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ANALYSIS OF THE IMPLEMENTATION OF STEM-BASED MODULES ON PERCEPTIONS OF TEACHER AND STUDENT READINESS DURING THE INDEPENDENT CURRICULUM PERIOD (a Case study at High School No. 2 Kesuma Bangsa)

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Abstract
This research aims to determine the readiness of teachers and students in the implementation of STEM-based modules for class X High School No. 2 Kesuma Bangsa in chemistry subjects. The type of research used is qualitative descriptive research. The population in This research is all class X students at High School No. 2 Kesuma Bangsa, while the sampling technique in this research is saturated sampling. Study This will be implemented in the odd semester of the 2023/2024 academic year. Data collection techniques are in the form of interviews, observations, questionnaires, and documentation. Data analysis determines the level of teacher readiness and student learning readiness in following the chemistry learning process by implementing STEM-based modules and calculating percentage values. The questionnaire then describes the results of the interviews and observations that have been carried out. The results showed that the class X chemistry teacher at High School No. 2 Kesuma Bangsa is ready to teach by obtaining an average score of 95.49, included in the very good category; this is proven by the results of the interviews showing that teachers are capable of developing curriculum and competency standards graduates, and development of learning tools. Class X students' learning readiness in High School No. 2 Kesuma Bangsa obtained an average score of 81.12, included in the very good category. This is proven by observation results, showing that students are ready based on physical, psychological, and material readiness indicators. It can be concluded that the readiness of chemistry teachers and class X students of High School No. 2 Kesuma Bangsa are ready to implement STEM-based modules.

Keywords: *Learning Readiness;STEM Based-Module; Kurikulum Merdeka*

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INTRODUCTION

The government is the highest institution and has the highest authority in organizing the education system [1]. Education is one way to advance and improve the quality of human resources, so education is an important factor that must be attention in national development [2]. The most important part of education is curriculum, and curriculum is seen as instruction, which includes aspects of preparation, implementation, research, and implementation of the teaching and learning process based on the education sector [3]

The presence of the Minister of Education and Culture of the Republic of Indonesia, Nadiem Makarim, inspires. The idea that curriculum change is an independent curriculum learning [4]. This curriculum takes the form of educational plans that enable students to learn independently, be calm and pleasant, not feel pressured, and pay attention to students' skills and interests [5]. An independent curriculum is a curriculum that provides students with the freedom to learn and search. This change will be a challenge for teachers to achieve appropriate learning of their talents freely [6].

At the beginning of the 21st century, the national education system faces serious challenges in preparing good human resources (HR) to compete globally [7]. To equip students with 21st-century skills in the era of the Industrial Revolution 4.0, namely carrying out learning using an approach that can make students think critically (Critical Thinking), creativity (Creativity), collaboration (Collaboration), and communication (Communication). One way to overcome this problem is to learn using the STEM (Science et al.) approach [8]. STEM will help students build their knowledge by combining certain knowledge in one project [9].

Teachers have quite a big influence on learning outcomes [10] Teachers have quite a big influence on learning outcomes [10]. Teacher readiness plays an important role in supporting the implementation of a new curriculum that is ready to be implemented for students at all levels of education.

Students' readiness to participate in the learning process can be seen in physical, mental, emotional, motivation, and knowledge of participating in learning [12]. Teachers face the problem of implementing an independent curriculum at all levels of education. Considering the importance of an independent

curriculum that incorporates various subjects, especially chemistry subjects, efforts need to be made to determine whether this has been implemented. So, the author is interested in researching "Analysis of the Implementation of STEM-Based Modules on Perceptions of Teacher and Student Readiness at High School No. 2 Kesuma Bangsa During the Independent Curriculum Period".

METHOD

Types of research

Research data was collected and analyzed descriptively. Data was obtained through a previously validated questionnaire as the main research instrument, and as research support, interviews were conducted to obtain additional information from the research subjects.

Time and Place of Research

This research was carried out in the odd semester of the 2023/2024 academic year in class X. This research was conducted at High School No. 2 Kesuma Bangsa.

Population and Sample

The population in this study were all chemistry teachers and class X students at High School No. 2 Kesuma Bangsa. The sampling technique in this research was saturated sampling. Saturated sampling is a technique in which all population members are used as samples [13] So, the researchers took samples from chemistry teachers and class X students at High School No. 2 Kesuma Bangsa.

