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Development of The Merdeka Curriculum Teaching Module based on the Local Wisdom of Bondowoso Batik

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Abstract

The aim of this research is to develop an Merdeka curriculum teaching module for the science and science project subject matter of substances and changes based on the local wisdom of Bondowoso Batik at SMK Negeri 1 Tamanan and to find out the responses of practitioners and students to the teaching module developed. This research uses Research and Development research, with the ADDIE (Analysis, Design, Development, Implementation and Evaluation) development model. The subjects in this research were 33 students in class X Craft Design and Production at SMK Negeri 1 Tamanan. The results of data analysis in this research show that the development of teaching modules for the Social Science Project subject based on the local wisdom of Bondowoso Batik is valid, very good, and very interesting to increase student interest. This is proven by: (1) The validation results of the material expert obtained a score of 93.84% which was included in the "Very Valid" category, (2) The validation results of the Merdeka curriculum learning planning expert obtained a score of 98.67% which received the qualification "Very Good", (3) The results of the small scale and large scale response tests obtained a score of 87.87% and 93.24% respectively which met the criteria of "Very Interesting", (4) The validation results from practitioners obtained a score of 92.66% which is included in the criteria "Very Valid. Based on these results, it can be concluded that the Merdeka curriculum teaching module based on the local wisdom of Bondowoso batik in science and science learning is suitable for use as a learning resource.

Keywords: ADDIE, batik, local wisdom, merdeka curriculum, teaching module

INTRODUCTION

The education and learning system in the curriculum should be able to develop creativity, critical abilities in solving problems and adept at communicating and collaborating. The education and learning system has been launched and thoroughly socialized by the minister of education through the Merdeka Belajar Platform (Alfitri et al., 2022; Sukmayadi & Yahya, 2020).

The main characteristic of the Merdeka learning curriculum in learning recovery is the focus on essential material chosen by students, this aims to develop hard skills and soft skills as well as student character in accordance with the Pancasila profile through project-based learning (Syahria et al., 2022). This activity aims to create in-depth learning to achieve basic competencies in the form of literacy and numeracy. As a result, teachers do not need to rush in teaching. Teachers can use methods that are more interactive, deeper and more fun (Ayundasari, 2022).

The curriculum should need to be developed from the perspective of standards-based education theory and

competency-based curriculum. The standards-based curriculum is established to provide students with the most free learning experience in developing intellectually, emotionally and spiritually. Standards-based education sets standards as minimum quality (Waruwu et al., 2022). In the Merdeka curriculum, standard education will be differentiated into graduation criteria or graduation competency standards, content standards, assessment standards and process standards. In this case, process standards are minimum criteria for the learning process based on pathway, level and type of education to achieve graduate competency standards (Barlian, 2022; Rahayu et al., 2022).

Based on Process Standards in Education, it is stated that process standards are used as guidelines in carrying out effective and efficient learning processes to develop students' potential, initiative, abilities and independence optimally (Maulida, 2022; Samho et al., 2009). Process standards have criteria that include 1) learning planning; 2) implementation of learning; and 3) assessment of the learning process.This is the same as the content of the teaching module, namely planning, implementation and evaluation (Faiz et al., 2020).

Learning planning is prepared in the form of flexible, clear and simple teaching modules by educators. The teaching module contains learning activities to formulate 1) learning planning; 2) implementation of learning; and 3) assessment of the learning process. Teaching modules have a main role in supporting teachers in designing learning. In the previous curriculum, teachers were required to create and print syllabus, lesson plans, annual program, semester program and assessment instruments separately. Meanwhile, the Merdeka curriculum has the term in which simplified teaching modules in the form of short teaching materials (Hamidah et al., 2022; Hasanah & Kusumawati, 2022).

The main principle of the Merdeka curriculum in educational units is student-oriented by prioritizing the complete growth and development of students, emphasizing the development of student competence and character (Jenkins, 2024; Harti et al., 2021). In addition, each educational unit carries out learning by adding local content determined by the regional government according to the characteristics of each region flexibly, through three options, one of which is correlating local content into subjects. Implementation of subjects with local wisdom can be done in the classroom (Safitri & Mujdalipah, 2018). The way to integrate local wisdom with learning is through an ethnoscience or local wisdom approach (Saputra & Wahyuni, 2017; Indriaturrahmi & Sudiyatno, 2016). Ethnoscience is a process of modification between original science and scientific science.

