Development of Teaching Module Based on the Merdeka Curriculum with the Application of Character Integrated Problem Solving Model

Nurhafidhah¹, Mauliza¹*, Ahmad Fauzi Syahputra Yani¹, Rapita Aprilia², Ismi Zatya¹, Wan Zumusni Wan Mustapha³

¹Chemistry Education Study Program Samudra University, Langsa, Indonesia
²Primary School Teacher Education Study Program Samudra University, Langsa, Indonesia
³Academy of Language Studies Teknologi Mara University Kampus Seremban, Negeri Sembilan, Malaysia

*Email: mauliza@unsam.ac.id

Abstract. Starting in 2022, the merdeka curriculum can be implemented by educational units even though they are not Driving Schools. One of the learning tools needed to implement the independent curriculum is teaching modules. The lack of sources of information and examples of the application of the character integrated learning model in developing teaching modules is an urgency in this research. The aim of this research is to develop an independent curriculum teaching module by implementing an integrated problem solving model of character education in science lessons that is valid and feasible and can be well received by teachers as product users. This research uses research and development (R&D) methods, with the ADDIE (analysis, design, development, implement and evaluation) development model. The instruments used were interview guides, questionnaire sheets and observations. The population in this research is teachers at Langsa City State Middle School, the research sample was taken using a purposive sampling technique. The product produced in this research is a science learning teaching module with an integrated problem solving model of character education. The teaching module developed is valid and suitable for use in science learning, with a percentage score of 89.2% in the very valid category. Apart from that, the teacher response to the teaching module product was 89% in the very good category. Therefore, it is recommended that this integrated problem solving model of character education science teaching module be implemented in learning to determine its effectiveness and influence on student learning outcomes.

Keywords: Teaching modules, independent curriculum, integrated character problem solving model

Introduction

Character education is one of the aspects needed to balance the challenges of the 21st Century. 21st Century learning is characterized by the integration of students' literacy abilities, knowledge, skills, attitudes and mastery of technology (Mudrikah et al., 2022). Education without character is not only useless, but very dangerous. The 2013 curriculum, revised in 2017, stipulates attitude aspects (character values) as the main aspect apart from cognitive and psychomotor aspects (Sukidin et al., 2022; Susilo et al., 2022; Purwaningsih, 2022). Apart from that, the character of the nation's children is one of
several things that is being improved in the world of Indonesian education today (Fitriyah et al., 2022).

In the curriculum currently being implemented, namely the merdeka curriculum, of course there is a structure to improve the character of the nation's children through one of its programs, namely the pancasila student profile (Iskandar et al., 2023). Character Education is a systematic, comprehensive and planned approach to teaching moral values so that students can know the concepts of right and wrong (Prayitno et al., 2022; Birhan et al., 2021). The current reality is that education in Indonesia is faced with various problems, namely an inadequate learning system and moral degradation that occurs in Indonesian society in general, one of which is among some schools which are felt to have not reached the standard of character education, especially during the pandemic. This can be seen from several incidents reported in the mass media regarding examples of students' poor character or morals being shown, in the school environment and in society. This happens in remote areas too, there are still many complaints about character education and it doesn't get enough attention from the government (Angga et al., 2022).

Learning natural sciences (science) which is in line with character education is very important in supporting learning goals, for this reason learning models and approaches are needed that support the implementation of the learning process in schools (Arman et al., 2020). Learning activities within the framework of student character development can use active learning approaches such as problem-based learning (Sugiyanto & Wema., 2020). In the process of analyzing learning problems, emphasis should be placed on character formation, not just emphasis on academic achievement, during the learning process students familiarize themselves with caring personalities, are critical of information, build polite communication between friends in groups, justify the results of the analysis honestly and bravely (Suhirman et al., 2020). Previous research states that learning using positive problem solving models can increase creativity, character and creative problem solving (Kim et al., 2019). This is in accordance with research by Ozpinar & Arslan (2023) suggesting that further research can consider other factors, including metacognitive and affective in the application of problem solving learning. Teachers play a big role in developing the character of their students. One of the big challenges is finding ways to effectively integrate character education with academic content standards (Clampa & Wolfe, 2020).

