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Analyzing the Implementation of Kurikulum Merdeka: Insights from Chemistry Educators in Gunung Kidul Vocational Schools

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Abstract: The implementation of Kurikulum Merdeka, a crucial education initiative introduced by the Indonesian government to enhance national education quality, is particularly significant in Vocational Schools (Sekolah Menengah Kejuruan/SMK). These schools play a strategic role in preparing students with relevant skills for the workforce. Chemistry educators in vocational schools could develop alternative learning materials aligned with the latest curriculum standards through the implementation of Kurikulum Merdeka. This qualitative descriptive study employed a survey method, utilizing a specially designed questionnaire to measure the perspectives of chemistry educators regarding Kurikulum Merdeka. The survey involved 32 diverse chemistry teachers in SMKs across Gunung Kidul who had implemented Kurikulum Merdeka. Results indicate a strong commitment among educators to curriculum updates and alignment with student needs. While positive progress is noted in implementing a differentiated learning approach, attention is needed to provide additional programs for students struggling with understanding materials. Moreover, sustained efforts are required for effective community engagement and the development of a structured framework for data-based interventions. Overall, this study provides valuable insights into the challenges and opportunities of implementing Kurikulum Merdeka in vocational schools, offering recommendations for improvement.

Keywords: Chemistry teacher; Implementation of kurikulum merdeka; Vocational school

Introduction

Kurikulum Merdeka is an important educational initiative introduced by the Indonesian government with the aim of improving the quality of education nationally. Kurikulum Merdeka offers various types of learning aimed at ensuring that students have adequate opportunities to explore various concepts and enhance their skills (Dasmo et al., 2023). In the implementation of Kurikulum Merdeka, teachers are a key element responsible for teaching and guiding students to achieve the desired competencies (Dewi et al., 2022).

Vocational schools, also known as Sekolah Menengah Kejuruan (SMK) in Indonesia, play a strategic role in the education system as they aim to prepare students with relevant skills for the workforce. This is supported by academics and policymakers in Indonesia, indicating a significant focus on implementing an education approach that emphasizes competency mastery in vocational schools (Misbah et al., 2020). Therefore, the understanding and participation of teachers in implementing Kurikulum Merdeka, particularly in the field of chemistry, are crucial.

Gunung Kidul, a regency located in the Special Region of Yogyakarta, is an example of an area where Kurikulum Merdeka is being implemented. The research findings by Fatah et al. (2022) demonstrate that although most teachers in State Vocational Schools (SMK) in Gunung Kidul have a good understanding of Kurikulum Merdeka, their readiness in developing the

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curriculum and teaching modules still needs improvement to ensure the success of the implementation of Kurikulum Merdeka. The Gunung Kidul region serves as an important representation in the application of Kurikulum Merdeka, but special attention is required to enhance teachers' preparedness in curriculum development and teaching module creation to achieve the desired objectives.

To achieve the national education targets, the government continues to strive to enhance the quality of education through changes in the educational curriculum, aiming to improve and expand the existing curriculum (Pakpahan et al., 2023). Kurikulum Merdeka, introduced by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) in 2022, exhibits distinct characteristics from the previous curriculum. Kurikulum Merdeka emphasizes the needs and interests of students while granting educators the freedom to develop creative and innovative learning approaches. Active participation of educators in curriculum development is key to the success of schools and the effectiveness of educational programs, which encompass the philosophy, objectives, targets, learning experiences, teaching resources, and appropriate learning assessments (Setiawan et al., 2023).

One of the main goals of Kurikulum Merdeka is to enhance the quality of vocational education in Indonesia. Vocational education aims to prepare students for the workforce, and this curriculum is designed to ensure that students are equipped with relevant skills and competencies needed in the job market. Vocational high school students require quality educators to enhance their abilities and skills. The competencies of vocational school graduates should be aligned with the demands of the job market to reduce the unemployment rate among vocational school graduates (Rahmadhani et al., 2022).

Teachers are key actors in curriculum implementation. They play a crucial role in designing learning focused on students' competencies and needs. Various studies have highlighted the importance of teachers and adequate support in curriculum delivery. According to Karakuş (2021), teachers need to have a good understanding and interpretation of the curriculum as well as master the application of curriculum materials for effective implementation. Teachers not only act as implementers of the curriculum but also are responsible for integrating the curriculum with students' characteristics and needs. Additionally, teachers have an obligation to test curriculum materials, evaluation strategies, and teaching methods (Alek et al., 2021).

Chemistry teachers in vocational schools play a crucial role in implementing Kurikulum Merdeka. They must understand the specific characteristics of this curriculum and design learning that aligns with this approach to ensure that students derive maximum benefit from their educational process. Chemistry teachers in vocational schools could develop alternative learning materials that align with the latest curriculum standards through the implementation of Kurikulum Merdeka (Witri et al., 2023).

