

## Analysis of Material Urgency and Main Aspects of the Essential Concept of Natural Science in *Kurikulum Merdeka*

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**Abstract:** Understanding the urgency of the material and the main aspects of the essential concepts of science is very important in learning. This study aims to analyse the urgency of the material and the main aspects of the essential concept in learning Natural Sciences (IPA) in the *Kurikulum Merdeka* at the junior high school level. The *Kurikulum Merdeka* provides flexibility for educators in designing contextual learning that is relevant to the needs of students, so that the selection of essential materials becomes very crucial. This study uses quantitative descriptive analysis with a simple random sampling technique on science teachers in Mataram City. Data was collected through a Likert-scale questionnaire to measure the level of urgency of science materials and the essentiality of aspects of the learning process. The results showed that most of the science materials, such as "Substances and Their Changes", "Life Organization Systems", and "Energy and Its Changes" were categorized as very urgent, with an average score of 3.44. In addition, aspects of the science learning process, such as "science-based problem solving", "science project development", and "science literacy skills", were also considered very essential, with an average score of 3.40. However, there are two materials with a moderate level of urgency, namely "Electricity and Magnetism" and "Human Reproductive System". Meanwhile, only one aspect of learning is considered essential (not very essential), namely "application of science in everyday life". This finding indicates the importance of adjusting the curriculum and learning strategies to ensure optimal achievement of competencies. Recommendations are directed to curriculum developers and educators to focus on materials and aspects of learning that best support students' scientific literacy and 21st-century skills.

**Keywords:** Essential Science Concept, *Kurikulum Merdeka*; Urgency of Material.

### Introduction

The development of education in Indonesia, in line with the demands of the times, which continue to develop, requires adjustments to the curriculum so that it remains relevant to the needs of society and the development of science [1]. Lots of Research that explains the relevance of the Indonesian education curriculum in facing the rapid development of the era and technology. In this case, the curriculum needs to be continuously adjusted to the needs of the world of work and technological developments [2]. The *Kurikulum Merdeka*, introduced in the 2022 school year, is an important momentum in primary and secondary education in Indonesia. This reveals that the *Kurikulum Merdeka*, introduced in 2022, is an innovative step in the development of education in Indonesia, providing flexibility for schools to design learning that is relevant to the characteristics and local needs of students [3]. This curriculum is designed to provide schools with flexibility to design learning that is more relevant and in accordance with the needs of students and the school environment. One of the main focuses of the *Kurikulum Merdeka* is essential material, namely material that is considered the most important for students to master to achieve competencies that are relevant to real-life challenges and industrial developments [4]. The study reviewed the application of essential material in the *Kurikulum Merdeka*, which was designed to ensure that

students master competencies that are relevant to industrial developments and real-life challenges. [5]. An essential analysis of science learning in schools needs to be carried out to find out which essential material is really needed by students, and the material is also adjusted to the needs of students. [6]. Essential materials are important materials or subjects that must be mastered and understood by students, and ongoing materials that exist at all levels of class or phases of education. The application of essential materials in the *Kurikulum Merdeka* is designed to ensure that students master competencies that are relevant to industrial developments and real-life challenges [7].

Science materials have different characteristics and levels of urgency in real-world implementation [8]. The level of urgency of the material is a special concern for subject teachers in providing emphasis and mastery of concepts. In science learning, the urgency of the material greatly influences how students can connect scientific concepts with everyday life [9]. For example, material that is considered more relevant to students' lives, such as climate change or health, often has a higher level of urgency and therefore, is given more priority in the teaching process [10]. Teachers have an important role in determining the urgency of science material. The urgency of the material is studied in depth and then conveyed to students with learning strategies and methods to achieve learning objectives. The achievement of student competencies cannot be separated from the essential

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aspects of the material based on its urgency, which is applied [11]. However, if the teacher does not have the competence in determining the urgency and essentiality of science material, it will certainly be a major obstacle in achieving understanding and implementing science concepts in students' lives.

In responding to the urgency of the material, several methods are applied by teachers in learning to develop student competence. Experiments in science learning have been widely studied by students, teachers, and lecturers to improve student competence. The methods and models applied, and the analysis of their achievement, include implementing PjBL, discovery with laboratory experiments, and PBL with direct observation in the field. Questions in accordance with the research of the Problem-Based Learning Learning model can improve students' critical thinking skills in the sub-topic of regular accelerated linear motion. This strategy provides students with direct experience in applying the material as a manifestation of the urgency of the material being studied [12].