One of the efforts made to improve 21st century skills is to prepare appropriate and high-quality learning plans so that they will better support the achievement of the desired learning goals (Putri et al., 2023). Educators must develop Independent Educators must develop independent curriculum teaching modules that are integrated with character education. One of the functions of teaching modules is to reduce the burden on teachers in presenting content so that teachers can have more time to be tutors and help students in the learning process (Maulida, 2022). However, in several cases in schools, teachers have not been able to read CP well, have not been able to compile TP (learning objectives), have not been able to compile ATP (learning objective flow) from TP, and have had difficulty developing teaching modules (Rindayati, 2022).

The development of teaching and learning modules to strengthen character education is one of the research themes in accordance with the master research plan (RIP) 2022-2030 at Samudra University, namely the focus of research in the development of integrated and innovative learning. Apart from that, continuing the 2021 superior basic research (PDU) research on developing a character-integrated problem solving learning model, this research applies the model that has been developed into a teaching module, with the hope that teachers can use it in the science learning process and strengthen students' character.
The aim of this research is to develop a science learning teaching module product with an integrated problem solving model for character education that is valid and suitable for use in science learning, as well as knowing teachers' responses to the science learning teaching module product using the integrated problem solving model for character education. Thus, it is hoped that this research will have a positive impact on education, especially in Aceh, in facing the challenges of developing character education through the science field.

**Methods**

This research was carried out at SMP Negeri 1 Langsa, SMP Negeri 7 Langsa, and SMP Negeri 11 Langsa. The research population was all science teachers at Langsa State Middle School which was the research location. The sampling technique used purposive sampling with the consideration that the samples were science teachers who were actively teaching at the research location in 2023. The number of samples was 6 science teachers. Apart from teachers, this research also involved intrusion experts to obtain data on the validity and feasibility of the teaching modules being developed.

This research is a type of research and development. Research and development methods are research methods used to produce certain products and test the effectiveness of these products (Ramot & Bialik., 2022). In other words, research and development is a research method used to produce certain products and test the effectiveness of these products. In this case, the product developed is a science teaching module with an integrated character problem solving model. The development model used is the ADDIE development model. The ADDIE research and development model consists of 5 main stages, namely analyze, design, develop, implement, and evaluate (Gagne et al., 2005; Morrison;2010; Rayanto & Sugianti, 2020). However, researchers reached the Develop stage due to limited time in product creation and validation (Miskiyyah & Buchori, 2023).

![Figure 1. The stages of ADDIE development model (Gagne et al., 2005)](image-url)

In order to collect primary data, data collection is carried out directly by researchers, namely: (1) observation is direct observation of the school being studied to strengthen the results of the interview; (2) interviews, namely holding questions and answers with the teacher; (3) validation and feasibility questionnaire and response questionnaire. Data
collection uses research instruments that have been validated and tested for reliability (Sati et al., 2023). Data analysis techniques resulting from observations and interviews were carried out descriptively. Meanwhile, the questionnaire data was analyzed by calculating the percentage of answers using the following formula (Nurlian, 2023):

\[
(\%) \text{Validity} = \left( \frac{\text{the score obtained}}{\text{maximum score}} \right) \times 100
\]

The results of the value calculations are interpreted according to Table 1.

### Table 1. Percentage Criteria

<table>
<thead>
<tr>
<th>No</th>
<th>Interval</th>
<th>Validity Category</th>
<th>Response Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0≤ X ≤ 20</td>
<td>Very invalid</td>
<td>Very Not Good</td>
</tr>
<tr>
<td>2.</td>
<td>21 &lt; X ≤ 40</td>
<td>invalid</td>
<td>Not good</td>
</tr>
<tr>
<td>3.</td>
<td>41 &lt; X ≤ 60</td>
<td>quite valid</td>
<td>pretty good</td>
</tr>
<tr>
<td>4.</td>
<td>61 &lt; X ≤ 80</td>
<td>valid</td>
<td>good</td>
</tr>
<tr>
<td>5.</td>
<td>81 &lt; X ≤ 100</td>
<td>Very valid</td>
<td>Very good</td>
</tr>
</tbody>
</table>

(Source: Mutiara & Hardjono, 2023)

**Results and Discussion**

Based on the research objectives and development of a natural science learning teaching module with an integrated problem solving model of character education, a valid and feasible teaching module was developed using the ADDIE model. The results of each activity stage according to the ADDIE model are as follows.