Previous research has revealed that the implementation of Kurikulum Merdeka in vocational schools poses its own challenges. Factors such as lack of resources and teacher training can influence the execution of this curriculum. Challenges in understanding curriculum-related materials, as expressed by teachers and students, are due to limited access to textbooks or appropriate reference materials. Therefore, it is essential to create an engaging learning environment and ensure the availability of textbooks that align with the latest curriculum (Kartini et al., 2022).

Recent studies have attempted to understand teachers' perspectives on Kurikulum Merdeka. The results vary, with some teachers viewing it as an opportunity to enhance learning, while others express concerns about additional workload or implementation challenges. Kurniawan et al. (2022) convey that Kurikulum Merdeka provides an opportunity for teachers to support effective and straightforward learning in line with the rapid technological advancements. However, according to Putu et al. (2022), in practice, teachers feel the need for regular socialization, clear guidance, and innovative spaces that align with their capabilities and personal characteristics in the school environment.

This study brings several novelties and significant contributions to vocational education and the implementation of Kurikulum Merdeka. Firstly, the research focuses on the vocational education in Gunung Kidul, an area with unique characteristics and challenges in implementing Kurikulum Merdeka (Yudianto et al., 2022). Furthermore, the study explores the perspectives and understanding of chemistry teachers, who are a key group in the curriculum implementation. This provides a specific perspective from individuals directly involved in teaching chemistry in the vocational education setting. The perspective of chemistry teachers may not always have been explored in-depth in previous research, although according to Farwati et al. (2022), chemistry teachers are aware that curriculum changes are a common and frequent occurrence.

The research has an urgency to provide in-depth insight into the implementation of the Independent Curriculum at vocational schools in Gunung Kidul. By focusing attention on the key role of chemistry teachers,

this research details the challenges and opportunities teachers face in adapting to the new curriculum. The unique area of Gunung Kidul also provides confirmation for understanding the local adaptation of the Independent Curriculum. This research has the potential to make a significant contribution to improving the quality of vocational education.

Based on this background, this study aims to analyze the implementation of the Kurikulum Merdeka from the perspective of vocational chemistry teachers in the Gunung Kidul area. The aims are also to identify obstacles and challenges faced by teachers in the implementation of this curriculum, as well as to recognize opportunities and develop recommendations that can improve the implementation of the curriculum in vocational education.

Method

This research was conducted using a qualitative descriptive approach through a survey method. The qualitative research method is an engaging and flexible approach with diverse applications, providing benefits for both researchers and respondents (Braun et al., 2021). The study involved the participation of chemistry teachers teaching at Vocational Schools (SMK) who have implemented Kurikulum Merdeka and were categorized as Mandiri Belajar, Mandiri Berubah, and Mandiri Berbagi in the Gunung Kidul area. The participation of these teachers is crucial as they play a primary role in the curriculum implementation and the teaching of chemistry subjects.

The main instrument used in this study was a questionnaire specifically developed to measure the views and understanding of chemistry teachers regarding Kurikulum Merdeka. The questionnaire included 19 items reflecting five aspects relevant to the Implementation of Kurikulum Merdeka. Prior to use, the questionnaire underwent a validation process to ensure that the instrument was effective in measuring the desired variables. Additionally, a reliability test was also conducted to ensure the consistency and reliability of the data obtained from the questionnaire.

The data collection process was conducted through a survey approach, where the questionnaire was distributed to chemistry teachers who were respondents in various vocational schools in Gunung Kidul that had implemented Kurikulum Merdeka. The survey results were analyzed descriptively to depict the characteristics of the respondents and analyze relevant findings. These analytical results were used to identify barriers, challenges, and recommendations related to the implementation of Kurikulum Merdeka by chemistry teachers in vocational schools in Gunung Kidul. In summary, the following Figure 1 illustrates the flow of this research.

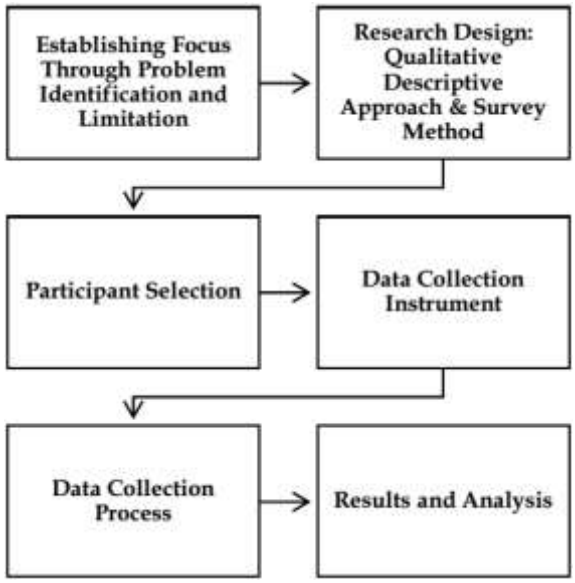

Figure 1. Research flow

Result and Discussion

A survey has been conducted on 39 Vocational Schools (SMK) in the Gunung Kidul region that have implemented the Kurikulum Merdeka categorized as Mandiri Belajar, Mandiri Berubah, and Mandiri Berbagi. Mandiri Belajar refers to schools that use the 2013 curriculum but have started implementing the principles of Kurikulum Merdeka to enhance the quality of learning. Mandiri Berubah indicates the full use of the Merdeka Mengajar platform provided by Kemendikbudristek. Mandiri Berbagi is awarded to schools that are prepared and have implemented many best practices in the development of learning materials (Sulistyani & Mulyono, 2022).