Teachers in determining the urgency and essential aspects of the material are the center of attention of the Mataram City government in educating the nation's children. Research that has been conducted has found that determining the urgency of material in science learning is highly dependent on the context of students' real lives. Material that is considered more relevant to students' daily experiences is understood more quickly and is easier to remember, so it becomes the main priority in teaching [13]. This study shows that the urgency of the material must be based on the analysis of students' needs and the relevance of the topic to their lives. The importance of the urgency and essential aspects of science material is the basis for conducting a field analysis of the role of teachers in determining the urgency of science material and examining the essential aspects applied by teachers in responding to the urgency of the material that has been determined

## Research Methods

This research method uses quantitative descriptive analysis, which aims to describe and analyze the phenomena that occur by utilizing quantitative data. In this study, the data collected is processed statistically to obtain an average value that will be used as a basis for providing a clear picture of a condition or variable being studied. The description resulting from the analysis of this average value explains the meaning or pattern contained in the data, thus allowing researchers to understand more deeply the characteristics or certain tendencies that exist in the research object. With this approach, the results obtained can be understood objectively based on numerical data that describe the phenomenon being analyzed.

The sample in this study consisted of teachers who teach science subjects in Mataram City. Sample selection was carried out using simple random sampling, which is a random sampling method without considering certain characteristics or categories of the population. Every science teacher in Mataram City has an equal opportunity to be selected as part of the research sample, so it is expected that the results of this study can reflect the general situation and provide a representative picture of the condition of science teaching. This random sample selection also aims to reduce

bias and ensure that the data obtained is objective and valid.

Determining the level of material urgency criteria can be seen in the table below.

**Table 1.** Science Material Urgency Criteria Level

Range of values	Criteria
3.26 – 4.00	Very urgent
2.51 – 3.25	Urgency
1.76 – 2.50	No urgency

[14]

The range of values given indicates the level of urgency based on the scores obtained. Values between 3.26 and 4.00 indicate a very high level of urgency, which is categorized as "Very Urgent". Values between 2.51 and 3.25 indicate a high level of urgency, which is categorized as "Urgent". While values between 1.76 and 2.50 indicate a low level of urgency, which is categorized as "Not Urgent". This assessment helps in determining priorities based on the extent to which the topic or aspect is considered important and urgently needed to be implemented or studied.

**Table 2.** Science learning process aspect criteria level

Range of values	Criteria
3.26 – 4.00	Very essential
2.51 – 3.25	Essential
1.76 – 2.50	Not essential

[14]

The range of values given describes the level of essentiality of a topic or aspect. A value between 3.26 and 4.00 indicates that the topic is very important and fundamental, which is categorized as "Very Essential". A value between 2.51 and 3.25 indicates that the topic has a sufficient level of importance, categorized as "Essential". While a value between 1.76 and 2.50 indicates that the topic is considered less important or not very fundamental, which is categorized as "Not Essential". This assessment helps in determining the priority of teaching or attention to a particular topic.

## Results and Discussion

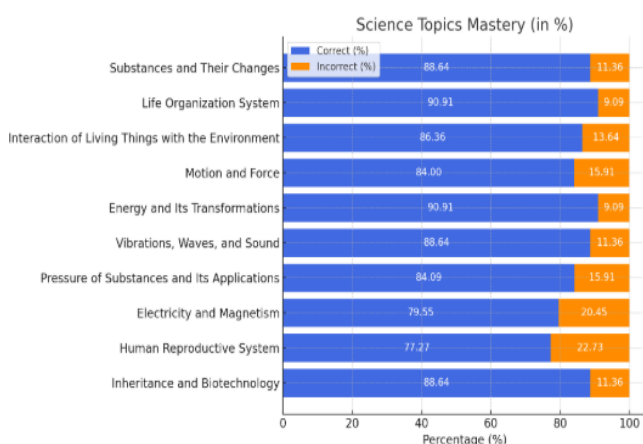
From the research results, the science material in the *Kurikulum Merdeka*, especially at the junior high school level, is identified as having high urgency. Several materials, such as "Substances and Their Changes", "Life Organization Systems", and "Energy and Its Changes", are very urgent to be taught because of their level of relevance to students' daily lives. This material is consistent with existing research, as it expresses the importance of emphasizing the relevance of science material to real life in improving students' understanding [15]. This study also shows that materials related to contextual topics, such as the interaction of living things with the environment, receive high ratings from teachers. This is in accordance with the results of the analysis conducted to see the level of urgency of science materials in junior high schools throughout Mataram City.