**Analysis Results**

The initial stage in the ADDIE development model is analysis. Requirements analysis is part of module design (Farihah et Al., 2021). The analysis carried out includes analysis of learning, materials and learning media used in schools (Lerian et Al., 2022). Analysis was carried out to determine the difference between expectations in learning and facts in the field (Asmar & Suryadarma, 2021). Analysis was carried out through observation and interviews were carried out to explore the information needed to develop teaching modules according to school needs and readiness. The items and aspects observed and interviewed refer to the steps for developing teaching modules in the independent curriculum described by Maulida (2022). The results of observations at the research location obtained the following information.
Table 2. Observation result

<table>
<thead>
<tr>
<th>Observation Aspect</th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) The school has adequate infrastructure to support the implementation of the independent curriculum, such as: library, computer room, lab room and sports field.</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2) Schools have documents implementing the independent curriculum, such as: Permendikbud, independent curriculum learning tools, independent curriculum assessments and report cards</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>3) The school applies an independent curriculum</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>4) The school has Pancasila student profile documents, such as: Pancasila student profile pocket book/guidebook, Pancasila student profile project proposal/report</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>5) The school has documentation on the implementation of strengthening the Pancasila student profile</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>6) The school has ATP documents</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>7) Teachers at schools actively participate in MGMP/KKG forums</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>8) Teachers at schools actively participate in seminars related to the development of independent curriculum learning tools</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>9) Schools and teachers have teaching module documents</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>10) Schools and teachers use teaching modules in classroom learning</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>11) Schools and teachers have curriculum learning evaluation documents, such as: question and non-question instruments, assessment processes, reporting, and remedial or enrichment follow-up</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

Based on Table 2, it is known that the three research location schools have sufficient infrastructure and experience in implementing the merdeka curriculum. In fact, schools and teachers have used teaching modules in classroom learning. However, from the results of the interview it is known that the teaching modules used so far by teachers are not teaching modules developed personally by the teacher but rather adapted from various
sources, one of which is through the merdeka mengajar platform. Based on the results of interviews regarding aspects of teacher knowledge readiness, it is known that teachers already know the definition and benefits of teaching modules. Teachers have created teaching modules and implemented them. However, the teachers in the research sample had never attended training in creating teaching modules and had never implemented an integrated problem solving model of character education. Teaching materials will be realized by displaying illustrations of everyday life (Wuryani et al., 2018). Teachers receive information about teaching modules from Langsa City MGMP activities. The material that teachers get from MGMP activities is still at the stage of developing learning objectives (TP) from learning outcomes (CP). The teaching modules that teachers need mentioned in the interview are measurement material, acids and bases, elements, mixtures and compounds, vibrations and waves, and temperature and heat.

**Design Results**

The design stage is a systematic process that begins with compiling a flowchart and storyboard as a basis and description of the form, content and appearance in developing the teaching module. Objectives, assessment tools, exercises, content, and media selection are aligned during design (Bates, 2019). In this stage, supporting content is collected for the development of teaching modules through three steps, namely, collecting references, compiling a map of teaching module development needs and preparing a comprehensive teaching module design. The step of collecting references is carried out by collecting sources in the form of images and writing that are suitable for use in making teaching modules. Other sources used include books and journals as well as a complete guide to preparing teaching modules for the Merdeka curriculum published by the ministry of education and culture. Equipment such as a computer is prepared for the process of typing teaching modules, display design is carried out using microsoft word 2010. The activities in this module pay attention to aspects that can improve teachers' skills on how to use teaching resources, direct students to focus and participate in learning activities (Farihah et al., 2021).