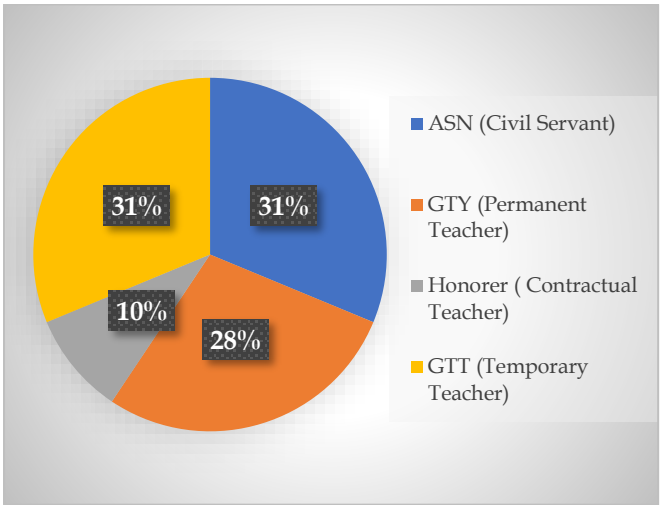

Figure 2. Respondents' status

Of the total, 11 of them are public vocational schools, while the remaining 28 schools are private schools. The survey involved 32 chemistry teachers with diverse demographics, consisting of 11 male teachers and 21 female teachers. Based on their status as shown in Figure 2, respondents consisted of various types of teaching staff, namely 10 civil servants, 10 temporary teachers, 9 foundation permanent teachers, and 3 contractual teachers. The age range of the respondents ranged from 23 to 57 years, while their teaching experience varied from 1 to 26 years.

There are five main aspects measured to assess the implementation of Kurikulum Merdeka in Vocational High Schools (SMK) in the Gunung Kidul region from the perspective of chemistry teachers. The first aspect focuses on efforts to update the operational curriculum of educational units, which requires deep adjustments and strong understanding of the principles of Kurikulum Merdeka. The operational curriculum in educational units is a curriculum that contains the entire learning process carried out in educational units, as a guide for the overall implementation of learning (Sumandya et al., 2022).

The suitability of the simple lesson plan (RPP) descriptions and teaching modules is also an important consideration to ensure that the chemistry learning materials are well integrated in line with the vision of Kurikulum Merdeka. RPP and teaching modules are designed to assist teachers in independent and self-directed learning, which is the core principle of Kurikulum Merdeka. The development of RPP and Teaching Modules is important in the implementation of Kurikulum Merdeka and the operational curriculum in educational units (Mukhlishina et al., 2023).

Meanwhile, the implementation of the Strengthening the Profile of Pancasila Students Project (P5) is also a primary focus, emphasizing the challenges in integrating this project into daily learning, especially in chemistry education. This aspect underscores the importance of more targeted strategies to ensure the seamless integration of the project into the curriculum and teaching. According to Danial et al. (2023), the integration of Pancasila values into chemistry education can be effective in developing character and ethics in students.

Furthermore, it is also necessary to ensure that the learning is tailored to the students' achievement levels, which requires a careful differentiation approach to meet the needs and potentials of each student. Pozas et al. (2021) emphasize that differentiated instruction is an effective way to achieve inclusive education and support academic learning and social and emotional development for all students. Lastly, the aspect related to solving data-based school education reports aims to emphasize the need for careful assessment of students' learning outcomes. In summary, Syamsuddin et al. (2023) state that data-based educational reports can be used to measure the quality of education, identify gaps in student achievement and services, and plan improvements based on the 8 national education standards.

The first aspect of this study discusses the involvement of educators in efforts to update the operational curriculum of the education unit. To measure this aspect, an analysis of the survey results has been carried out. Survey responses are divided into five levels, ranging from "Always" to "Never." In general, the survey results can be seen as shown in Figure 3.

