	Statements
Use of Teaching Devices	I am involved in participating in both real and virtual experiments related to learning physics.
	I use the internet, dictionaries, and encyclopedias to obtain information on physics materials.
	I use the internet and communicate through other electronic media to discuss physics materials.
	I know and understand books, dictionaries, and encyclopedias optimally for learning physics.
	I use physics textbooks to understand physics.
Project to Strengthen the Pancasila student profile	I provide project designs that will be made.
	I gather information from the internet, books, dictionaries, and encyclopedias as literature for project creation.
	I have a responsive attitude in learning physics.
	I am active in working on projects.
	I ask the teacher when experiencing difficulties in working on projects.
	I am more creative due to project assignments.
	I am happy when discussing with friends during project work.
	I ask and use opinions or ideas in group activities.
	Group activities encourage me in understanding physics materials.
	I understand physics materials through projects and discussions.
Evaluation of teaching activities for Pancasila student profile	I can clearly express opinions about physics concepts in writing or orally.
	I can cooperate with my seatmate after physics lessons.
	I can develop projects and creative ideas in everyday life.
	I am more sensitive to daily events or incidents.
	I can read and understand textbooks independently, the physics concepts in physics textbooks, the internet, dictionaries, and encyclopedias.

Table 2. The list of interview questions for teachers

Aspects	Questions
Aspect of the Use of Teaching Aids	To what extent does the process of learning physics involve or use appropriate teaching aids?
Aspect of the Pancasila Student Profile Strengthening Project	How does the implementation of the Pancasila Student Profile Strengthening Project relate to physics learning?
Aspect of Learning Outcomes of Activities	What skills do students acquire during the Pancasila Student Profile Strengthening Project in relation to physics learning?

involves providing codes that identify information relevant to the research questions and giving brief partial summaries of the information. Thirdly, the phase of development, in this phase, the researcher organizes the codes related to the research phenomenon into themes and explores the relationships between these themes. This phase provides a comprehensive overview of the data and addresses the research questions. If any codes or themes do not fit the overall research, they are either replaced with new topics or discarded (Ikhtiara et al. 2022).

Table 3. The lists of the interview questions for students

Aspects	Questions
Aspect of the Use of Teaching Aids	During the physics learning process, are tudent worksheets, books, and practicals used?
	Are you involved in real or virtual practicals?
	Are you taught or given instructions for practicals?
	Do you understand what is being taught?
	What do you do to understand?
Aspect of the Use of Teaching Aids	How do you determine the title of a project?
	How is a project carried out?
	How do you understand the project you are working on?
	Do you understand physics concepts after completing the project?
Aspect of Learning Outcomes of Activities	After completing the project, what skills do you gain?
	Are you sensitive to events or incidents of physics concepts in everyday life?
	If you do not understand the physics material being taught, how do you try to understand the physics material?

4. Result of the research and discussion

4.1 The implementation of Kurikulum Merdeka in form of quantitative data

In the aspect of using teaching aids, five questionnaire statements were utilized with 160 participants. The analysis results indicated that 92% of respondents agreed and 8% strongly agreed that the process of learning physics within the context of the independent curriculum employs teaching aids. These percentages are based on five statements in the questionnaire themed around Information and Communication Technology literacy. The questionnaire covered topics such as student participation in both real and virtual experiments, the use of the internet as a medium for learning physics, comprehending physics textbooks to the fullest extent, and the use of physics textbooks in the learning process.

The analysis results, which consisted of ten statements and involved 160 student participants, showed that 13% of students strongly agreed and 87% agreed with the implementation of physics learning within the independent curriculum through P5 activities. The percentages obtained in the P5 aspect refer to ten statements in the questionnaire themed around students' communication attitudes, living in the world, and work methods. The questionnaire included topics such as the process of designing the projects to be created, responsiveness in physics learning, group discussions, and the ability for students to express creative ideas.

he analysis of the learning outcomes aspect of P5 implementation, which consisted of five questionnaire statements filled out by 160 student participants, indicated that 9% strongly agreed and 91% agreed with the process of achieving the application of P5 within the context of the independent curriculum. The skills perceived by students included the ability to clearly communicate physics concepts both in writing and orally, collaborate with classmates, develop creative ideas in daily life, relate to physics concepts in events or phenomena, and independently understand physics textbooks. The questionnaire focused on the skills possessed by the students.