Local wisdom can be integrated into teaching materials or teaching modules. Local wisdom-based teaching materials are educational materials developed by utilizing the knowledge, culture and values that exist in local communities. The main

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aim is to link the teaching and learning process with the environment around students, so that they can more easily understand and apply the knowledge they learn in everyday life (Indriaturrahmi & Sudiyatno, 2016).

Based on the results of observations at SMKN 1 Tamanan, regarding the continuation of batik activities at SMK 1 Tamanan, over the years it has begun to experience degradation and decadence. This phenomenon is fundamental in this research, it is necessary to provide treatment for teachers in providing education about the importance of cadre formation for students majoring in batik or creative crafts, batik and textiles. This can be seen through problem analysis that as many as 81.82% of science teachers have never taught the local wisdom of batik which is linked to an understanding of science.

The science material contained in the Merdeka curriculum-based teaching module consists of three elements of learning outcomes that refer to scientific literacy competencies, namely explaining phenomena scientifically, designing and evaluating scientific investigations, translating data and evidence scientifically. These three elements are studied in the form of a project.

This aspect of substance and its changes can be integrated with local wisdom. The local wisdom in question is the local wisdom of Bondowoso Batik. The substance aspect and its changes are related to Bondowoso Batik which lies in the batik making process. Examples of the integration of natural sciences with the batik making process are the use of measuring instruments to weigh grams of batik color according to their size, the use of natural colors as batik dyes and their effect on the environment and the process of purifying batik waste using the Electrocoagulation mixture separation method. Based on the needs analysis, as many as 75.76% of class local such as substance modules and their changes.

Based on these problems, this research aims to develop the Merdeka curriculum teaching module for the science subject in the matter of substances and changes based on the local wisdom of Bondowoso Batik at SMK Negeri 1 Tamanan and to determine the responses of practitioners and students to the teaching module developed.

METHOD

The research method used is Research and Development by developing Merdeka curriculum teaching modules and testing their level of validity. The research location is SMKN 1 Tamanan Bondowoso. The population of this study were students in class X, and sampling was carried out using purposive sampling to test large-scale and small-scale responses. This test sequentially selected 6 students to represent each group and 33 students in the class. The development model used by researchers is ADDIE. In the ADDIE model there are five stages, namely Analysis, Design, Development, Implementation, Evaluation (Cahyadi, 2019). From these five stages the researcher carried out the

implementation stage. Research and development procedures are depicted as in the following diagram in figure 1:

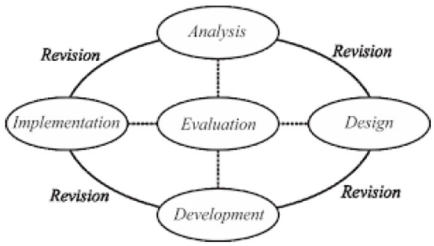

Figure 1. ADDIE Development Model

Analysis

This stage aims to raise problems encountered in learning, and aims to analyze the need to develop teaching modules based on local wisdom. Therefore, at this stage, 4 activities are carried out, namely: Problem analysis, Needs analysis, Curriculum analysis and Concept analysis

Design

The design stage includes several plans for developing teaching modules by designing several of them, such as designing Teaching Module components, preparing teaching module materials, and designing instruments.

Development

At the development stage, the stages carried out include validation from experts. determine the validity of Merdeka curriculum-based teaching modules based on assessments from several experts, namely Merdeka Curriculum learning planning experts, material experts and users.

Implementation

At this stage, the teaching module that has been developed will then be tested for implementation on respondents, namely class X students at SMKN 1 Tamanan Bondowoso. The implementation test carried out at this stage was a small scale response test aimed at 6 students from each group leader. The small-scale trial aims to find out comments regarding the Merdeka curriculum teaching module that will be developed. Meanwhile, the large-scale response test was shown on 33 students.

RESULT AND DISCUSSION

This research produces a learning tool in the form of a Teaching Module based on an Merdeka learning curriculum with a local wisdom approach to Bondowoso batik for students in class X at SMKN 1 Tamanan Bondowoso. This teaching module contains learning plans, student worksheets and assessments in them. This teaching module contains material aspects of substances and their changes. Researchers created this teaching module by referring to the ADDIE development model according to Robert Marible Branch. The ADDIE development model includes five development procedures, namely analysis, design, development, implementation and evaluation.

