

## IMPLEMENTATION OF THE INDEPENDENT CURRICULUM IN MATHEMATICS LEARNING AT SMKN 1 BUKITTINGGI

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### ABSTRACT

This study aims to analyze the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi, which includes the planning, implementation, evaluation, use of teaching aids, and student responses to the learning process. The study used a descriptive qualitative approach with field observation methods. Data collection techniques were carried out through direct observation, interviews with mathematics subject teachers, distribution of questionnaires to 35 grade X Electronic Engineering students, and documentation. The results of the study indicate that the implementation of the Independent Curriculum at SMKN 1 Bukittinggi has been running quite well. Teachers have used learning tools such as Learning Objectives (TP), Learning Objective Flow (ATP), teaching modules, and implemented formative and summative assessments. Students showed a positive response to mathematics learning, especially to innovative and group-based learning methods. However, there are obstacles in optimal implementation of the curriculum, particularly limited learning time allocation and the density of material that must be delivered. Therefore, further evaluation is needed so that the implementation of the Independent Curriculum can run more effectively.

*Keywords: Independent Curriculum, Mathematics Learning, Curriculum Implementation, Student Responses, Vocational Schools.*

### 1 INTRODUCTION

Education is a crucial process in developing the quality of human resources because it allows individuals to optimally develop their cognitive, affective, and psychomotor potential. Within the education system, the curriculum is a key component that determines the direction of learning, educational objectives, content, learning strategies, and evaluation of student learning outcomes. According to Law Number 20 of 2003 concerning the National Education System, the curriculum is a set of plans and regulations regarding objectives, content, learning materials, and methods used as guidelines in organizing learning activities to achieve specific educational goals. In line with developments, technological transformations, and the demands of 21st-century competencies, the curriculum in Indonesia continues to evolve to adapt to student needs and global challenges. One of the government's latest policies is the implementation of the Independent Curriculum, officially implemented as an effort to restore learning after the pandemic and improve the quality of national education through more flexible, student-centered learning, oriented toward strengthening competencies and character through the Pancasila Student Profile.

The Independent Curriculum provides teachers with the flexibility to design learning tailored to student needs, school characteristics, and the context of the learning environment. In its implementation, this curriculum emphasizes the use of Learning Outcomes (CP), Learning Objectives (TP), Learning Objective Paths (ATP), teaching modules, diagnostic assessments, formative assessments, summative assessments, and projects to strengthen the Pancasila Student Profile. The Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia, through the Merdeka Mengajar Platform, also provides various learning tools to support teacher readiness in implementing the curriculum. However, the implementation of the new curriculum does not always

run as expected, as various obstacles are often encountered in learning practices in the field, particularly related to teacher readiness, limited infrastructure, learning time management, and student adaptation to changes in the learning system.

In mathematics, the implementation of the Merdeka Curriculum is a particularly important issue because mathematics is a fundamental subject that plays a role in developing students' logical, critical, systematic, analytical, and problem-solving skills. Asmara, A. S. and Junaedi, I. (2017) stated that the development of the current mathematics curriculum requires the integration of digital technology, contextual approaches, and learning innovations that can improve students' conceptual understanding. The development of mathematics learning in the digital era also requires the use of supporting applications such as GeoGebra, Photomath, Mathlab, and various other digital media to make learning more interesting and meaningful for students.

Although conceptually, the Independent Curriculum is considered capable of providing more flexible learning, in practice, various problems still arise in its implementation in mathematics learning. Research by Sadieda et al. (2022) shows that implementing the Independent Curriculum in mathematics learning requires teachers to be prepared to design innovative learning models to improve student learning outcomes. Another study conducted by Elsavani and Hidayati (2023) shows that teachers still experience difficulties in developing mathematics learning materials that align with the principles of the Independent Curriculum. Furthermore, research by Sari et al. (2024) explains that the implementation of the Independent Curriculum in mathematics learning has been quite successful, but challenges still arise in teacher preparedness and adaptation of learning materials.

More specific problems were also found at the Vocational High School (SMK) level. Research by Dewi et al. (2024) at SMKN 2 Bukittinggi showed that mathematics teachers experienced obstacles in implementing the Independent Curriculum due to limited learning time, dense teaching materials, and difficulties in maximizing differentiated learning. Research by Telaumbanua et al. (2024) also found that the implementation of the Independent Curriculum in vocational schools still faces challenges in the planning, implementation, and evaluation of mathematics learning. Furthermore, Nur'aini, Kartini, and Sutirna (2024) explained that the problems of implementing the Independent Curriculum in mathematics learning in vocational schools include low student readiness, limited learning media, and teachers' suboptimal understanding of the new curriculum.

