

# Teachers' professional competence profile dataset during implementation of *Merdeka curriculum*



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## ARTICLE INFO

Received January 23, 2024

Revised March 11, 2024

Accepted March 16, 2024

### Keywords

*Merdeka curriculum*

Professional competence

Teacher training

Curriculum implementation

Educational quality

## ABSTRACT

The *Merdeka curriculum* serves as a mechanism for enhancing the quality of education in Indonesia. Effective utilization of professional competence among educators can expedite the success of the *Merdeka curriculum*. However, the challenges associated with the *Merdeka curriculum*, as encountered by educators, are multifaceted and demand a high level of professionalism for resolution. This study aims to scrutinize teachers' professional competence concerning the design of learning activities within the *Merdeka curriculum*. It constitutes a quantitative descriptive study involving 205 primary school teachers from Indonesia. A semantic differential scale, administered through a Google Form, was employed to gather data on professional competence, comprising three indicators and 12 questions. The validity of the instrument was assessed using Pearson correlation, and reliability was determined using Cronbach's alpha. This investigation encompassed a series of cluster analysis procedures. The research has yielded significant insights into the professional competence of teachers during the implementation of the *Merdeka curriculum* in Indonesia. The categorization of teachers' professional competence reveals a prevalence of moderate to high competence, with a minority exhibiting low competence. These findings underscore the necessity for attention from governmental bodies and other stakeholders. Prioritizing training and sustainable professional development through collaborative learning communities emerges as imperative. Areas identified for enhancement encompass an understanding of student characteristics and pedagogical methodologies, mastery of learning content, and proficiency in curriculum development and implementation.



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## 1. Introduction

The *Merdeka curriculum* was launched in 2020 as a way to reform the education system in Indonesia. This curriculum is structured with an in-depth understanding of the needs of the current and future world of work [1]. Emphasis is needed on developing 21st-century skills such as creativity, communication, collaboration, and problem-solving [2]–[4]. This curriculum is designed to build positive character and develop a solid personality in students [5]. It fosters values such as ethics, responsibility, honesty, and discipline. The curriculum also involves parents and the community in the educational process to create better support and

understanding [6], [7]. Holistic growth of students can be achieved with the support of good relationships between schools, parents, and society. The high flexibility of the *Merdeka curriculum* gives the teacher space to develop student-based learning [8]. Encourage students to become lifelong learners by developing adaptability and innovation. This condition requires the empowerment of teachers to support the improvement of their professionalism and provide relief for creativity in teaching. Teachers need to be trained to use educational technology to improve accessibility, efficiency, and learning effectiveness. The curriculum emphasizes moral, social, and ethical values, making character education an integral part of the educational process. It also takes into account the needs of students with a variety of backgrounds, talents, and interests. Evaluation in the *Merdeka curriculum* is very holistic, with cognitive, social, and emotional considerations [9].

This ideal condition also has a huge challenge in its implementation. Lack of in-depth understanding from all stakeholders, including teachers, students, parents, and educational institutions, can hinder the success of curricula. The understanding and readiness of teachers to teach in accordance with the new approaches and new devices introduced by the Free Curriculum becomes the homework of the government [10]. Resource constraints, including textbooks, learning devices, and technology, can be an obstacle to optimum implementation of the Free Curriculum [11]. Financial and infrastructure challenges can affect student learning experiences. The evaluation methods used to measure students' understanding and abilities may not always match a more contextual and holistic curriculum approach [9]. It should be ensured that the evaluation tool reflects a curriculum approach that emphasizes 21st century skills development. Not all parents may have an adequate understanding of changes in the curriculum or are not actively involved in the education of their children. *Merdeka's* curriculum must be able to adapt to the cultural, social, and economic diversity of the various regions of Indonesia. The challenge of adapting curricula to local and regional needs may need to be addressed. The professional competence of teachers in the *Merdeka curriculum* should include the skills and knowledge to implement innovative, contextual, and relevant educational approaches to the needs of students [12]. Teachers must have an in-depth understanding of the philosophy, purpose, and principles of the Free [13]. This understanding involves knowledge of approaches that emphasize 21st-century skill development, contextual learning, and the integration of character values. Teachers need to have learning design skills that enable them to design interesting and relevant learning experiences for students [14]. It includes the ability to design tasks, projects, and activities that motivate and support the understanding of concepts in depth. Teachers need to have the ability to integrate technology into their learning [15]. They must also participate in professional development activities relevant to this curriculum.