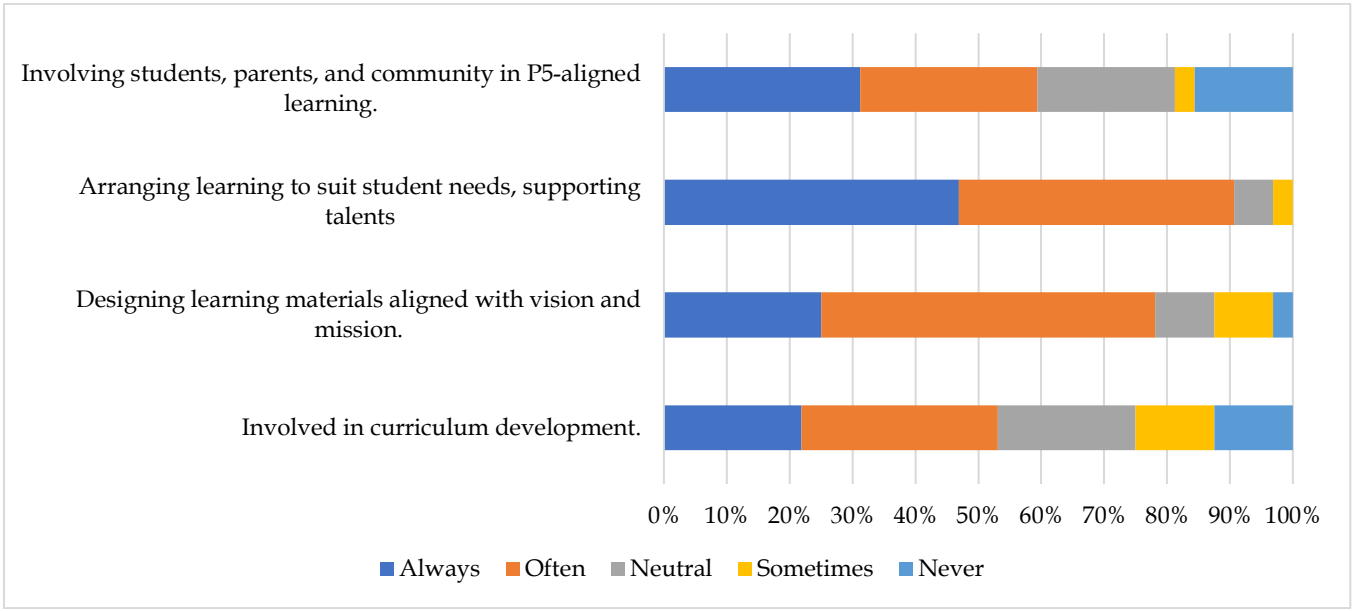

Figure 3. Updates on operational curriculum of the education unit

Figure 3 shows that most educators are actively involved in curriculum development. About 21.88% of respondents stated that they are "Always" engaged, and 31.25% responded that they "Often" engaged. This reflects the strong commitment of educators to the curriculum development process.

When it comes to designing learning materials that align with the school's vision and mission, a significant number of educators, 25.00%, state that they do this "always." Additionally, 53.13% responded that they did it "Often." This shows a strong commitment from educators to ensure that learning materials are in line with the objectives of the education unit.

Based on Figure 3 it is also revealed that most educators, i.e., 46.88%, "Always" organize learning according to the needs of students and support their talents. A total of 43.75% responded that they do this "Often." These findings demonstrate educators' commitment to providing tailored learning experiences for students, ensuring that their needs and talents are recognized and developed.

The last dimension of this aspect is related to the involvement of students, parents, and the community in P5-related learning. The survey results indicate that 31.25% of educators are involved in this aspect "Always," while 28.13% do so "Often." Collaborative efforts with students, parents, and the community are crucial to achieving the goals of Kurikulum Merdeka. Paccaud et al. (2021) emphasize that effective collaboration between educational institutions and families can foster an environment that enhances students' emotional well-being and academic achievement.

In summary, the survey results indicate that chemistry educators in Gunung Kidul vocational schools demonstrate strong commitment to the first aspect of this study, which focuses on the renewal of the operational school unit curriculum. Their active involvement in curriculum development, instructional material design, and support for students' needs and talents reflects their dedication to the principles of Kurikulum Merdeka. This level of commitment is a positive sign for the successful implementation of the Kurikulum Merdeka. This is consistent with research by Gerard et al. (2022), which reveals that teachers' engagement in the curriculum adjustment and testing cycle can facilitate practical knowledge development through the design, testing, and reflection on learning.

The second aspect of this study discusses the importance of ensuring the suitability of simple RPP teaching tools and teaching modules to the needs and interests of students. The survey results showed responses from educators based on five levels, ranging from "Always" to "Never." Figure 4 shows the survey results regarding the suitability of descriptions of simple RPP teaching tools and teaching modules to student needs and interests.