In addition to teacher and student readiness, the success of the Independent Curriculum implementation is also influenced by teachers' pedagogical competence in designing adaptive and innovative learning. Teachers no longer act merely as transmitters of material but also as facilitators capable of creating meaningful learning experiences for students. According to the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia (2022), teachers in the Independent Curriculum are required to be able to implement differentiated learning to meet the diverse learning needs of students. In mathematics learning, teachers need to adapt learning methods to student characteristics so that abstract material can be understood in a more concrete and applicable way.

Mathematics learning at the vocational high school level differs from that at the general school level because students in vocational high schools are more focused on mastering vocational skills relevant to the world of work. Therefore, mathematics learning in vocational high schools should be designed contextually by linking mathematical material to the areas of expertise being studied. According to NCTM (2018), effective mathematics learning must be able to connect mathematical concepts to real-world situations so that students understand the benefits of mathematics in everyday life and the world of work. If mathematics learning in vocational high schools remains theoretical and lacks contextualization, students tend to experience difficulty understanding the material.

The development of digital technology is also a crucial factor in supporting the implementation of the Independent Curriculum in mathematics learning. The digital era demands that teachers utilize technology as a learning medium that can enhance student motivation and learning outcomes. The use of applications such as GeoGebra, Photomath, Microsoft Excel, and other digital

learning platforms can help students understand abstract mathematical concepts in a more visual and interactive way. Research by Hadi, S. et al. (2023) shows that integrating technology into mathematics learning can increase student interest in learning and strengthen mathematical problem-solving skills. However, the implementation of technology in learning is still hampered by limited facilities and teachers' digital capabilities.

In addition to internal school factors, educational policy support also plays a crucial role in the successful implementation of the Independent Curriculum. The government has provided various teacher training programs, the Independent Teaching Platform, learning communities, and a school-driven program to accelerate schools' adaptation to the new curriculum. Research by Rahmadayanti, D. and Hartoyo, A. (2022) explains that government policy support has a positive impact on school readiness to implement the Independent Curriculum. However, not all schools have the same level of readiness, especially those located in areas with limited access to technology and educational resources.

Furthermore, the implementation of the Independent Curriculum is also closely linked to improved student learning outcomes. Flexible, collaborative, and student-centered learning is expected to improve students' numeracy, creativity, mathematical communication, and critical thinking skills. According to the Organization for Economic Co-operation and Development's Programme for International Student Assessment (2022), Indonesian students' numeracy skills are still relatively low compared to other countries. This situation indicates that mathematics learning in Indonesia still requires innovation and continuous evaluation to improve the quality of student learning outcomes. Therefore, the implementation of the Independent Curriculum is expected to be a solution to improve the quality of mathematics learning in schools, particularly at the vocational high school (SMK) level.

Based on initial observations conducted at SMKN 1 Bukittinggi, it was found that the school has been implementing the Independent Curriculum for the past three years. Mathematics teachers have used learning tools such as teaching modules, TP (Teaching Materials), ATP (Analytical Learning Tools), Student Worksheets (LKPD), and formative assessments. However, several obstacles remain in its implementation, such as the limited time allocated for mathematics lessons (only four hours per week), the dense learning materials, and the suboptimal implementation of exploratory learning, a key characteristic of the Independent Curriculum. Furthermore, questionnaire results indicate that although most students are satisfied with the learning model implemented by teachers, some students remain passive during lessons and desire more innovative learning methods.

This research is important because there is little research specifically examining the implementation of the Independent Curriculum in mathematics learning in vocational schools, particularly at SMKN 1 Bukittinggi. This study aims to analyze the learning planning process, learning implementation, learning evaluation, use of teaching materials, student responses, and the obstacles faced by teachers in implementing the Independent Curriculum in mathematics.

Based on theoretical studies and previous research, the research hypothesis is that the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi has been quite successful, but still faces obstacles in aspects of learning time allocation, student readiness, and optimization of student-centered learning strategies.

