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Self-Directed Learning Based Teaching Module on Angle Material

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ABSTRAK

Perubahan kurikulum menjadi kurikulum merdeka dilatar belakangi ketertinggalan pembelajaran. Dalam penerapannya kurikulum merdeka tidak sesuai dengan konsep yang ditetapkan oleh pemerintah. Modul ajar perlu dikembangkan sehingga dapat digunakan untuk memfasilitasi guru dan peserta didik. Penelitian ini merupakan penelitian pengembangan (R&D). Tujuan penelitian ini mengembangkan modul ajar self-directed learning (SDL) serta menguji kelayakan modul ajar SDL. Dalam mengembangkan modul ajar tersebut peneliti menggunakan model penelitian 4D. Pengumpulan data menggunakan metode dokumentasi, observasi, wawancara tidak terstruktur dan angket. Analisis data yang digunakan adalah teknik analisis deskriptif kuantitatif. Berdasarkan penelitian yang telah dilakukan peneliti menghasilkan modul ajar SDL. Proses pengembangan modul ajar dikembangkan sesuai dengan proses pengembangan model 4D yang dimodifikasi. Modul ajar yang dikembangkan dikategorikan sangat layak digunakan dalam pembelajaran dan telah dibuktikan secara teoritis maupun empiris. Modul ajar SDL yang telah dikembangkan dapat memfasilitasi guru dan peserta didik dalam melaksanakan pembelajaran yang sejalan dengan konsep kurikulum merdeka.

ABSTRACT

The change of curriculum to an independent curriculum was motivated by the backwardness of learning. In its implementation, the independent curriculum is not based on the concept set by the government. Teaching modules need to be developed so that they can be used to facilitate teachers and students. This research is a development research (R&D). This study aims to develop a self-directed learning (SDL) teaching module and test the feasibility of the SDL teaching module. In developing the teaching module, the researcher used the 4D research model. Data collection used documentation, observation, unstructured interviews and questionnaires. Data analysis used quantitative descriptive analysis techniques. Based on the research that has been done, the researcher produced an SDL teaching module. The modified 4D model development process developed the process of developing the teaching module. The developed teaching module was categorized as very suitable for use in learning and has been proven theoretically and empirically. The SDL teaching module that has been developed can facilitate teachers and students in implementing learning that is in line with the concept of the independent curriculum.

1. INTRODUCTION

The change in the education curriculum from the 2013 curriculum to the independent curriculum was motivated by the existence of learning loss and the decline in the character standards of Pancasila students, as well as the independence of thinking in students (Daga, 2020; Hartoyo & Rahmadayanti, 2022).The change in curriculum to the independent curriculum aims to improve the curriculum in Indonesia in line with the goals of the nation and the values of Pancasila. So that in accordance with the Decree of the Ministry of Education, Culture, Research, and Technology No. 262 of 2022 concerning Amendments to the Decree of the Minister of Education, Culture, Research, and Technology Number 56/M/2022 concerning Guidelines for Implementing the Curriculum in the Context of Learning Recovery, the elementary school curriculum refers to the independent curriculum which consists of intracurricular

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learning and a project to strengthen the profile of Pancasila students which is allocated 20% of the total JP per year (Kahfi, 2022; Zahir, Nasser, Supriadi, & Jusrianto, 2022).