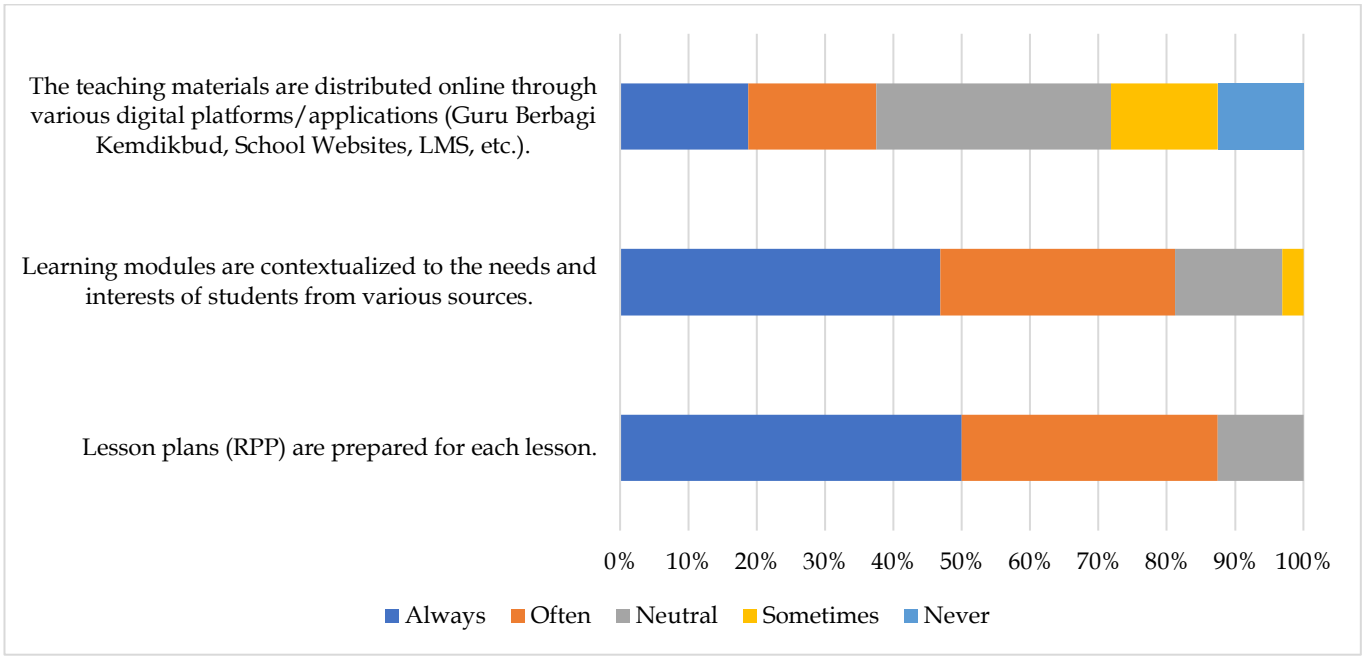

Figure 4. Suitability of RPP and teaching modules to student needs

From the survey results, most educators, as many as 50.00%, stated that they "Always" prepare lesson plans for every lesson. In addition, 37.50% of respondents indicated that they do it "Often." This shows a strong commitment from educators in preparing structured and detailed lesson plans. Figure 4

also shows that 46.88% of educators stated that they "Always" contextualize learning modules according to students' needs and interests from various sources. Additionally, 34.38% stated that they do it "Often." These findings demonstrate educators' awareness of the importance of ensuring that learning materials are relevant and engaging to students.

Meanwhile, the survey results also indicate that the distribution of instructional materials through various digital platforms or applications varied. Only about 18.75% stated that they "Always" distribute these materials online, while another 18.75% reported doing so "Often." Additionally, several respondents (34.38%) gave a "Neutral" response in this regard. These findings suggest that there is room for improvement in terms of disseminating instructional materials online through digital platforms. Jawahir et al. (2022) emphasize that the Guru Belajar and Berbagi platforms are online platforms that enable teachers to share their knowledge and experiences. Both platforms have received positive feedback from users in enhancing continuous professional development.

Thus, from the results of this survey, we can observe the commitment of the educators to the second aspect of this research, which emphasizes the importance of the suitability the simple lesson plan (RPP) descriptions and teaching modules with the needs and interests of the students. This is consistent with the findings highlighted by Nursuhud et al. (2019), underscoring the importance of aligning the descriptions of simple lesson plans, teaching tools, and learning modules with the needs and interests of the students to achieve successful learning outcomes.

The commitment of chemistry teachers is evident through their efforts in structuring the RPP, contextualizing the learning modules, and their endeavors in distributing learning materials through digital platforms. Aligning the learning materials with the students' needs is a crucial step in ensuring the effective implementation of Kurikulum Merdeka. Teachers should develop plans, teaching tools, and learning programs within the Kurikulum Merdeka, as it is one of their responsibilities to execute the curriculum in meeting the students' needs (Supriatna et al., 2023).

The third aspect focuses on the implementation of the Pancasila Student Profile Strengthening Project (P5). The results of the questionnaire illustrate different levels of involvement of chemistry teachers in several indicators. An overview of the survey results is shown in Figure 5.