Some of the problems related to the competence of teachers in Indonesia involve various aspects, from formal education to professional development to working conditions. Not all teachers have an adequate educational background [16], [17]. Many teachers may have qualifications that are less relevant to the subject or level of education they are teaching. Lack of access to training and professional development means that many teachers in Indonesia may have difficulties accessing professional training and development to improve the quality of their teaching [18]. Some schools, especially in rural areas, may be under-equipped with the facilities and resources needed to support the development of teacher competence, such as libraries, laboratories, or technological devices. Management systems at the school or educational district level may not always provide adequate support to teachers, including in terms of curriculum development and the implementation of teaching strategies [19], [20]. The standards of the teacher profession may not always be followed consistently. It can affect the quality of teaching and the teacher's ability to cope with changes in the world of education. Although technology is evolving, not all teachers may be skilled in using technology in the teaching process. This can affect student involvement and learning relevance. Teacher performance measurement methods may not always be consistent or fair [21]. It can motivate teachers to improve their competence or, on the contrary, create dissatisfaction and a lack of incentives to improve performance. Some teachers may experience excessive workloads, especially those related to administration, examination preparation, and additional tasks outside the teaching process. It can hinder the time and energy that can be invested in professional development. Research Question: How is teacher professional competence in implementing learning on the *Merdeka curriculum* in Indonesia?

## 2. Method

This is a quantitative descriptive study involving 205 primary school teachers in Indonesia. A semantic differential (SD) scale based on a Google Form was used to obtain professional competence data, consisting of three indicators and 12 questions. Semantic differential techniques ask a person to evaluate a subject or subject based on a set of standard bipolar properties (*i.e.*, in the opposite sense), each representing a seven-point scale [22]. The validity of the instrument has been measured with Pearson correlation and reliability with Cronbach's alpha. The statistical significance of the Pearson correlation coefficient can be determined by calculating the p value and comparing it with a chosen significance level (usually 0.05). If the p value is less than the selected significance level, we can conclude that the relationship between the two variables is statistically significant. The results of the instrument validity test can be seen in the Table 1.

**Table 1.** The results of the instrument validity test

Finding	Value	No	Value
Pearson Correlation	.655**	7	.774**
Sig. (2-tailed)	.000		.000
Pearson Correlation	.765**	8	.823**
Sig. (2-tailed)	.000		.000
Pearson Correlation	.851**	9	.836**
Sig. (2-tailed)	.000		.000
Pearson Correlation	.901**	10	.848**
Sig. (2-tailed)	.000		.000
Pearson Correlation	.779**	11	.772**
Sig. (2-tailed)	.000		.000
Pearson Correlation	.745**	12	.902**
Sig. (2-tailed)	.000		.000

Table 1 show that all stated questions are valid with a sig value < 0.05 or a count greater than 0.361 (N = 30,  $\alpha = 5\%$ ). The number of respondents involved in testing the reliability of this instrument was quite large, namely 112 people. This is considered a good enough number to assess reliability with Cronbach's alpha. Reliability calculations show that the Cronbach's Alpha coefficient is 0.948, it means that the instrument has an adequate level of reliability (> 0.7). This study involves a series of cluster analysis processes consisting of several methodological steps. The first step involves gathering data through a Google Form to assess the competencies, characteristics, and curriculum relevant to a teacher. Once the data is collected, the next step is to preprocess the data to prepare it for cluster analysis. Descriptive analysis follows this procedure to give a general overview of the teacher's situation based on the available datasets. After conclusions are drawn from the descriptive analysis, the next step is to conduct a cluster analysis. To determine the optimal number of clusters, the elbow method is employed, allowing for the identification of the best cluster count based on the available data. Once the number of clusters is determined using the Elbow method, the subsequent process involves implementing the K-means clustering method. This method categorizes data based on the closest distance to the cluster center, thereby assigning each data point to a group with a cluster center having the minimum distance from that data point. The final step of this research involves analyzing the cluster outcomes. At this stage, the grouping results are studied in depth, identifying the characteristics of each member within each cluster.

## 3. Results and Discussion

The professional competence in this research is directed at three sub-competences, namely knowledge of the learning content and how to teach it, the characteristics and ways of learning of the student, as well as knowledge of the curriculum and the way to use it. In the first part, the descriptive analysis is carried out. The indicators are knowledge of the structure and flow of the content of the field of science (material content), the ability to identify the content that is relevant to the achievement of learning goals, and the capacity to organize the content relevant to learning (concreate/real, abstract, easy, difficult). In 53% of the 205 elementary school teacher respondents in Indonesia, the three indicators were in the category of moderate-low competence, whereas 36% were in high competence and the rest were in low competence. Professional competence in the context of elementary school teaching in Indonesia refers to the