The data in Table 1 presents the ranking of essential materials in learning Natural Sciences (IPA) based on the level of urgency. There are several main topics, such as "Substances and Their Changes", "Life Organization

Systems", "Interaction of Living Things with the Environment", and "Energy and Its Changes". Each material is evaluated using an average score (*Average*), which represents the level of urgency based on expert or education stakeholder assessments, with an evaluation scale that produces an average value between 3.36 and 3.64. All materials in this table are categorized as "Very Urgent", indicating that these topics are considered very important and fundamental for students to master to achieve the main competencies of science at the elementary education level. This category provides priority direction in the preparation of the curriculum and the development of teaching materials based on essential learning needs. The following is a percentage of the description of the material that is considered urgent and the same as urgent. The following table shows the percentage of urgency of science material in the learning process.

**Table 3.** The urgency level of science material in junior high schools throughout Mataram City

No	Essential Material	Average	Criteria
1	Substances and Their Changes	3.55	Very urgent
2	Life Organization System	3.64	Very urgent
3	Interaction of Living Things with the Environment	3.45	Very urgent
4	Motion and Force	3.36	Very urgent
5	Energy and Its Changes	3.64	Very urgent
6	Vibrations, Waves, and Sound	3.55	Very urgent
7	Pressure of Substances and Its Applications	3.36	Very urgent
8	Electricity and Magnetism	3.18	Urgency
9	Human Reproductive System	3.09	Urgency
10	Inheritance of Traits and Biotechnology	3.55	Very urgent



**Figure 1.** Percentage of urgency of science material

The Electricity and Magnetism material has the "Urgency" criteria with an average value of 3.18, while the Human Reproductive System material has an average value of 3.09 with the same criteria, namely "Urgency". Electricity

and Magnetism and Human Reproductive System materials have the "Urgency" criteria even though the themes are different because both have a fairly high level of complexity and are important for basic understanding of science. Electricity and Magnetism are important for understanding physical phenomena related to technology, but the concepts are more abstract and less practical in everyday life. The Human Reproductive System is important for health knowledge, but may be considered more theoretical and not directly applied in students' daily lives. In everyday life, Electricity and Magnetism materials are often more technical and focused on physical phenomena needed to understand the development of modern technology [16]. However, this material may not be practised much in students' daily lives compared to some other science materials that are more directly connected to their life experiences. In contrast, the Human Reproductive System is more relevant to aspects of individual life in terms of understanding health and the life cycle [17]. However, due to its more personal and theoretical nature, it may be less prioritized as material that must be mastered in depth at the junior high school level, although it remains important. Both are considered urgent to be studied, although other materials such as Substances and Their Changes are more prioritized because they are more relevant to students' daily experiences.

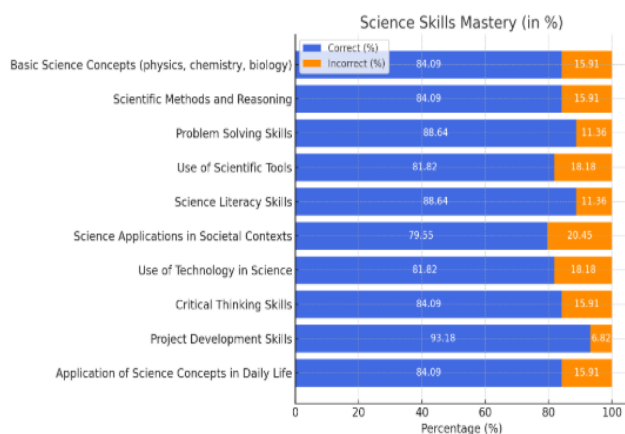
Determining the essential components in the learning process is a crucial step after the essential material has been successfully identified. These components cover various aspects such as learning objectives, delivery strategies, media used, and relevant forms of assessment. Without clarity in determining these components, learning can run without direction and fail to achieve the expected results [18]. Therefore, teachers must be able to design learning holistically and integrately, considering the diversity of needs and characteristics of students [19]. Determining the main aspects in the learning process is very important because from there we can design activities that are appropriate to the conditions of the students. This process allows teachers to adjust the approach and teaching methods so that the essential material to be delivered can be well received by students [20]. Not only that, by paying attention to these important aspects, the learning process becomes more meaningful and effective, and is able to encourage active student involvement in understanding and developing the material being taught [21]. The following table reflects the main aspects that must be adjusted to the learning process in the classroom.