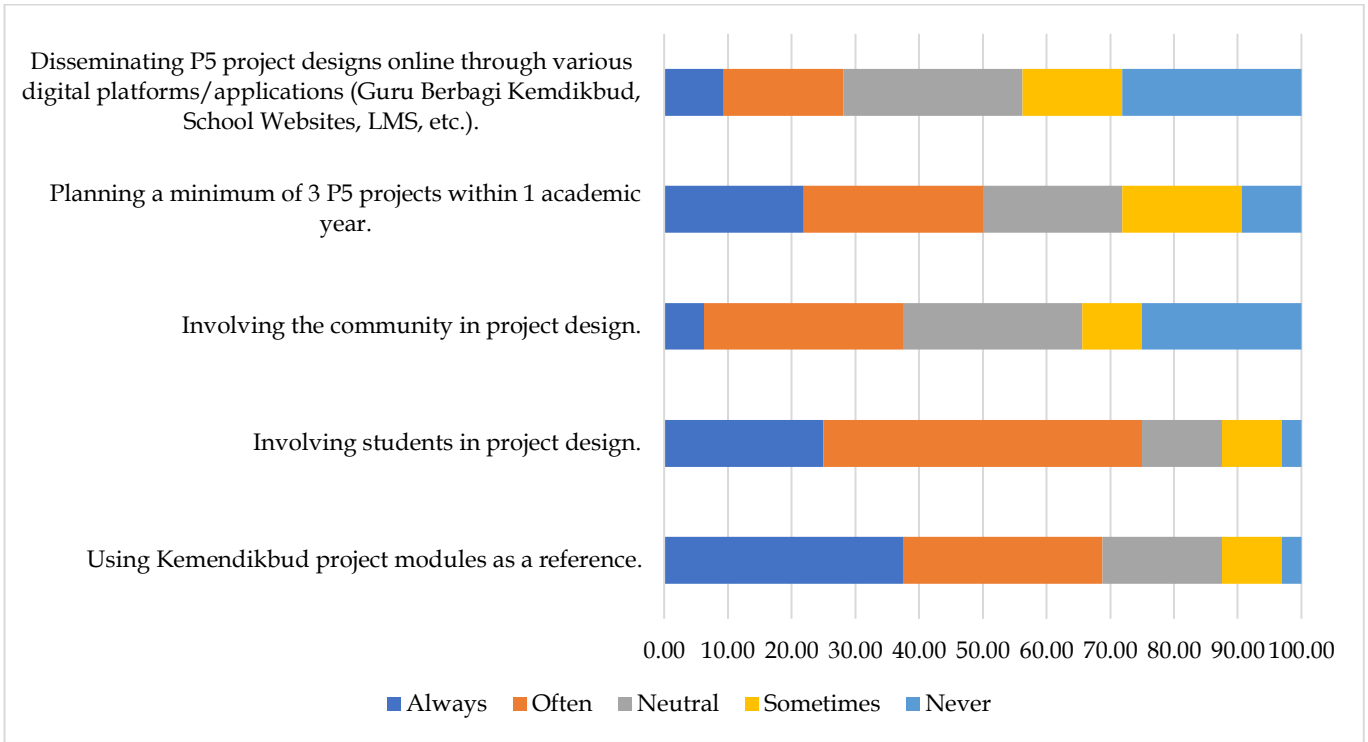

Figure 5. Implementation of pancasila student profile strengthening project

Based on Figure 5, most respondents (37.50%) stated that they always use the project module of Kemendikbudristek as a reference in learning. This shows a positive indication that chemistry teachers at vocational schools in Gunung Kidul support the Strengthening Pancasila Student Profile Project (P5) by adopting materials provided by the Ministry of Education and Culture. Most chemistry teachers

(50.00%) stated that they often involve students in project design. This illustrates a positive signal that teachers involve students in decision-making and project making, which is in line with the participatory spirit of the Kurikulum Merdeka.

The next indicator highlights the lack of community involvement (with only 6.25% always involving the community) in project design, which is something that needs attention. However, Kurikulum Merdeka provides significant opportunities for students to contribute to the community and engage in social activities, while emphasizing the importance of character formation based on Pancasila values (Riyan Rizaldi & Fatimah, 2022). Community involvement is a crucial component of the Kurikulum Merdeka approach and could be a potential area for improvement.

A total of 21.88% of respondents stated that they always plan at least 3 P5 projects in one academic year. While this demonstrates commitment to project implementation, there is room for improvement so that more chemistry teachers can achieve this target. Fahlevi (2022) suggests that teachers should implement at least three of the seven project themes set by Kemendikbudristek each school year, based on current issues relevant to students.

Only 9.38% always distribute the P5 project designs digitally through various digital platforms. However, the government has introduced the Guru Belajar and Berbagi platforms in response to efforts for transforming digital education in Indonesia, aimed at providing support to educators in the teaching, learning, and creative processes (Marisana et al., 2023). This indicates that there is an opportunity to enhance efforts in broadcasting and sharing project outcomes more widely through available digital platforms.