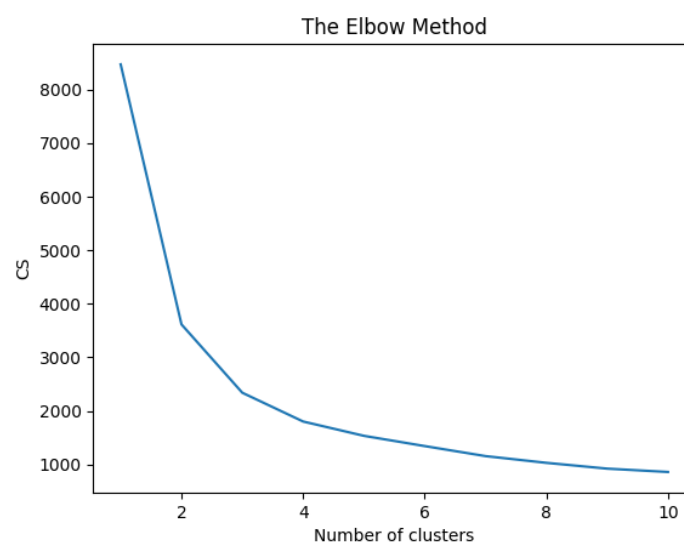
combination of knowledge, skills, attitudes, and behaviors that teachers possess and demonstrate in effectively carrying out their roles and responsibilities in the classroom and school setting. This encompasses various aspects of teaching, including pedagogical knowledge, subject matter expertise, classroom management, communication skills, assessment and evaluation techniques, cultural sensitivity, and professional ethics. Specifically in the context of elementary school teaching in Indonesia, professional competence can be further defined and delineated based on the unique demands and requirements of the educational system, curriculum, and student population.

In the pedagogical aspect, the data is seen in the knowledge of the characteristics and learning methods of the student. There are five indicators that are analyzed: the knowledge of the level of development and the characteristics of the student that are relevant to the learning needs. Second, knowledge about the social, cultural, religious, and economic background of the pupil is relevant to the learning needs of the learner. Third, the ability to explore the potential, interests, and learning methods of the apprentice that are related to learning requirements. Fourth, the capacity to identify the characteristics and ways of learning of the disabled pupil. And lastly, the capability of identifying the diversity of learning needs for inclusive learning. Measuring results showed that 64% of 205 teachers were in the high-competence category, while the rest were in the moderate-low competence category. In the curriculum and instruction aspect, competence is measured based on knowledge of the curriculum and how to use it. The measurement was done during the implementation of the *Merdeka curriculum*. There are four indicators that are being studied, first about the ability to apply curricula in a student-centered learning process. Second is the capacity to apply assessments to enhance student-centered learning. Third, about the ability to implement strategies to improve student-centered learning. Last, about the capability to implement effective learning strategies for student literacy and numeration learning access. Measuring results showed that 76% of the 205 teachers were in the category of low competence, 17% were high competence, and the rest were in the moderate-low competence category. According to the information gathered from the Google Form used to assess the teachers' competence, [Table 2](#) illustrates the teachers' competence in each aspect.

**Table 2.** Descriptive of Lecturer Competences

Aspect	N	Min	Max	Mean	Std
Content	205	9.000000	21.000000	16.653659	2.616323
Pedagogic	205	13.000000	35.000000	26.887805	4.711490
Curriculum	205	8.000000	28.000000	22.800000	3.530539

From the average grade, Competence Lecturers tend to be quite high. The assumption is that the cut off is 15. To be able to see more deeply the grouping of Lecturer Competences profiles, cluster analysis is needed. Cluster analysis results by selecting 3 clusters (based on the Elbow technique), [Fig. 1](#) shows the grouping that occurred using Elbow method.