1. Analysis Stage

a. Problem analysis

Problem analysis was carried out by gathering information from 3 students and the Social Science teacher through interviews and distributing problem questionnaires. The analysis stage consists of 2 stages that must be carried out before researchers develop the Merdeka curriculum-based teaching module. The stages consist of problem analysis, needs

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analysis.

Apart from that, the results of interviews with students stated that there was a lack of information regarding the implementation of the Social Science project subject in the Batik and Textile Creative Crafts department, even though the Social Science project subject was a means of combining study objects in the form of concrete objects found in nature with the characteristics of the field of batik expertise. especially for batik and textile creative craft skills programs. This is because the Merdeka learning curriculum-based teaching modules used by teachers are less relevant to students' desires in facing the world of work.

The next activity was an interview with the Science Project teacher at SMKN 1 Tamanan Bondowoso and the results obtained were that the natural science material that had often been a problem for students was the material aspect of substances and its changes and the energy aspect and its changes. This is because the material aspects of Substance and its changes have a variety of new words that they must understand. In the energy aspect and its changes, students do a lot of calculations using various physics formulas. while the ability of class X DPK students is lacking in the field of arithmetic.

On the other hand, the media and learning resources used are very limited to textbooks. This package book can only be held by students if the student borrows the book from the school library. Usually students borrow books when studying the Science Project, after learning is finished, students return the school textbook. In this case, the student has no control over the ownership of the textbook. This makes learning less Merdeka because student handbooks are only available at school.

Apart from interview activities, problem analysis was also carried out by distributing problem questionnaires to 33 students. This aims to find out problems in learning the Science Project and difficulties in learning the Science Project, implementing the Merdeka curriculum, and understanding the material in the Science Project and its relation to local wisdom in making batik according to the major. The problem analysis stage is carried out by distributing a problem questionnaire containing 12 questions. The percentage of problem analysis questionnaire results is presented in Table 1.

Table 1. Data from Problem Analysis Questionnaire Results

Question	Percentage (%)	
	Yes	No
Students have difficulty learning the Science Project	84.85	15.15
Students have difficulty studying the material aspects of substances and their changes	72.73	27.27
Students are confused about the implementation of the Merdeka Curriculum in the Science and Technology Project Subjects	57.58	42.42
Students can channel their talents and interests in Science Project lessons	45.45	54.55

Continuation of Table 1

Question	Percentage (%)	
	Yes	No
The science and science teacher once taught the local wisdom of batik in relation to understanding science/ natural science	45.45	54.55
Students have a handbook to study substances and their changes.	30.30	69.70
Students will easily understand the material on substances and their changes because of the modules provided by the teacher	27.27	72.73
Students use special teaching materials to learn the concept of substances and their changes (for example, videos, teaching aids, etc.) that are appropriate to their vocation, such as in the Batik and Textile Creative Crafts department or the Wood and Rattan Crafts department.	54.55	45.45
Students agree that it is necessary to develop teaching materials based on local wisdom, such as modules on substances and their changes.	90.91	9.09

From Table 1 above, the results show that 84.85% of students think that studying the Science Project is difficult and 72.73% of students think that studying aspects of substances and their changes is difficult. One of the TPs that students consider difficult is "Participant Students can determine elements, compounds and mixtures in everyday life from an economic and social perspective." Apart from that, 57.58% of students felt confused about the implementation of the Merdeka Curriculum in the Science Project Subjects. The thing that makes students confused is that there is no provision for achieving the material at each meeting. Teachers may combine different aspects of material in one meeting. So that the teacher can change the material at each meeting and this seems to free up the teacher to convey the lesson material.

Then as many as 54.55% of students felt they had not received their rights in channeling their talents and interests in the Science Project lessons. Apart from that, as many as 54.55% of students thought that science and science teachers had never taught an understanding of science/natural sciences related to the local wisdom of making batik.

b. Needs Analysis

The needs analysis stage is carried out by distributing a needs questionnaire containing 10 questions. Respondents in the needs analysis were class X DPK students. The sample data used in this needs analysis represents all students in class X DPK.

Based on the results of the needs questionnaire, it is known that 69.70% of students do not have a handbook for studying substance material and the change is because the student handbook can only be accessed at school. Apart from that, 72.73% of students considered the handbook or module difficult to understand in studying material aspects

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of substances and their changes.