The overall survey results in the third aspect illustrate the diversity in the implementation of the P5 project at Gunung Kidul vocational school. A focus on involving students in project design is a positive thing, but efforts need to be made to better involve the community and increase the distribution of projects online so that the wider community can access and appreciate the results of the project.

The fourth aspect focuses on learning according to the stage of student learning outcomes (differentiated), the results of the questionnaire show the level of involvement of chemistry teachers in adjusting learning to the individual needs of students. In general, the survey results look like in Figure 6.

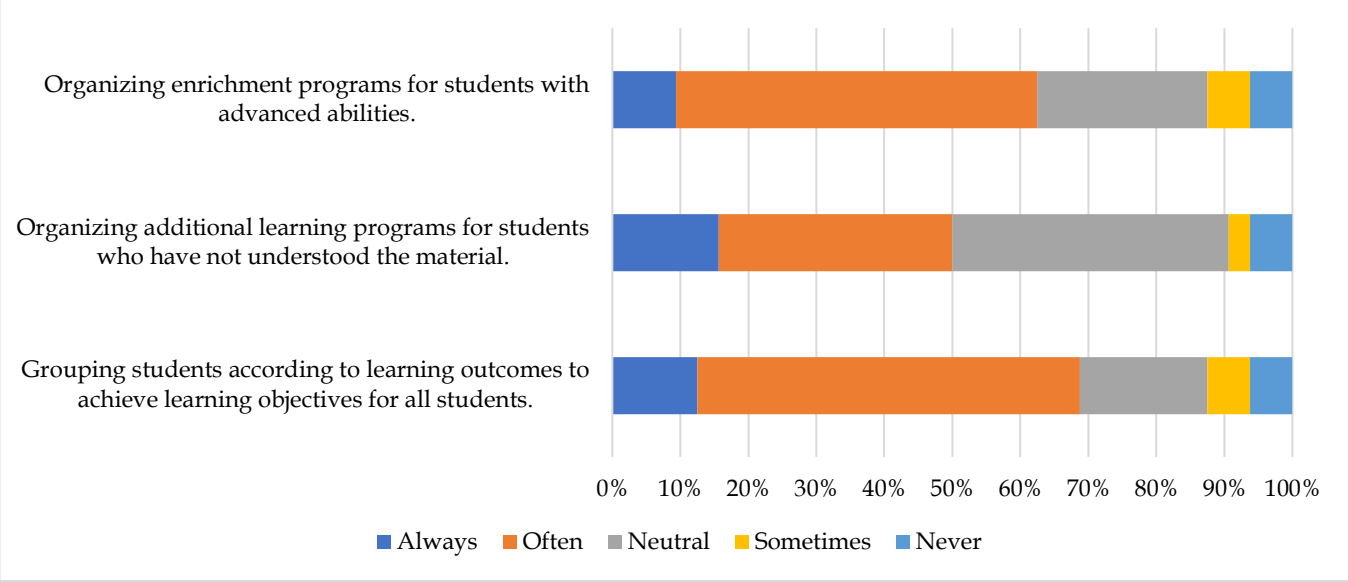

Figure 6. Learning according to the stage of student learning outcomes (differentiated)

Most respondents (56.25%) stated that they often divide students according to learning outcomes to achieve learning goals for all students. This shows awareness of the importance of a differentiation approach in learning, which is a key element of the Kurikulum Merdeka. Most chemistry teachers (40.63%) stated that they were neutral in organizing additional learning programs for students who have difficulty understanding the material. This indicates the need to pay more attention to students who require additional assistance in understanding the learning materials. Cicekci et al. (2019) remind teachers that some students may need additional support, and teachers should provide appropriate interventions to support their development.

Most respondents (53.13%) often organize enrichment programs for students with excellent abilities. This shows the teacher's good attention to

talented students and commitment to providing challenges that work for them.

The survey results demonstrate the chemistry teachers' strong awareness in implementing a differentiated approach to learning. However, there is a need for more attention in organizing additional programs for students who struggle to comprehend the material. Continuous efforts are also necessary to ensure that all students receive appropriate support and challenges tailored to their abilities and needs. Whitehead et al. (2022) highlight that attentive teaching is expected to build caring teacher-student relationships and encourage teachers to be present, listen, and respond to student needs.

The fifth aspect focuses on establishing solutions to solve root problems based on school education report card data. The results of the questionnaire show the level of involvement and proficiency of chemistry teachers in dealing with problems faced by students. In general, the survey results for the fifth aspect are as shown in Figure 7.