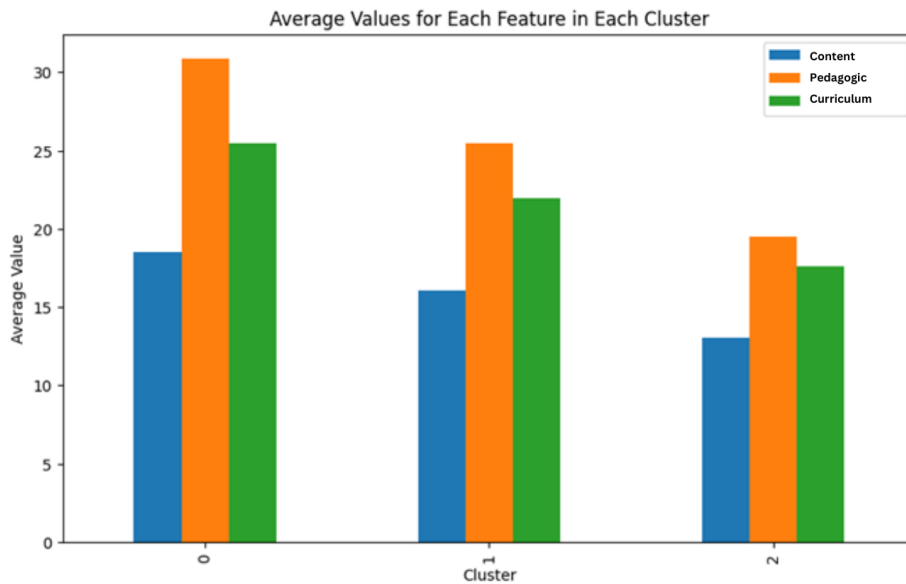
**Fig. 1.** The Number of Cluster Obtained by The Elbow Method

Table 3 shows the grouping that occurred.

**Table 3.** Final Cluster Centers

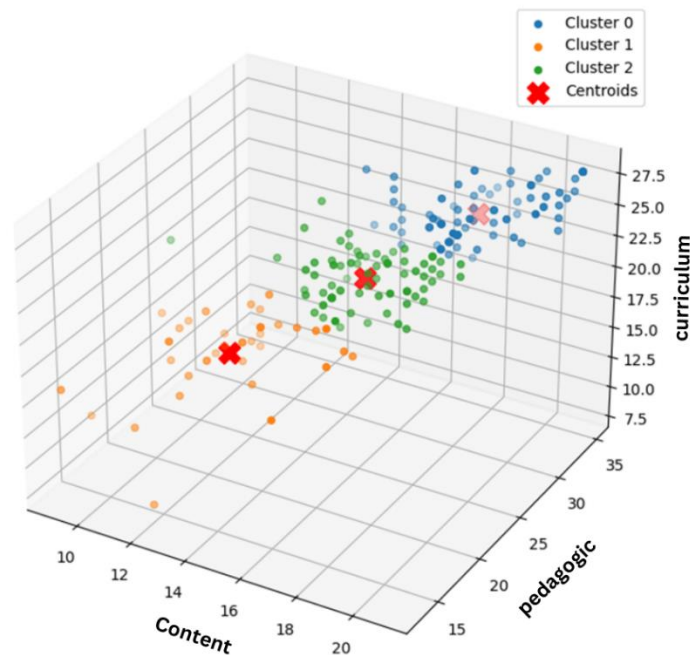
Aspect	Cluster 0	Cluster 1	Cluster 2
Content	18.5	13.02777778	25.45744681
Pedagogic	30.87234043	19.5	17.58333333
Curriculum	25.45744681	25.44	21.97333333

The results of the conversion of Table 2 into a Lecturer Competence grouping graph are Fig. 2. From this figure, there are three groups with different characteristics. The ANOVA test for these three groups had significant differences.



**Fig. 2.** The clustering results

The number of members per cluster is 94 for group 1 (high Competence), 36 for group 2 (moderate-low Competence), and 75 for group 3 (low Competence). Group 3 becomes the most critical cluster to be addressed. The distribution of group members is shown in the following Fig. 3.



**Fig. 3.** The distribution of group members

Teacher competence in learning content refers to a deep understanding of the subject matter or subject being taught [23]. Teachers with good content knowledge have a deep understanding of the lesson material [24]. They not only know basic facts, but also understand more complex concepts and relationships between various topics. The teacher can convey lesson material clearly and easily understood by students. They are able to relate concepts to concrete examples, explain in an interesting way, and respond well to student questions. Teachers who have good content knowledge can teach using various learning methods [25]. They can present information with stories, demonstrations, discussions, or using learning technology. The teacher always follows the latest developments in his field. They update their knowledge regularly and ensure that the material taught remains relevant to the latest developments. This teacher can relate lesson material to real life situations so that students can see its relevance in everyday life. This helps students to better understand and apply the concepts taught. Teachers with good content knowledge have the ability to analyze problems and help students understand how to solve these problems [25], [26]. They can provide effective guidance and motivate students to think critically. The teacher can adapt teaching methods and lesson materials according to students' needs and level of understanding. They are able to present material in a way that is accessible to a variety of student learning styles.