So as many as 54.55% of students think that learning will be better if the learning implementation uses special teaching materials for learning the concept of substances and their changes (for example, videos, teaching aids, etc.) that are vocationally appropriate. Learning will be more meaningful if the teacher invites students to do practical work on the concept of substances and their changes in accordance with their major (Suprapto et al., 2019). As many as 90.91% of class Based on this needs analysis, researchers are interested in developing a teaching module that can facilitate learning activities according to their major, namely Craft Design and Production.

2. Design Stage

The design stage includes several plans for developing teaching modules by designing several of them, such as designing Teaching Module components, preparing teaching module materials, and designing instruments. Core components include learning objectives, learning scenarios along with syntax, trigger questions, etc. and the last part of the teaching module is the attachment component. This component contains student worksheets, reading materials and a bibliography. So the prototype results at this design stage produce an initial design of the Merdeka curriculum-based teaching module components integrated with the local wisdom of Bondowoso Batik in substance and its changes, namely: (1) Cover, (2) Foreword, (3) general information, (4) components core, (5) Attachment Components.

The main focus at this stage, researchers designing teaching modules, is designing and determining the appearance of the cover and also the content of the teaching module that will be developed as well as creating illustrations that match the theme of the teaching module. The cover of the teaching module was designed using the CorelDraw.

1) Cover

The initial stage carried out by researchers in making the cover was to explore various motifs that have become icons of Bondowoso Batik. Bondowoso Batik motifs are dominated by plant motifs that circulate in the region, for example in Ijen Batik, Ijen itself has the most and best coffee commodities in Indonesia, so coffee has become branding and is worthy of being a motif owned by Ijen. The motifs highlighted are the Coffee Bean and Coffee Leaf Motifs, while the Tamanan and Maesan Motifs have characteristics of cassava plants, because in that area many cassava plants are planted. Apart from that, cassava plants are also the branding of Bondowoso Regency. The image of the illustration is in figure 2.

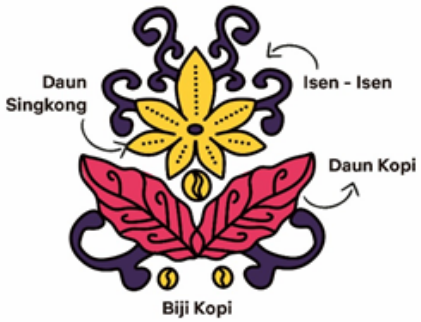

Figure 2. Illustration of motifs on Bondowoso Batik

2) Foreword

In creating an introductory sentence, the author conveys brief information related to the material from the teaching module, the author's hopes for students after studying the teaching module. Thanks are also included in the foreword and an apology as well as suggestions and input for the teaching module developed in this study.

3) Module Identity

Module Identity: This teaching module is written in tabular form and contains information regarding the school name, material, class, phase, time allocation, academic year and name of the author.

4) Initial Competency

Researchers wrote down what knowledge and skills students need to have before studying substances and their changes

5) Pancasila Student Profile

Researchers compiled a profile of Pancasila students by describing the character students would gain after taking part in the learning. The Pancasila student profile is also a hope for the writer to reflect Pancasila values in everyday life. There are 4 dimensions of the Pancasila student profile formulated by researchers, namely: mutual cooperation, independence, creativity and critical thinking. The explanation for selecting elements of the Pancasila student profile in the teaching module can be explained as follows:

Mutual cooperation; In learning activities, students will be formed into groups to work on projects. Each group member works together and collaborates and pays attention to friends who have difficulty implementing the project.

Merdeka; In a group project, the group leader creates tasks for each group member. So each group member is responsible for their respective duties, including presenting the product.

Creative; This teaching module contains worksheet regarding Ecoprint Batik Making, here students will be directed to produce batik cloth using natural dyes that have aesthetic value. The resulting fabric will be meaningful for students, useful and have an impact on the surrounding environment. Apart from that, the worksheet weighing batik dyes can encourage students to develop ideas that are in accordance with work procedures.

Critical Reasoning; Each group member has the right to have an opinion regarding the problems contained in the worksheet and make decisions based on facts and data from relevant and accurate sources

6) Facilities and infrastructure

The author formulates facilities and infrastructure based on the assets owned by SMKN 1 Tamanan Bondowoso, namely blackboards, projectors and school textbooks.

7) Target Students

Target students are written based on the student's background. Researchers looked at the abilities in class X DPK SMKN 1 Tamanan Bondowoso who had the same interests, namely designing and

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drawing

8) Learning objectives

Learning objectives are arranged in table form so that teachers can know which elements represent learning outcomes. This learning objective has also been formulated jointly by the Science Project teachers.