The independent curriculum policy changes the way teachers carry out learning. The implementation of learning with the independent curriculum has changes related to the concept of learning and teaching tools that need to be prepared and considered by teachers. In the independent curriculum learning process, teachers are made the ones in control during the learning process, demanding homogeneous learning and strengthening learning that is oriented towards the rights and abilities of students in determining their learning process which includes setting learning objectives, reflecting on their abilities and taking steps and at the same time being responsible for their learning success (Jufriadi, Huda, Aji, Pratiwi, & Ayu, 2022; Wahyuningsari, Mujiwati, Hilmiyah, Kusumawardani, & Sari, 2022). In the independent curriculum, teachers can be more flexible in implementing differentiated learning and can focus more on essential materials such as literacy and numeracy (Jusuf & Sobari, 2022; Santoso, Damayanti, Murod, & Imawati, 2023). The independent curriculum focuses on freedom in carrying out independent and creative learning activities (Ardianti & Amalia, 2022; Zahir et al., 2022). So that the implementation of the independent curriculum in classroom learning must be based on fun and innovative activities according to the needs, interests, and aspirations so that it can foster positive behavior in students when learning (Rahayu, Rosita, Rahayuningsih, Hernawan, & Prihantini, 2022; Sari, Sunedar, & Anshori, 2022).

In addition to changes in the learning process, in the independent curriculum there are changes in the policy for compiling teaching materials. In the independent curriculum, teachers are free to design learning that is tailored to the abilities of students and aligned with the local context and content (Jufriadi et al., 2022; Rosmana, Iskandar, Fauziah, Azzifah, & Khamelia, 2022).KThe independent curriculum has several characteristics that differentiate it from the 2013 curriculum, namely the RPP which has been changed into a teaching module consisting of Core Competencies (KI) and Basic Competencies (KD) which have been changed into Learning Outcomes (CP), from CP it is derived into the Learning Objective Flow (ATP) (Ardianti & Amalia, 2022; Sopiansyah, Masruroh, Zaqiah, & Erihadiana, 2022). In independent curriculum learning, teachers play an important role in determining learning designs and designing teaching modules in accordance with the module components that have been determined by the government (Y. Indarta et al., 2022; Yamin & Syahrir, 2020). The components of the teaching module consist of general information, core components and attachments.

The teaching module is one of the components that plays an important role in creating learning that is in line with the learning concept in the independent curriculum. And the role of the teacher is very important in determining the direction of creating a learning atmosphere that is in accordance with expectations in the independent curriculum (Gusteti & Neviyarni, 2022; DA Ramadhan & Muhroji, 2022). The role of teachers in independent curriculum learning includes: formulating specific learning objectives that are in accordance with the objectives of the curriculum, characteristics of the subjects, consistency of students and classes, arranging an effective learning process so that students can achieve the goals and competencies set, implementing the learning process as a step in implementing the independent curriculum, carrying out evaluations of the process and results obtained in learning and evaluating the interaction between curriculum components that have been implemented. The various roles of teachers in independent curriculum learning can be achieved through the preparation of teaching modules that are used as guidelines in learning. Therefore, teaching modules are a mandatory requirement for teachers to be made before implementing learning in class (Daga, 2021; Ningrum & Suryani, 2022).

However, conditions in the field provide an illustration that the concept of an independent curriculum is still far from the concept of an independent curriculum. Based on the results of observations and unstructured interviews at SDN Tenggilis Mejoyo I with grade IV teachers, researchers observed the atmosphere of mathematics learning by implementing a drill system, in learning students were given various problems related to material that had previously been discussed. The drill method is a learning method that provides repeated practice for students in order to obtain certain competencies. The drill method was chosen because the teacher wanted learning that could provide direct experience to students in working on practice questions so that students' understanding of the material was more optimal. However, based on the results of unstructured interviews with grade IV students, it showed that students felt bored with learning using the drill method. This is because they only do practice questions in class and focus on the practice questions given.

The weakness of the drill method in learning mathematics is that it can cause boredom. This is because during learning, students work on questions under strict supervision and in a serious classroom atmosphere. In addition, students will experience a decrease in interest in learning (Aman, Uliyanti, & Syamsiati, 2021; Khotimah, 2020). In this case, it is necessary to make adjustments to the learning process in the classroom. These improvements can be initiated by changing the learning model used in the classroom. To develop education optimally in the independent curriculum, educational facilities are needed

that can facilitate students to understand skills and lessons according to the characteristics of each individual through teaching methods (Gusteti & Neviyarni, 2022; Warsidah, Satyahadewi, Amir, Linda, & Mulya Ashari, 2022). The use of monotonous learning models can be replaced by the use of more appropriate learning models to be implemented in the classroom. In mathematics learning, an appropriate learning model is needed by considering the conditions of students and classes that are in accordance with the characteristics of the material, students, and the environment (Dewi Anggelia, Ika Puspitasari, & Shokhibul Arifin, 2022; Fajri, 2019). One of the learning models that supports learning in accordance with the concept of the independent curriculum is the self-directed learning model.