The step of compiling a needs map is done by making a mind map about the material that will be included in the teaching module and the syntax of the learning model used, namely the integrated problem solving model of character education. This is in accordance with research by Tze Kiong et al, (2021) which states that learning to deal with problem solving at the school level will enable them to solve problems independently with skills developed at school and can be applied in the integrated design of subjects and projects. In line with Diani's (2015) research which produces an integrated module of character values which is very suitable in the learning process because it can support the achievement of basic competencies, indicators, meet quality standard criteria and can help in the character formation process. The steps for compiling a teaching module design are carried out by following the steps for creating a teaching module according to Maulida (2022). The design of the science learning teaching module design with an integrated problem solving model of character education can be seen in Table 3.
### Table 3. View of the initial design of the teaching module

<table>
<thead>
<tr>
<th>Teaching module components</th>
<th>Appearance</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>General information,</td>
<td><img src="image.png" alt="Teaching module image" /></td>
<td>The first page of the teaching module consists of information on the Teaching Module Title, Level of Education, Phases and Classes, Subjects, Learning Objectives, Sparking Questions, Targeted CP Elements, Learning Model, and Pancasila Student Profile</td>
</tr>
<tr>
<td>Achievements and Learning Objectives</td>
<td><img src="image.png" alt="Specialized area" /></td>
<td>Details of Usage Plan and Module List (Meeting Details)</td>
</tr>
</tbody>
</table>

#### General information, Achievements and Learning Objectives

- **Appearance**: ![Teaching module image](image.png)
- **Information**: The first page of the teaching module consists of information on the Teaching Module Title, Level of Education, Phases and Classes, Subjects, Learning Objectives, Sparking Questions, Targeted CP Elements, Learning Model, and Pancasila Student Profile

#### Details of Usage Plan and Module List (Meeting Details)

- **Appearance**: ![Meeting details](image.png)
- **Information**: This section of the page contains information on facilities and infrastructure, learning activities along with time allocation and learning model syntax

---

Details of Usage Plan and Module List (Meeting Details)

This section of the page contains information on the 2nd meeting's learning activities along with time allocation and learning model syntax.

Supporting Materials or Attachments (Assessment Plans, Student Worksheets, and Reflex Instruments)

This section of the page contains formative assessments.
Develop results

The results of the teaching module design are then developed at the development stage. The initial design of the teaching module was validated and tested for feasibility by instructional experts, namely educational expert lecturers. The results of the validation and feasibility testing process become a reference for revising the initial design of the teaching module. The validators of the teaching module are 6 education lecturers. The validation process is carried out by submitting an initial design draft of the teaching module to the validator along with a validation questionnaire. The results of the recapitulation of validator answers to the validation questionnaire can be seen in Table 4.

**Table 4. Recapitulation of validation questionnaire answers**

<table>
<thead>
<tr>
<th>No</th>
<th>Validation Aspect</th>
<th>Question number</th>
<th>Validation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learning objectives</td>
<td>1-5</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Assessment Plan</td>
<td>6-8</td>
<td>94</td>
</tr>
<tr>
<td>3</td>
<td>Igniter Question</td>
<td>9-10</td>
<td>92</td>
</tr>
<tr>
<td>4</td>
<td>Success Indicators</td>
<td>11-12</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>Activity Framework</td>
<td>13-18</td>
<td>92</td>
</tr>
<tr>
<td>6</td>
<td>Selection of Pancasila Student Profile</td>
<td>19-20</td>
<td>92</td>
</tr>
<tr>
<td>7</td>
<td>Teaching Facilities / Equipment</td>
<td>21-23</td>
<td>83</td>
</tr>
<tr>
<td>8</td>
<td>Supporting Materials / Appendices</td>
<td>24-25</td>
<td>88</td>
</tr>
<tr>
<td>9</td>
<td>Teaching Module in General</td>
<td>26-27</td>
<td>83</td>
</tr>
</tbody>
</table>

Overall percentage 89.2
Based on table 4, the overall percentage of teaching module validation is 89.2%, referring to table 1 this percentage is in the very valid category. A comparison of the percentages for each aspect of validation can be seen in Figure 2.