## 2 RESEARCH METHOD

This study used a qualitative descriptive approach with field observation to analyze the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi. The qualitative descriptive approach was chosen because this study aimed to obtain an in-depth overview of the planning, implementation, and evaluation processes of learning, the use of teaching materials, and student responses to the implementation of the Independent Curriculum. According to Sugiyono (2022), qualitative descriptive research is a research method used to examine the conditions of natural objects, where the researcher acts as the key instrument, and the research

results emphasize meaning rather than generalization. This aligns with the opinion of Moleong and Lexy J. (2021), who stated that qualitative research aims to understand the phenomena experienced by research subjects holistically through verbal descriptions in a natural context.

The research design used in this study was a field study using direct observation of the mathematics learning process in the classroom. Field research was conducted to obtain factual data regarding the implementation of the Independent Curriculum as it actually occurs in schools. According to Creswell, John W. (2018), field research is conducted by directly observing the activities of research subjects in the natural environment to obtain more accurate and contextual information. This research was conducted on November 28, 2023, at 8:00 a.m. WIB (Western Indonesian Time) at SMKN 1 Bukittinggi, located on Jalan Teja Sukmana, Tarok Dipo, Guguk Panjang District, Bukittinggi City, West Sumatra.

The scope of this research focused on the implementation of the Independent Curriculum in 10th-grade mathematics at SMKN 1 Bukittinggi. The research subjects consisted of one mathematics teacher, Fithri Novilia, and 35 10th-grade Electronic Engineering students, consisting of 28 boys and 7 girls. The research objects included the learning planning process, learning implementation, learning evaluation, the use of learning tools, supporting infrastructure, and student responses to the Independent Curriculum-based mathematics learning.

The main materials and tools used in this study include observation guidelines, interview guidelines, student response questionnaires, stationery, a documentary camera, and learning documents in the form of teaching modules, Learning Objectives (TP), Learning Objective Flow (ATP), and Student Worksheets (LKPD). The use of learning documents aims to support the validity of research data. According to Arikunto and Suharsimi (2020), documentation is a data collection technique carried out through the analysis of written documents, images, and archives related to the research object.

This study used four main data collection techniques: observation, interviews, questionnaires, and documentation. First, observation was conducted using participant observation, where researchers were directly involved in the learning situation to observe the activities of teachers and students during the learning process. According to Marshall, Catherine, and Rossman, Gretchen B. (2016), participant observation allows researchers to obtain more in-depth data regarding the behavior and interactions of research subjects. Second, semi-structured interviews were conducted with mathematics teachers to obtain information related to learning preparation, implementation of the Independent Curriculum, assessments, learning strategies, and obstacles faced by teachers. According to Creswell, John W. (2018), semi-structured interviews provide researchers with the flexibility to dig deeper into information based on field conditions. Third, a questionnaire was administered to students to determine their responses to the implementation of the Independent Curriculum in mathematics learning. The questionnaire consisted of 18 closed-ended statements with "yes" and "no" answer options. According to Riduwan (2020), the questionnaire was used to efficiently obtain data regarding respondents' perceptions, attitudes, and responses. Fourth, documentation was conducted by collecting photos of activities, teaching modules, ATP (Analytical Learning Outcomes), TP (Teaching Outcomes), and other supporting documents.

The operational definition of the variables in this study consists of one main variable, namely the implementation of the Independent Curriculum in mathematics learning, which is measured through several indicators: (1) learning planning, including the development of teaching modules, TP (Teaching Outcomes), ATP (Teaching Outcomes), and LKPD (Worksheets); (2) learning implementation, including learning strategies, student engagement, and the use of learning media; (3) learning evaluation, including formative and summative assessments; (4) learning support facilities and infrastructure; and (5) student responses to the mathematics learning process.

The data analysis technique in this study used the interactive analysis model by Miles, Matthew B., Huberman, A. Michael, and Saldaña, Johnny (2014), which includes three stages: data reduction, data presentation, and drawing conclusions. Data reduction was carried out by selecting relevant information from observations, interviews, questionnaires, and documentation. Data presentation

was done in descriptive narrative form for ease of understanding. The final stage is drawing conclusions to obtain a comprehensive picture of the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi.

To maintain data validity, this study employed source and method triangulation techniques, comparing data from observations, interviews, questionnaires, and documentation to ensure more accurate and reliable data. According to Patton and Michael Quinn (2019), triangulation is used to increase the credibility of research results by examining data from various sources and methods.