Data Collection Instruments and Techniques

Interview

This research conducted interviews with chemistry teachers by asking questions regarding the teacher's readiness in the learning process.

Observation

The observations in this research aimed at implementing STEM-based modules in chemistry learning. The activity of students was observed by 2 observers and the data was recorded for further analysis.

Questionnaire

The questionnaire in this research was distributed to chemistry teachers and class X students at High School No. 2 Kesuma Bangsa. Both teachers and students were allowed to answer the questionnaire for thirty minutes and the data was then collected and analysed.

Documentation

The documentation carried out is the collection of evidence in the form of images. Documentation is carried out to obtain complete data and activities carried out while conducting research in the field.

Data Collection Instrument

Teacher Readiness Questionnaire Grid

Table 1. Teacher Readiness Indicators

Variable	Indicator	Descriptor
Chemistry teachers' willingness to implement STEM-Based Modules during the curricula implementation period	Curricula development	Independent curricula understanding
	Standard of graduate competency	Student understanding
	Learning tools development	Assembling learning devices
		Learning resources understanding
		Teaching skills and methods
		Evaluation

Source [14]

Student Readiness Questionnaire Grid

Table 2. Indicators of Student Readiness

Aspect	Indicator
Learning readiness	Physical readiness
	Psychological readiness
	Content readiness

Source [14]

Data analysis technique

Data analysis is an activity after collecting data from all respondents or other data sources. The data collected can be through interviews, observations, questionnaires, and documentation. Data collected through interviews, observations, and documentation will be described. Meanwhile, the percentage values of the questionnaire will be calculated using Microsoft Excel [8]

Table 3. Descriptive based on categories

No	Interval	Category
1	X≥Yi + 1.Sbx	Excellent
2	Yi+1.Sbx>X≥Yi	Good
3	Yi>X≥Yi-1.Sbx	Bad
4	X<Yi-1.Sbx	Very bad

Source [20]

RESEARCH RESULTS

Analysis of Teacher Readiness Data Descriptions

The description of the data that has already been collected and the data that actually exists is carried out based on the data collation guidelines and data dissemination guidelines without drawing overall conclusions. The chemistry level readiness of class There are indicators of graduate readiness, namely 1) curriculum development, 2) graduate competency standards, and 3) development of learning tools. Based

on the data obtained, the total score was 77. So, the average score obtained was 95.49, which was categorized as very good.

The results obtained were that the indicator for the development of student education at SMA Nelgelri 2 Kelsulma Bangsa was 93.75 in the "very good" category, the standard indicator for student competency was 95.00 in the "very good" category, and the indicator for the development of learning equipment was 97. Seventy-three items are included in the "very good" category. Based on the data obtained in the research, the results of the rolling readiness survey survey results were as follows:

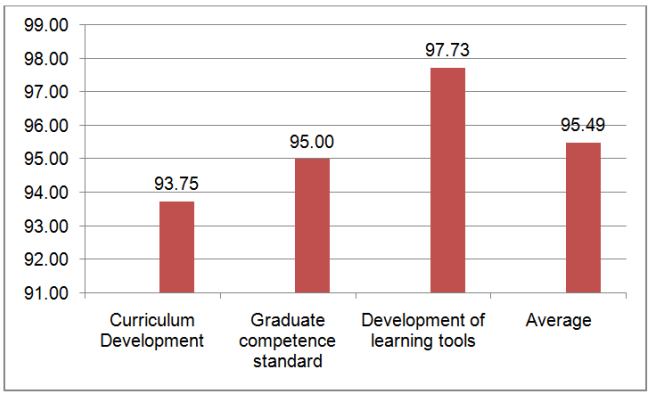

Figure 1. Histogram of Student Teacher Readiness

Analysis of Student Readiness Data Descriptions

The learning readiness of class There are indicators of students' learning readiness, namely 1) physical readiness, 2) psychological readiness, and 3) material readiness. Data regarding students' learning readiness was obtained through questionnaires from 72 samples from 3 classes, including class X.