The self-directed learning model is a learning model that leads to independent learning. Self-directed learning is a process of individuals independently systematizing their learning activities independently or with the help of others. In this case, teachers can develop teaching modules using the self-directed learning model so that the designed teaching modules can be a guide for teachers to direct students according to the syntax of the self-directed learning model (Baharuddin, Rosyida, Irawan, & Utomo, 2022; Hanik, 2020).The SDL module can encourage students to develop time management, organization, and prioritization skills. In addition, with a learning method that gives freedom to determine how to learn, students are more encouraged to think critically, connect different concepts, and produce creative solutions. So that the information received by students will stick longer. By learning using the SDL module, students will be able to increase their self-confidence, because when students succeed in achieving the goals they set for themselves, they feel more confident in their ability to learn independently (Gresita & Panduwinata, 2022; Waskito, Subandowo, & Rusmawati, 2020). This can also increase their sense of responsibility and success in their personal and professional lives.

Several previous studies have stated that the development of a hybrid thermodynamic module based on self-directed learning (SDL) for sailors (A. Ramadhan, Jalinus, Ta'ali, & Mulianti, 2021; Waskito et al., 2020).The electronic module based on self-directed learning that was developed has high practicality (Baharuddin et al., 2022; Rudianto, Wulandari, & Yuliati, 2021). Other studies state that the use of interactive digital modules in online learning and self-directed learning-based practicums is appropriate when used in online learning to improve learning achievement during the pandemic (Gresita & Panduwinata, 2022; Hanik, 2020). Based on previous findings, it can be said that self-directed learning-based modules have a positive impact on the learning process. Therefore, this study emphasizes the development of teaching modules based on self-directed learning models by loading mathematics subjects on angle material in grade IV of elementary school which have never been developed by previous researchers. With the development of teaching modules based on self-directed learning, it is expected to describe the creation of teaching modules and the validity of teaching modules based on self-directed learning. The purpose of this study is to develop a self-directed learning (SDL) teaching module and test the feasibility of the SDL teaching module.

2. METHOD

This research is a type of research and development (R&D) research that refers to the 4D development model. The 4D development model consists of four stages, namely the define, design, develop and disseminate stages. In this study, 4D research is adapted into 3 stages consisting of the define, design and development stages presented in Figure 1.The subjects of the study were fourth grade teachers at SDN Tenggilis Mejoyo I, fourth grade students of elementary school, 3 expert validators, namely experts in teaching modules, teaching materials, LKPD and assessment instruments. Data collection techniques in this study were documentation, observation, unstructured interviews used to collect data as a reference for implementing the process of developing teaching modules and questionnaires used to measure the feasibility of self-directed learning teaching modules for corner material and product validation questionnaires development including teaching module validation, teaching material validation, LKPD validation, assessment instrument validation.

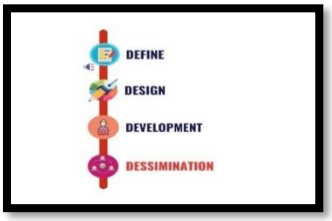

Figure 1. 4D Development Model

Data collection methods include distributing validation questionnaires to expert validators of teaching modules, teaching materials, LKPD, and assessment instruments. The data obtained are in the form of quantitative data. The data obtained in the analysis uses quantitative descriptive analysis techniques, namely by describing the quantitative data that has been collected so as to obtain general conclusions. The quantitative data in question is data obtained from the calculation of the number of answers for each respondent calculated using the average formula.The questionnaire data obtained was calculated using an average score to produce quantitative data, after which the values were summarized and categorized into assessment criteria score intervals.not feasible, less feasible, feasible and very feasible as in Table 1.