With this research method, it is hoped that the results will provide a comprehensive picture of the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi and can be replicated by other researchers in similar contexts.

### **3 RESULT AND DISCUSSION**

#### **3.1 Result**

Observations were conducted during a mathematics lesson in the 10th grade Electronic Engineering class at SMKN 1 Bukittinggi. Based on the observations, the learning process began with introductory activities, including greetings, checking student attendance, conveying learning objectives, and providing motivation. In the core activities, the teacher delivered material using a group discussion approach, provided practice questions, presented discussion results, and engaged in contextual learning related to the students' daily lives. In the closing activities, the teacher provided a learning reflection, a brief evaluation, and presented the material to be covered in the next meeting. Overall, the learning process demonstrated characteristics aligned with the principles of the Independent Curriculum, which emphasizes active, student-centered learning.

Interviews with Fithri Novilia indicate that the implementation of the Independent Curriculum in schools has been ongoing for approximately three years since the policy was implemented. Teachers reported that at the beginning of the curriculum's implementation, they encountered several difficulties, particularly in understanding the development of new learning tools such as Learning Outcomes (CP), Learning Objectives (TP), Learning Objective Flow (ATP), and teaching modules. However, through training provided by the school and the use of the Merdeka Mengajar Platform, teachers have begun to adapt their learning process to the demands of the new curriculum. However, teachers still face challenges in managing their learning time due to the relatively dense mathematics material that must be completed within a limited timeframe.

Furthermore, documentation shows that the school has made efforts to support the implementation of the Merdeka Curriculum by providing various learning facilities such as adequate classrooms, learning technology devices, internet access, textbooks, and other learning media. Questionnaire data also shows that the majority of students responded positively to the mathematics learning implemented by the teacher, especially when learning was conducted in groups or using more interactive methods. These initial findings indicate that the implementation of the Merdeka Curriculum at SMKN 1 Bukittinggi has shown considerable progress, although several aspects of the learning process still require evaluation and improvement.

##### **A. Mathematics Learning Planning in the Independent Curriculum**

Based on observations and interviews with Fithri Novilia, a mathematics teacher, it was found that the teacher had planned her lessons in accordance with the principles of the Independent Curriculum. This planning was carried out by compiling learning tools in the form of Learning Objectives (TP), Learning Objective Flow (ATP), teaching modules, and Student Worksheets (LKPD) obtained through the Independent Teaching Platform (PMM) and discussions from teacher working groups (KKG).

Teachers also prepared practice questions, quizzes, and learning strategies before the teaching and learning activities began. This preparation aimed to ensure effective learning and enable teachers to gauge students' understanding of the material being taught.

This finding aligns with research from the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia (2022), which stated that the learning tools in the Independent Curriculum consist of CP, TP, ATP, teaching modules, and assessments, flexibly designed to meet student needs. Research by Rahmadayanti, D., and Hartoyo, A. (2022) also stated that the successful implementation of the Independent Curriculum is greatly influenced by teachers' readiness in designing learning.

#### **B. Implementation of Mathematics Learning**

Observations indicate that mathematics instruction in the classroom has implemented several principles of the Independent Curriculum, such as student-centered learning, group discussions, providing worksheets (LKPD), presentations of discussion results, and contextual learning. Teachers strive to connect mathematics material to students' daily lives.

One example of contextual learning found is when teachers invite students to learn outside the classroom by measuring the height of objects using poles and calculating angles of objects around the school environment. These activities make students appear more active and enthusiastic than in-class learning.

However, the implementation of the Independent Curriculum is not yet fully optimal. Based on interviews, teachers reported that implementation of the new curriculum is still only 50% effective, as some teachers are still using the 2013 Curriculum approach due to the limited time available for mathematics instruction, which is only four hours per week.

This finding aligns with research by Suryaman, M. (2023), which states that the main challenges in implementing the Independent Curriculum are limited learning time and teachers' adaptation to the new learning model.

#### **C. Learning Evaluation**

The research results show that teachers have implemented two forms of assessment in the Independent Curriculum:

- Formative assessment, in the form of quizzes, daily assignments, observations of student activity, and evaluations of the learning process at each meeting.
- Summative assessment, in the form of end-of-semester exams and end-of-learning assessments.
- Teachers also conducted initial diagnostic assessments, specifically for 10th-grade students, to determine their initial abilities before the learning process began.
- This aligns with the guidelines of the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia (2022), which explain that assessment in the Independent Curriculum aims to support student-centered learning.