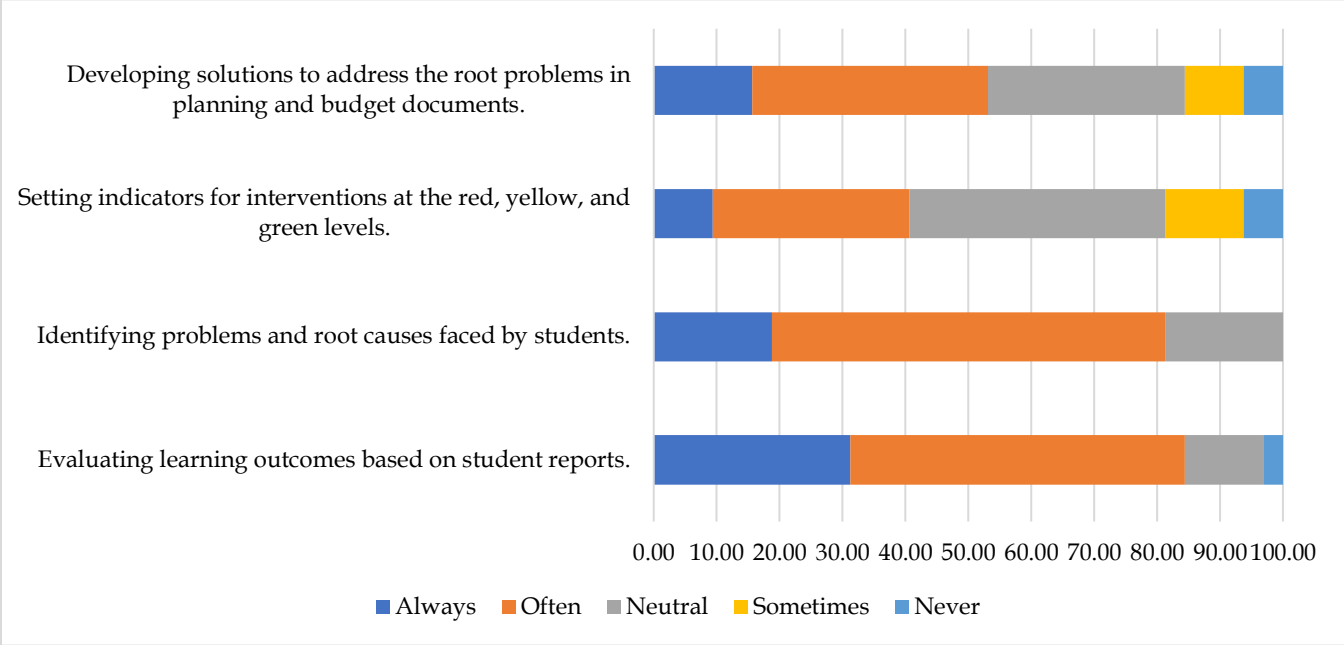

Figure 7. Analysis of data-based solution determination school education report card

Most chemistry teachers (53.13%) say they often evaluate learning outcomes based on student reports. This suggests that evaluations based on student reports are considered important for understanding student performance and identifying areas that require special attention. Most respondents (62.50%) stated that they often identify problems and root causes faced by students. This reflects their sensitivity to the challenges students face and awareness of the importance of addressing problems in depth.

Most chemistry teachers (40.63%) expressed a neutral stance in setting indicators for intervention at red, yellow, and green levels. This indicates the need to pay more attention to frameworks and indicators to address the problems facing students. Most respondents (37.50%) said they often develop solutions to address root issues in planning and budget documents. This shows an awareness of the importance of planning the right solution to address the underlying problem.

The survey results indicate a strong commitment from chemistry teachers to address students' challenges through careful evaluation and identification of the root problems. However, more attention is needed in establishing a framework and indicators for interventions, as well as planning effective solutions to address underlying issues. This aligns with the research by Ståhle et al. (2019), which reveals that teachers need to regularly monitor student participation in class, enhance their abilities to observe and interpret student behaviors, and provide appropriate support to help students overcome obstacles.

Conclusion

In conclusion, the implementation of Kurikulum Merdeka in vocational schools in Gunung Kidul presents both challenges and opportunities. While chemistry teachers exhibit a strong commitment to updating the curriculum and aligning learning materials with students' needs, there are specific areas that demand more profound attention. The execution of the P5 project highlights a focus on student involvement, yet

there is a need for closer community interaction and enhanced online project distribution. Positive progress is observed in the implementation of a differentiated learning approach, though additional programs for students facing difficulties in understanding materials require further attention. While careful evaluation and root problem identification are positive steps, there is a need for clarification in establishing frameworks and indicators for intervention. Sustained efforts are necessary to improve community engagement, develop a more inclusive differentiated approach, and create a structured framework for data-based interventions. These efforts are crucial for ensuring a more effective implementation of Kurikulum Merdeka in vocational schools in Gunung Kidul and enhancing overall student learning outcomes.

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Author Contributions
Conceptualization was conducted by F. M. and I. S., methodology was carried out by F. M. and I. S., validation was performed by I. S., investigation was led by F. M., resources were provided by F. M., data curation was handled by F. M., original draft preparation was done by F. M., and the writing, review, and editing processes were overseen by F. M. and I. S. All authors have thoroughly reviewed and approved the final version of the manuscript for publication.

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Conflicts of Interest
The authors have no conflicts of interest to disclose.

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