4.2 The implementation of Kurikulum Merdeka in form of qualitative data

Based on the qualitative data from the questionnaire results, respondents agreed with the implementation of the independent curriculum. However, data from five students at different schools indicated contrasting themes revealed in the interview results. It was found that teaching aids such as

student worksheets, practicals, and textbooks are rarely used in the physics learning process. In terms of the Pancasila Student Profile aspect, some schools have not yet implemented Pancasila Student Profile activities, and there were themes indicating that after participating in Pancasila Student Profile activities, students had a limited understanding of physics concepts. Regarding the aspect of learning outcomes in the implementation of the Pancasila Student Profile, some themes indicated that students had not yet experienced skill development because they had not engaged in projects. However, students who did participate in Pancasila Student Profile activities demonstrated better collaboration and increased creativity.

Table 4. The result of interview process with students

Aspects	Themes obtained
Aspect of the Use of Teaching Aids	The physics learning process rarely uses worksheets and practicals.
	The absence of a laboratory results in the lack of practical activities.
	Real practicals have been conducted, whereas virtual practicals have never been done.
	Students are taught practical instructions.
	Students' understanding of what the teacher teaches.
	Teaching methods that result in students' lack of understanding.
	Ways to understand practicals include asking friends and teachers.
	Practicals are independently researched and practiced.
Aspect of the Pancasila Student Profile Strengthening Project	Project titles are determined according to the theme, then observed, and subsequently decided upon through group discussions.
	The Pancasila Student Profile Strengthening Project (P5) has not yet been implemented.
	Projects are carried out outside of school.
	Projects are worked on in groups by finding instructions on the internet.
	Projects are done during physics lessons, and students bring tools and materials to school.
	No projects have been conducted in the physics learning process.
	Understanding projects involves reading articles, finding the uses of the project, and discussing with the group.
	Understanding physics concepts after completing the project.
	Lack of understanding of concepts after completing the project.
	No physics elements in project creation and no projects were done.
Aspect of Learning Outcomes of Activities	Ability to collaborate and produce creative projects.
	Skills have not been felt because no projects have been done.
	After studying physics, students develop sensitivity to physics phenomena in everyday life.
	To understand, students look for physics material information on the internet.

ased on the quantitative data obtained, the researcher further confirmed the findings through interviews with four teachers from different schools. The teaching aids developed must be tailored to the conditions of the school, and at the schools where the researcher conducted the study, the implementation of the independent curriculum was at level two or self-directed change. This included themes of adapting project modules from other schools and themes indicating that some project modules had not yet been realized. Furthermore, the Pancasila Student Profile activities were not directly related to physics courses but were mandatory for all educational units. In the Pancasila Student Profile activities, the physics learning process incorporated elements of divinity,

independence, collaboration, respect for differences, and critical thinking. In terms of learning outcomes from the Pancasila Student Profile activities, students demonstrated critical thinking, creativity, independence, and cooperation.

Table 5. The themes obtained from interviews with teachers

Aspects	Themes obtained
Aspect of the Use of Teaching Aids	The limitations of physics equipment and teaching aids are made according to the school's conditions.
	Adapting project modules from other schools.
	Project module learning activities have not been realized.
Aspect of the Pancasila Student Profile Strengthening Project	The implementation of the Pancasila Student Profile Strengthening Project in physics learning has not been carried out because it is not related to physics.
	The Pancasila Student Profile activities in the physics learning process involve divinity, independence, collaboration, critical thinking, and creativity.
Aspect of Learning Outcomes of Activities	The skills students possess after participating in the Pancasila Student Profile include the ability to think critically, be creative, independent, and cohesive.