Table1. The Score Interval

***Interval* score**	**Criteria**
4.2 – 5.00	Very decent/good
3.4 – 4.2	Worthy / good
2.6 – 3.4	Not good enough
1.8 – 2.6	Not worthy/good

3. RESULTS AND DISCUSSION

Results

The development of the self-directed learning teaching module for angle material was carried out using the 4D development research model which has been adapted into 3 stages, which include the define, design and development stages. The initial stage in the development of the independent curriculum teaching module based on self-directed learning is the definition stage (Define). This stage is divided into 5 stages, namely initial and final analysis, student analysis, concept analysis, task analysis, and formulation of objectives. In the student analysis, the researcher conducted unstructured interviews and direct observations in the classroom. The data obtained by the researcher in the interview on November 7, 2022 found information that in the learning process of the angle chapter on the angle measurement material, students had difficulty determining the scale on the protractor which resulted in students being unable to determine the angle size correctly. Furthermore, the student analysis focuses on the analysis of student characteristics. In the classroom, students have characteristics that have diversity. So based on this student analysis, the researcher needs to develop a teaching module and student learning facilities that can support learning differentiation. Next, in the concept analysis, the concept analysis was carried out by the researcher by analyzing the learning achievements in phase B of class IV, the angle chapter included in the geometry domain. Based on this analysis, the researcher describes the angle chapter into several sub-chapters of discussion that focus on measuring angles. Furthermore, task analysis, based on the CP analysis of phase B of class 4, the researcher analyzed the tasks given to students. The researcher describes the students' tasks into various models or ways of learning, namely visual, kinesthetic, and verbal. and the formulation of objectives analyzed based on the learning achievements of phase B of class 4, the researcher reduces them to a learning objective flow (ATP).

The second stage in the development of the independent curriculum teaching module based on self-directed learning is the Design stage. This stage is divided into four stages which include the stage of compiling the test, the researcher compiles the test standard by describing the learning outcome test grid, assessment guidelines and answer keys. The test is in the form of an essay and consists of 5 questions. The assessment stage consists of an attitude assessment that refers to the characteristics of an independent attitude and the attitude concerned such as responsibility, self-confidence and so on, knowledge assessment and skills assessment. The media selection stage, the selection of media in this analysis is a protractor, and learning videos that can be accessed independently by students. The format selection stage, the format for developing the independent curriculum teaching module based on self-directed learning is adjusted to the format of the independent curriculum teaching module. Initial design, which is carried out in this stage, namely: making the cover of the teaching module, making the contents of the teaching module which includes the module identity, core components and attachments of the teaching module, compiling the initial framework of the attachments of the teaching module consisting of compiling teaching material, making student assignments on LKPD and making competency test questions, making the cover of the self-directed learning package book, arranging the initial framework of the module attachments into the design of the self-directed learning package book.

In the second stage, the initial design of the teaching module that has been designed is then consulted with the validator with the aim of obtaining input as evaluation material or improvement of the

teaching module that has been made. The teaching module that has been improved based on input and suggestions from the validator is draft I of the independent curriculum teaching module based on self-directed learning Figure 2.