The data in this table contains information about important aspects in learning Natural Sciences (IPA), with an assessment of their level of urgency. Each aspect, such as "Basic concepts of science", "Scientific methods and science experiments", and "Scientific literacy skills", is assessed with an average score (*Average*) ranging from 3.27 to 3.55, indicating a very high level of essentiality. All these aspects are categorized with the label "Very Essential", which indicates that these topics are considered very important and should be prioritized in the science learning curriculum to ensure a strong basic understanding for students. This criterion indicates that the aspects listed in this table should receive primary attention in the preparation of teaching materials and evaluation of science learning, because they play a major role in forming the foundation of scientific knowledge needed by students. The following is the

percentage of essential aspects of the science learning process from essential to very essential levels.

**Table 4.** Main aspects of the science learning process

No	Aspect	Average	Criteria
1	Basic concepts of science (physics, chemistry, biology, geoscience)	3,36	Very essential
2	Scientific method and science experiments	3,36	Very essential
3	Science based problem solving	3,55	Very essential
4	Use of experimental equipment in the laboratory	3,27	Very essential
5	Science literacy skills	3,55	Very essential
6	Applications of science in everyday life	3,18	Essential
7	The use of technology in IPA learning	3,27	Very essential
8	Critical thinking skills in science	3,36	Very essential
9	Science based project development	3,73	Very essential
10	Application of science concepts in the real world	3,36	Very essential



**Figure 2.** Essential aspects of the science learning process

Based on Table 2 regarding the main aspects in the science learning process, there are several aspects that are considered very essential in creating an effective learning experience. One very important aspect is Science-Based Project Development, which received the highest score (3.73) because it provides students with the opportunity to be directly involved in experiments and field studies that connect theory to the real world. In addition, Science-Based Problem Solving and Science Literacy Skills, with scores of 3.55 each, are also considered very essential. These two aspects encourage students to think critically and understand and evaluate scientific information thoroughly. Other very important aspects include Basic Science Concepts, which provide a foundation of basic knowledge in physics, chemistry, biology, and geosciences, and Scientific Methods

and Science Experiments, which teach students systematic ways to conduct research and experiments. Although several other aspects such as the Use of Technology in Science Learning and the Use of Experimental Equipment in the Laboratory received slightly lower scores (3.27), both are still essential because they can enrich students' learning experiences by introducing technology and providing direct experience in using scientific tools. Meanwhile, Application of Science Concepts in the Real World (value 3.36) and Critical Thinking Skills in Science are also important to help students see the relevance of science in everyday life and hone their ability to analyze information. Finally, Application of Science in Everyday Life, although having a slightly lower priority, remains an essential aspect to show that science does not only occur in the classroom, but is also connected to the environment and situations outside of school. By emphasizing these aspects in learning, it is hoped that students can develop more comprehensive and applicable science skills.

## Conclusion

Based on the overall average data, it shows that the science learning material is in the "Very Urgent" category with an average value of 3.44, which indicates that this material is very important and should be prioritized in learning. Meanwhile, for the aspect of the science learning process, an overall average value of 3.40 was obtained with the "Very Essential" criteria, which means that the science learning process is also very important to be developed further. In this study, there are two aspects with the "Urgent" criteria, namely, electricity and magnetism and the human reproductive system. On the other hand, in the aspect of the science learning process, there is one aspect categorized as "Essential", namely the application of science in everyday life, which shows that although important, the application of science in the context of everyday life needs to be given more attention.

## Author's Contribution

Riska Dia Sapitri: contributed to the conceptual framework, analysis of curriculum content, and manuscript drafting. Dian Susanti: contributed to data collection.

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