5. Discussion

The aim of this study is to analyze the implementation status of the independent curriculum in high schools. From the research findings, it is revealed that students strongly agree with a percentage of 9%, and those who agree with a percentage of 91% in the process of learning physics within the context of the independent curriculum using teaching aids. However, after conducting in-depth interviews with teachers, it was found that some parts of the project modules were modified from other schools, and physics textbooks were not realized due to school conditions. Students mentioned that in the process of learning physics, textbooks and practicals are rarely used, while student worksheets are not used in the physics learning process.

These findings are compared with the 21st-century skills identified, which focus on the use of information technology and computers for competency assessment (Binkley et al. 2012). Significant improvements recognize that information technology and computers have the potential to carry out large-scale testing and evaluation procedures, easily providing feedback to students. For example, many multiple-choice tests in various fields of study are conducted online. The focus is on testing thinking skills and processing information among students, memory, and on the reproduction of facts and information. Using online tests would be cost-effective and time-saving. However, concerns about the regulation of online skills assessment are related to security, fraud, validity, and reliability.

Furthermore, in terms of textbooks in the learning process, which are inadequate and lack references, this impacts the way physics material is delivered, which is incomplete and not in line with the context of the independent curriculum. In this context, the freedom to learn that teachers use to teach physics in class is not fulfilled. This is consistent with previous research findings that "the constraints of implementing the independent curriculum in schools are the lack of references where textbooks are incomplete and not in line with independent learning, the lack of experience of teaching staff (teachers), and there are still teachers who do not accept updates related to technology (Suryani, Muspawi, and Aprillitzavivayarti 2023).

In the aspect of the Pancasila Student Profile Strengthening Project, students agree with a percentage of 13% and strongly agree with a percentage of 87% that the process of learning physics within the context of the independent curriculum using projects. However, schools have not fully implemented Physics projects in the implementation of the Pancasila Student Profile Strengthening Project and will be carried out in the next semester. After conducting research in various schools,

one school implemented the Pancasila Student Profile Strengthening Project in physics learning activities by creating posters with different themes for each group. When compared with the research conducted based on identifying 21st-century skills (Binkley et al. 2012), students are able to be proficient in language skills, have a willingness to work hard in a team to produce products, and have sensitivity to cultural differences and resistance to stereotypes. In addition, students are also required to have responsive characteristics in the learning process.

Then, when viewed from the aspect of learning outcomes of the Pancasila Student Profile Strengthening Project activities, students express strong agreement with a percentage of 9% and agree with a percentage of 98% towards achieving physics learning within the context of the independent curriculum. However, in the interview results, students expressed that they have not yet felt the skills and success of implementing the independent curriculum. This is consistent with the interview results of teachers who mentioned that students have critical thinking skills, independence in completing tasks, creativity, and cooperation. This contrasts with the statements of students who mentioned a lack of understanding of physics concepts and feeling lacking in skills because they have not implemented these projects. When compared with the context of 21st-century learning conducted, the principles of 21st-century learning assessment are that students must be able to adapt to technological changes, work independently, interact effectively with others, work in teams, and demonstrate integrity and self-directed action (Binkley et al. 2012).

6. Conclusion

Referring to the research theme and the analysis of questionnaire and interview data processing, the implementation of the independent curriculum in physics learning activities in high schools can be seen from three aspects: the aspect of Teaching Materials, the aspect of the Pancasila Student Profile, and the aspect of Learning Outcomes. In the context of the aspect of Teaching Materials, empirical evidence shows that the use of teaching materials such as textbooks, student worksheets, and practicals is still rarely used in the physics learning process, and the creation of project modules is modified from other schools, as well as being tailored to the school's conditions and some are not yet realized. In the context of the Pancasila Student Profile Strengthening Project aspect, schools have already implemented this program separately from the Physics lesson. However, in physics learning, character education is still conducted in accordance with the Pancasila Student Profile. In the context of the learning outcomes aspect of the Pancasila program, students have critical thinking skills, independence, and collaboration, while some have not yet experienced these skills.

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