9) Igniter Questions

The author constructs a meaningful understanding. guided by the trigger questions. In this case the researcher asked questions based on: 1) What can students understand? And what can students do?

10) Meaningful Understanding

The author writes down ideas related to the subject matter. Teachers can write down ideas that are related to the teaching material to be taught, for example concepts, facts, examples, or the relationship between material substances and their changes in industrial life.

11) Learning Activities

The author plans learning based on the characteristics of the learning model that will be used using teaching modules. So that learning activities are in accordance with the syntax

12) Diagnostic Assessment

In this case the researcher designs a diagnostic assessment based on student learning styles, the researcher collects instruments related to learning styles. The choice of student learning style instruments was because class

13) Formative Assessment

In this assessment, the author created literacy-based questions regarding Bondowoso Batik. Students can answer questions with. read the descriptive test that has been presented by the author. This assessment is carried out before students take part in learning. The questions in this formative assessment relate to physical and chemical changes during the coloring process.

14) Enrichment and Remedial

In formulating this enrichment and remedial plan sheet, the author is guided by the document belonging to the Merdeka Teaching Platform.

15) Worksheet 1: “Measurements Used in the Textile and Batik Sector.

The worksheet contains reading materials related to the O'hauss Balance Sheet, QR Codes that can be scanned, observation tables and evaluation sheets

16) Worksheet 2: "Making Ecoprint Batik"

This worksheet contains natural dyes contained in plants that can be used to make Ecoprint batik, QR codes that can be scanned to see problems that occur, questions regarding substances and chemicals that are supporting materials for making batik.

17) Worksheet 3: "Batik Industry Waste Purification Process"

This worksheet contains reading material related to water purification techniques using electrocoagulation and a QR code that can be scanned.

c. Instrument Design

After deciding to create and design a teaching module, the researcher began

designing the instrument. The design of this instrument includes a problem analysis instrument. Needs analysis instruments, validation instruments for Merdeka curriculum learning planning experts, material expert and practitioner instruments and student responses.

3. Development Stage

At this stage, the research conducted a product assessment with expert validators to determine the level of validity of the teaching module. Expert validation tests were carried out to determine the validity of the teaching module before testing student responses. This validation was carried out on 3 expert validators consisting of 1 material expert validator, 1 Merdeka curriculum learning planning expert validator, and 1 teacher as a practitioner. The determination of validators is based on the competency of each validator. The material expert validator is the Tadris Science Lecturer at the State Islamic University KH Achmad Siddiq with chemistry competency, the Merdeka curriculum learning planning expert validator is the supervisor of SMKN 1 Tamanan Bondowoso who is competent in the field of educational planning and curriculum, and finally the practitioner expert is the Project subject teacher Science and Technology at SMKN 1 Tamanan Bondowoso.

Next, the data is calculated to know the total validation results from the three experts. The percentage of material expert validation results is 93.84% with a very valid category, namely the material is relevant to the competencies that students must master, the material description is sufficient to meet the demands of the curriculum, the material is presented coherently and is easy to understand by students and the language used in the teaching module is easy to understand by student. The percentage of validation results from Merdeka curriculum learning planning experts is 98.76% with a very valid category, namely the components in the teaching module are in accordance with the teaching module instrument created by the Ministry of Research, Education and Technology.

Meanwhile, the percentage of teacher validation results is 92.66% with a very valid category, namely the material is relevant to the competencies that students must master, the material description is sufficient to meet learning outcomes, the language used in the teaching module is easy for students to understand, it presents learning objectives that students must master, suitability of the teaching module cover design with the material. The average percentage of validation results from 3 validators is 95.05%. These results indicate that this teaching module is very valid without revision.

The maximum expert validation value obtained from learning planning experts is 98.76%. Based on these values, the teaching modules developed can be used in the classroom without revision. The product validation graph from experts is presented in Figure 3.