Teachers who understand the character of their students have the ability to know and respect the uniqueness of each student personally [27]. The teacher is open and empathetic to students' backgrounds, needs, and life experiences. They strive to understand students' perspectives and are willing to listen attentively. Teachers build positive personal relationships with their students. They not only focus on academic aspects but also pay attention to students' social and emotional development. Teachers actively observe and understand the strengths, weaknesses, interests, and potential of each student [28]. They engage in careful observation to identify individual student's needs. Teachers understand that each student has a different learning style. They seek to identify students' learning preferences and align teaching methods to support those learning styles. Teachers have the ability to adapt teaching methods according to students' needs and level of understanding [29], [30]. They understand that not all students learn the same way and can modify teaching strategies to meet individual needs. Teachers provide emotional support to students, especially when facing challenges and difficulties. They become reliable and supportive figures for students who need extra guidance. Teachers who understand the character of their students also try to communicate with the students' parents or guardians [31], [32]. They listen to parent feedback, understand the family context, and work together to support student development. Teachers provide academic challenges appropriate to each student's ability level. They not only understand students who excel but also provide additional support to students who may be struggling. If students come from different cultural backgrounds, the teacher strives to understand and respect those differences. They create an inclusive environment that celebrates diversity. Teachers who understand their students' characters are often involved in extracurricular activities or projects outside of class hours, helping them build closer relationships and understand their students' interests and talents.

Teachers who understand the curriculum have a deep understanding of the goals, structure, and content of the curriculum they teach [33], [34]. Curriculum understanding refers to the depth of knowledge and comprehension that educators possess regarding the curriculum framework, content, objectives, and instructional strategies relevant to their teaching context. This includes understanding the scope and sequence of the curriculum, its alignment with educational standards and goals, the intended learning outcomes for students, and the pedagogical approaches recommended for effective implementation. Additionally, curriculum understanding involves awareness of any updates, revisions, or adaptations to the curriculum, as well as the ability to interpret and apply it flexibly to meet the diverse needs of students and facilitate meaningful learning experiences. The teacher has a clear understanding of the educational standards applicable in his region or country. They know the learning goals that students are expected to achieve at various levels of education. Teachers understand the subject matter taught in the curriculum well. They have sufficient knowledge of the core concepts, theories, and practical applications related to the subjects they teach. Teachers have the ability to organize lesson material in a logical and structured manner [35]. They are also able to integrate various concepts and topics to make learning more meaningful and relevant. Teachers choose and use teaching materials that are appropriate to the curriculum [36]. They can assess

the quality of textbooks, learning resources, and other materials to ensure compliance with curriculum standards. Teachers understand the teaching methods recommended or integrated into the curriculum [37]. They know how to apply effective teaching strategies to achieve learning goals. Teachers can adjust the curriculum according to students' needs and level of understanding. They identify students who need more challenge or additional support and design teaching strategies accordingly. Teachers understand the measurement and evaluation process related to the curriculum. They know how to design and implement tests or other assessments to evaluate students' understanding of course material. Teachers can prepare learning plans that are in accordance with the applicable schedule and curriculum [37]. They understand the chronology of learning and organize activities according to learning priorities. They monitor and understand the latest changes or developments in the curriculum. They can adapt their teaching practices to these changes and continue to improve their skills. They are involved in the curriculum update process and participate in curriculum development or refinement at the school or district level.

#### 4. Conclusion

This research produces important findings on the profile of teachers' professional competence during the implementation of the *Merdeka curriculum* in Indonesia. The teachers' professional competence category is half of which is high competence, followed by low competence, and the least is moderate-low competence. This deserves the attention of the government and stakeholders. Training and continuous professional development through learning communities are top priorities. It involves creating structured opportunities for educators to engage in collaborative learning, reflection, and continuous improvement within supportive and inclusive communities. This initiative recognizes the importance of ongoing professional growth and the benefits of collaborative learning environments in enhancing teaching effectiveness and student learning outcomes. The findings from this research can have significant implications for improving the quality of education and learning under the *Merdeka curriculum*. Recommendations resulting from this research include the need for improvements in teacher training, curriculum development, improving educational facilities, or support for the use of technology in teaching.

#### Acknowledgment

The researchers thank the Research Center and Community Service of Universitas Ahmad Dahlan (LPPM UAD) and the Research and Innovation Management Centre (RIMC), Universiti Utara Malaysia, that have supported the funding through the International Research Collaboration Agreement number 27/RIA/LPPM-UAD/VI/2023.

#### Declarations

- Author contribution** : All authors contributed equally to the main contributor to this paper. All authors read and approved the final paper
- Funding statement** : Funding source from International Research Collaboration Agreement number 27/RIA/LPPM- UAD/VI/2023
- Conflict of interest** : The authors declare no conflict of interest
- Additional information** : No additional information is available for this paper

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