**Figure 2.** Comparison of percentages for each validation aspect

Based on Figure 2, the highest percentage of validation is in the assessment plan aspect, namely 94%. Meanwhile, the lowest percentage of validation was in the aspects of success indicators, teaching infrastructure/equipment, and aspects of teaching modules in general. Apart from quantitative data, through a questionnaire the researchers also explored criticism and suggestions for improvements to the teaching modules being developed. The criticisms and suggestions submitted by validators are as follows.

**Table 5.** Validator criticism and suggestions for teaching modules

<table>
<thead>
<tr>
<th>No</th>
<th>Validator criticism and suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attachments need to be added</td>
</tr>
<tr>
<td>2</td>
<td>Learning outcomes are not included in the teaching module</td>
</tr>
<tr>
<td>3</td>
<td>Prank questions do not encourage meaningful understanding in students. To build meaningful understanding in students at the intermediate level, present questions that are contextual and ask questions that arouse curiosity</td>
</tr>
<tr>
<td>4</td>
<td>There are no indicators in the teaching module so validators cannot assess alignment with learning outcomes and objectives.</td>
</tr>
<tr>
<td>5</td>
<td>Measuring the achievement of indicators with designed assessments cannot be assessed by validators because there are no indicators in the teaching module</td>
</tr>
<tr>
<td>6</td>
<td>So that the learning steps are easy to understand, some sentence editors need to be revised to be more efficient when read.</td>
</tr>
</tbody>
</table>
it is necessary to remap the variety of student achievements towards learning objectives in learning evaluation instruments

In the attitude assessment instrument in the Pancasila student profile values, a clear description of the relationship between the material and the Pancasila student profile values described is required

follow-up and assessment plans have not been clearly outlined

There are no question instructions/how to work on formative and summative assessments

several points need to be added to the teaching module, such as: CP, indicators, test answers, test grids, and worksheets

Table 5 shows that the teaching module needs to be revised in accordance with validator criticism and suggestions even though the teaching module is valid based on percentage value calculations. The development process required several expert feedback and revisions (Kowitlawakul et al., 2017). Apart from the validation data, the teacher’s response as a user is known from the results of the teacher's answers to the response questionnaire. The data on the results of the responses to the questionnaire can be seen in Figure 3.

![Figure 3. Data from teacher response questionnaire answers to each aspect](image)

The overall percentage of teacher responses to the questionnaire was 89%, based on table 1, in the very good category. Good results show that the module can be used well by teachers to apply to students (Figure 3 shows that the highest percentage of teacher responses to the teaching module is on the continuity aspect. The results show that the module is sustainable with a flow of learning activities that is appropriate to the needs of educators and the learning level of students. This aspect is very important because it can influence students' learning involvement and motivation in actively participating in learning (Hedge & Hewett, 2020; Yulando et al., 2019).
Conclusion

The product produced in this research is a science learning teaching module with an integrated problem solving model of character education. The teaching modules developed are teaching modules on elements, compounds and mixtures. The teaching module developed is valid and suitable for use in science learning, with a percentage score of 89.2% in the very valid category. Apart from that, the teacher's response to the science learning teaching module product using the integrated problem solving model of character education was 89% in the very good category. Therefore, it is recommended that this integrated problem solving model of character education science teaching module be implemented in learning to determine its effectiveness and influence on student learning outcomes.

Acknowledgement

Thank you to Samudra University, Ministry of Education and Culture, through its superior basic research intensive grant for Fiscal Year 2023, which has funded this research

References


Nurlian, N. 2023. Pengembangan LKPD mata pelajaran kimia berbasis discovery learning pada pokok bahasan termokimia kelas XI. *Jurnal Pendidikan Kimia FKIP Universitas Halu Oleo*, 8(2):133-146. [https://doi.org/10.36709/jpkim.v8i2.8](https://doi.org/10.36709/jpkim.v8i2.8)


Purwaningsih, E. 2022. Urgensi kebutuhan pembelajaran ekonomi berkarakter berbasis kelas di SMA. *Jurnal Visi Ilmu Pendidikan*, 14(1):74-84. [http://dx.doi.org/10.26418/jivip.v14i1.43383](http://dx.doi.org/10.26418/jivip.v14i1.43383)