4. Implementation Stage

The next stage is to apply the teaching module to trial subjects consisting of 33

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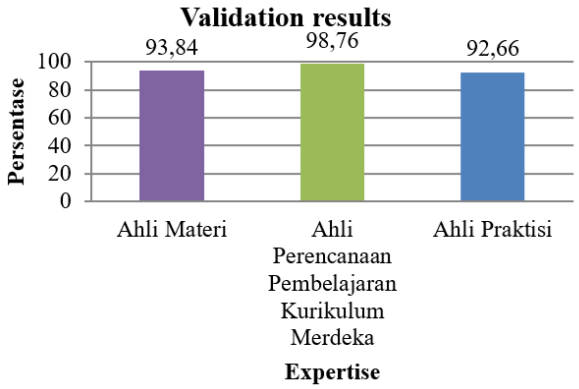

Figure 2. Graph of Expert Validation Results

students. Before being applied to students, the teaching module is validated first to assess the feasibility and validity of the teaching module. After that, a response test was carried out on the students. This response test contains small-scale and large-scale tests with certain criteria. The results of the small scale responses are presented in Table 2.

Table 2. Results of the Small Scale Response Questionnaire

Assessment Aspects	**Total Percentage (%)**	**Criteria**
Cover View	91.11	Very interesting
Module Contents Display	86.77	Very interesting
Ease of Learning	85.83	Very interesting
Total	87.87	Very interesting

The percentage of small-scale student response test results carried out on 6 students was 87.87%, namely the cover on the teaching module made students interested in learning, the images were clearly visible, the images in the teaching module could explain the material presented, the teaching module presented was clearly visible, illustrations displayed in the worksheet helps understand the material. These results show that this teaching module is very interesting and can be continued at the large-scale response test stage

The results of the large-scale student response test were 93.24%. These results show that this teaching module is very interesting. Comments and suggestions from students say that the teaching module is 1) interesting and easy to understand 2) the writing and size of the images in the teaching module can be read clearly 3) they are more interested in learning. The results of the large-scale response are presented in Table 3.

Table 3. Results of the Small Scale Response Questionnaire

Assessment Aspects	**Total Percentage (%)**	**Criteria**
Cover View	94.95	Very interesting
Module Contents Display	92.66	Very interesting
Ease of Learning	92.12	Very interesting
Total	93.24	Very interesting

The final results of this teaching module are very interesting and can be used as teaching material in learning. Teaching modules can help students become interested in the information presented by the teacher. Teaching modules are one of the teaching materials used by students and teachers in designing classes to carry out projects so that students do not get bored in class (Astuti, 2022; Anggraeni, 2023).

With teaching materials based on local wisdom, students not only gain

academic knowledge, but also have a deeper understanding of their culture and environment, and develop a sense of love and pride for local heritage (Irfandi et al., 2023). Local wisdom also often contains moral and ethical values that can help in developing students' character, such as mutual cooperation, tolerance, and respect for parents.

Teaching materials based on local wisdom have advantages that can support the teaching and learning process to be more effective and meaningful. The material presented is more relevant and contextual to students' daily lives, so that it is easier for students to understand and apply the knowledge gained (Ardianti et al., 2023). Local wisdom-based learning often includes interesting stories, myths or traditions, making learning more fun and interesting for students. Through learning based on local wisdom, students can also get to know and appreciate the culture and traditions of their region, which can strengthen their identity and pride in local culture (Hariyono et al., 2023).

With teaching materials based on local wisdom, students can be involved in practical activities that are directly related to real life. Apart from that, it can help students understand and appreciate the cultural diversity that exists in Indonesia, which is one of the nation's riches. Local wisdom is also closely related to knowledge about the local environment, so students can learn about ways to protect and utilize the environment in a sustainable manner. Teaching materials based on local wisdom can also be adapted to changing times and technological developments, so that they remain relevant (Dewi et al., 2019).

CONCLUSION

The aim of this research is to develop the Merdeka curriculum teaching module in the topic of matter of substances and changes based on the local wisdom of Bondowoso Batik at SMK Negeri 1 Tamanan and to find out the responses of practitioners and students to the teaching module developed. The results of this research show that the development of teaching modules for the Social Sciences Project subject based on the local wisdom of Bondowoso Batik is valid, very good, and very interesting to increase student interest. This is proven by: (1) The validation results of the material expert obtained a score of 93.84% which was included in the "Very Valid" category, (2) The validation results of the Merdeka curriculum learning planning expert obtained a score of 98.67% which received the qualification "Very Good", (3) The results of the small scale and large scale response tests obtained a score of 87.87% and 93.24% respectively which met the criteria of "Very Interesting", (4) The validation results from practitioners obtained a score of 92.66% which is included in the criteria "Very Valid. Based on these results, it can be concluded that the Merdeka curriculum teaching module based on the local wisdom of Bondowoso batik is suitable for use as a learning resource.

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