#### **D. Supporting Facilities and Infrastructure**

Based on observations, SMKN 1 Bukittinggi has provided adequate facilities and infrastructure to support the implementation of the Independent Curriculum, including:

- Complete textbooks
- Laboratories
- Learning aids
- Focus projectors
- Teacher laptops
- Teacher tablets
- School Wi-Fi network

The school also allows students to bring smartphones to support the digital learning process.

This finding supports research by Baharullah et al. (2022), which states that facilities and infrastructure are a critical factor in the successful implementation of the Independent Curriculum.

#### **E. Student Responses to Mathematics Learning**

The results of a questionnaire conducted on 35 students showed a fairly positive response to mathematics learning based on the Independent Curriculum.

**Table 1 Student Response Questionnaire Results**

No	Statement	Number of "Yes" Responses
1.	Preparing math books	32
2.	The spirit of learning mathematics	17
3.	Fun math	15
4.	Ever get bored of studying math?	10
5.	Math is not scary	23
6.	Mathematics is easy to understand	11
7.	Satisfied with the teacher's learning model	32
8.	Active in learning	16
9.	Free to ask the teacher	21
10.	Freedom to express opinions	13
11.	Often sleepy while studying	18
12.	Full concentration while studying	18
13.	Only smart students are active	15
14.	More passive students	25
15.	Wanting more innovative methods	34
16.	Enjoy group study	30
17.	Always get good grades	15
18.	Satisfied with learning outcomes	18

Based on the table, it can be seen that the majority of students were satisfied with the learning model implemented by the teacher (32 students), preferred group learning (30 students), and desired more innovative learning methods (34 students). However, 25 students also stated that they were more passive in learning, indicating that active student participation still needs to be improved. Research by Nur'aini et al. (2024) also found that one of the challenges of implementing the Independent Curriculum in mathematics learning is low student confidence in actively participating in class.

### 3.2 Discussion

Based on research findings, the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi has been quite successful, particularly in terms of lesson planning, use of teaching materials, assessments, and support for school infrastructure. Teachers have demonstrated readiness to adapt learning to the new curriculum.

However, implementation has not been fully optimized due to challenges such as limited learning time allocation, dense teaching materials, and low active participation by some students. This situation indicates that the implementation of the Independent Curriculum requires ongoing adjustments, both in terms of school policies, teacher readiness, and student readiness.

These research findings reinforce the findings of Rahmadayanti, D. and Hartoyo, A. (2022), Suryaman, M. (2023), and Nur'aini et al. (2024) that the successful implementation of the Independent Curriculum is influenced by teacher readiness, innovative learning strategies, time management, and active student involvement in learning.

Therefore, ongoing evaluation is needed to ensure the implementation of the Independent Curriculum in mathematics learning is more effective and aligned with national education goals.

#### 4 CONCLUSION

Based on the research and discussion on the implementation of the Independent Curriculum in mathematics learning at SMKN 1 Bukittinggi, it can be concluded that the implementation of the Independent Curriculum has been quite successful, although not yet optimal. During the planning stage, teachers developed learning materials in accordance with the Independent Curriculum, including Learning Objectives (TP), Learning Objective Flow (ATP), teaching modules, and Student Worksheets (LKPD). During the learning process, teachers implemented several student-centered strategies, such as group discussions, presentations, and contextual learning linked to the surrounding environment. Furthermore, the learning evaluation system utilized formative and summative assessments in accordance with the principles of the Independent Curriculum.

The research also showed that the school has provided adequate facilities and infrastructure to support curriculum implementation, such as textbooks, laboratories, technological devices, and internet access. Student responses to mathematics learning have also been positive, as evidenced by high levels of satisfaction with the teacher's learning model and student interest in group learning. However, several obstacles remain in the implementation of the Independent Curriculum, such as limited time allocated for mathematics learning in vocational schools, dense teaching materials, and the persistence of students who are less active in the learning process.

The implications of this research indicate that the successful implementation of the Independent Curriculum depends not only on teacher readiness but also requires school support through academic policies, more effective learning time management, and the development of more innovative learning methods to increase student participation.

Future research is recommended to examine the implementation of the Independent Curriculum in other subjects or at different educational levels with a wider range of respondents to obtain more comprehensive results regarding the effectiveness of the Independent Curriculum implementation in Indonesia.

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