Based on the data obtained, the total score was 4641. So, the average score obtained was 81.12, which was categorized as very good. The results obtained were that the physical readiness indicator of the personnel at High School No. 2 Kesuma Bangsa was 83.01 in the "very good" category, the readiness indicator was 79.04 in the "very good" category, and the real material readiness indicator was 81.13 in the "very good" category. Category "very good". Based on the data obtained in the research, the results of the student readiness assessment questionnaire were obtained as follows:

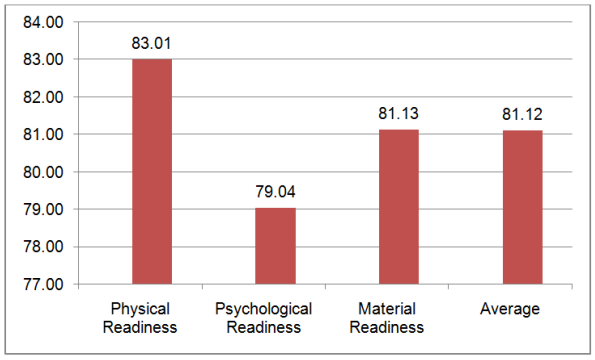

Figure 2. Histogram of Class X Student Readiness

Description of Class X E1 Student Readiness

Data regarding students' learning readiness was obtained through questionnaires from 22 samples. Based on the data obtained, the total score was 1429. So, the average score obtained was 81.78, which was categorized as very good. The results showed that from the indicators of physical readiness, psychological readiness, material and material readiness of students at High School No. 2 Kesuma Bangsa, the student readiness variable was in the following histogram:

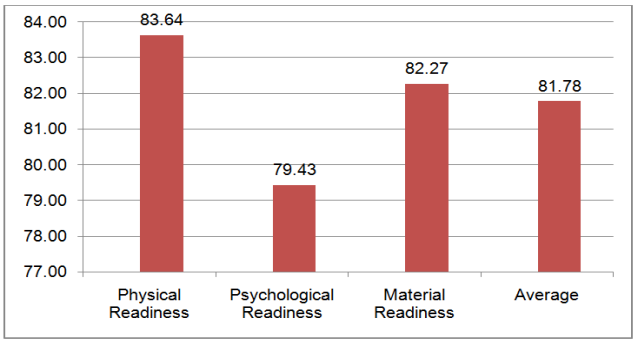

Figure 3. Histogram of Class X E1 Student Readiness

Description of Class X E2 Student Readiness

Data regarding students' learning readiness was obtained through questionnaires from 25 samples. Based on the data obtained, the total score was 1623. So, the average score obtained was 81.90, which was categorized as very good. The results obtained were that from the indicators of physical readiness, psychological readiness, material and material readiness of students at the High School of Kesuma Bangsa, the variables of student readiness is depicted in Figure 3.

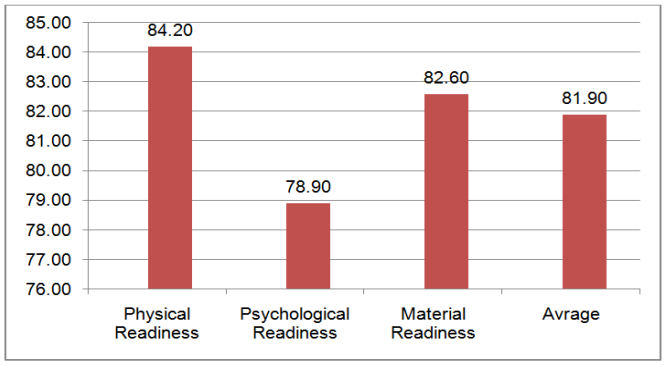

Figure 3. Histogram of Class X E2 Student Readiness

Description of Class X E3 Student Readiness

Data regarding students' learning readiness was obtained through questionnaires from 25 samples. Based on the data obtained, the total score was 1589. So, the average score obtained was 79.67, which was categorized as very good. The results obtained were that from the indicators of physical readiness, psychological readiness, material and material readiness of students at Nelgelri 2 High School, Kelsulma Bangsa, the variables of student readiness were found in the histogram of results:

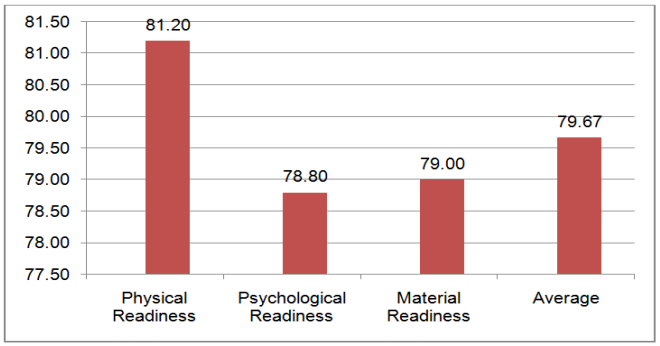

Figure 4. Histogram of Class X E2 Student Readiness

Based on the results of the data collected, it is known that the physical preparedness of class X EI2 students is superior compared to classes. The results of the distributed questionnaires revealed that the psychological preparedness of students in class X EI1 was superior to those in classes. The material readiness of class X E2 students is superior compared to classes.

Interview Result

Interviews were conducted to obtain data on educational readiness from aspects of curriculum development, graduate competency standards, and learning equipment development. The interview was conducted with the class X chemistry study field. Based on the interview with the chemistry study field, it was discovered that Belliaul had an educational background that followed his field, namely chemistry. Belliaul has taught for over four years at High School No. 2 Kesuma Bangsa.

Based on the data obtained by researchers, there are no problems with the teacher's educational background and teaching experience because the teacher is well-trained. The teacher has prepared the learning tools well before teaching.

Observation Results

Researchers observed every class X at High School No. 2 Kesuma Bangsa, the sample used to determine students' learning readiness in the STEM-based chemistry learning process. High School No. 2 Kesuma Bangsa has three classes for class X, each with a different number of students. Class X E1 has 32 students, class X E2 has 25 students, and class X E3 has 25 students. So, the total number of classes that were observed was 3. The results of the observations can be seen in Appendix 2, showing that students at High School No. 2 Kesuma Bangsa are ready to learn.

DISCUSSION

Teacher Readiness Perception Questionnaire

Based on data obtained in research, class Studying the independent curriculum begins with the socialization stage, namely learning and understanding the structure of the independent curriculum and independent training through the Merdeka Mengajar Platform [17]. Teachers can manage classes with learning experiences, managing learning and teaching interactions.

Student Readiness Perception Questionnaire

Based on the data obtained, class Physical readiness is in the very good category, as seen from the healthy condition of students when learning chemistry.

Students' self-readiness is important in achieving learning success. Psychological readiness affects students' mental and emotional well-being [5]. Material readiness or equipment for learning as a support for learning plays a very important role; without readiness or willingness, the learning process will not occur [15].

Class X E1 Student Readiness Perception

Based on the results of the data obtained, students in class The published data shows that students' physical learning readiness is still at the expected level. Students have a strong motivation to learn. Students prepare themselves by studying before learning begins [15].

Class X E2 Student Readiness Perception

Based on the results of the data obtained, students in class The published data shows that students' physical learning readiness is still at the expected level.

Physical readiness impacts individual learning outcomes and social progress [15]. Students' psychological readiness in learning shows how mentally prepared they are to carry out learning activities. Students with motivation and readiness to learn can improve learning outcomes [21]. Real

material readiness includes the presence of material that has been studied or worked on, whether it be reading books, notes, package books, worksheets, and so on [15]

Class X E2 Student Readiness Perception

Based on the results of the data obtained, students in class The published data shows that students' physical learning readiness is still at the expected level. A healthy student condition will encourage students to remain focused and pay attention to the explanations given by the teacher [7]. Learning readiness must be paid attention to in the learning process because the learning process accompanied by readiness will facilitate students to accept and understand the material presented by the teacher [7].

CONCLUSION

Based on the results of data analysis and discussion presented previously, it can be concluded that:

1. The readiness of chemistry teachers at High School No. 2 Kesuma Bangsa, as seen from indicators of curriculum development, graduate competency standards, and development of learning tools, obtained an average questionnaire score of 95.49, which is very good.
2. The learning readiness of class X High School No. 2 Kesuma Bangsa is evidenced by physical, psychological, and material aspects the average questionnaire score obtained was 81.12, which is included in the excellent category.

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