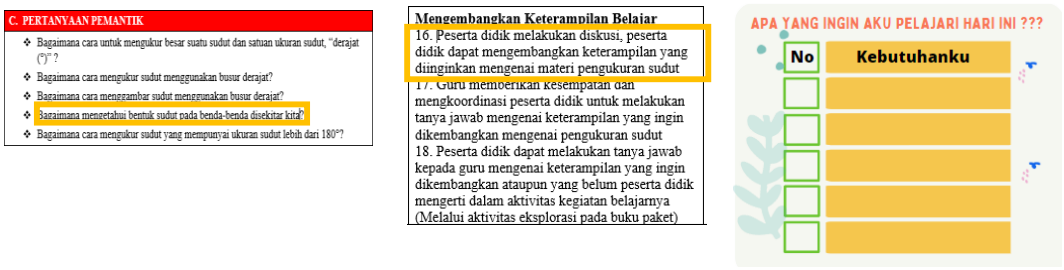

Figure 2. The Teaching Module Product Design Self-Directed Learning

The final stage in making this teaching module is the development stage (Develop). This development stage goes through 3 stages, namely: expert validation stage, at this stage the product of the development of the teaching module is validated by the validator, namely draft 1 which has been revised from the independent curriculum teaching module. Validation of the development product uses the validation instrument of the teaching module along with attachments from the teaching module consisting of teaching materials, LKPD, and assessment instruments. This aims to ensure that the teaching module that has been developed can be measured for its feasibility based on the assessment of the expert validator. The Product Design development stage (Draft II), draft I which has been validated by experts needs to be revised slightly so that the product developed is very suitable for use in the learning process. Draft I The teaching module product that has been revised by the researcher is draft II of the independent curriculum teaching module product based on self-directed learning. The final product stage, draft II of the independent curriculum teaching module development product is the final product of the independent curriculum teaching module based on self-directed learning shown in Figure 3.

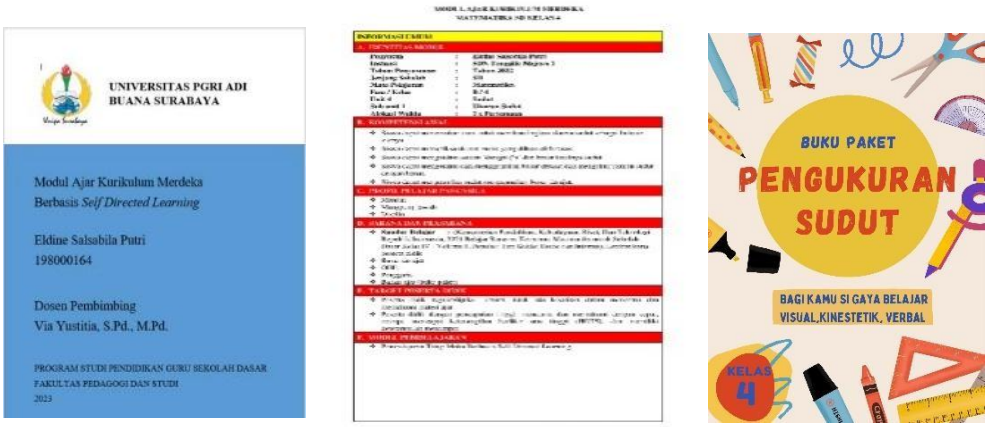

Figure 3. Final Product of Self-Directed Learning Teaching Module

The feasibility of self-directed learning-based teaching modules on corner material for grade IV elementary school is obtained from the validation results of teaching module experts, teaching materials, LKPD, and assessment instruments. Based on the validation results, teaching module experts, it is known that the self-directed learning-based teaching module on corner material is included in the very feasible criteria. The results of the validity of teaching material experts are known that the teaching materials that have been designed are included in the very feasible criteria. The results of the validity of LKPD experts are known that the LKPD that has been designed is included in the very feasible criteria, the results of the validity of assessment instrument experts are known that the assessment instruments that have been designed are included in the very feasible criteria, presented in Table 2.

Table 2. The Expert Validation Feasibility Test

Teaching module *self directed learning*	Score			Average score			Criteria
	Material	Language	Appearance	Material	Language	Appearance	
Teaching module	44	25	24	4.8	5	4.8	Very worthy
Teaching materials	70	23	36	4.6	4.6	4.5	Very worthy
Worksheet	49	20	25	4.9	5	5	Very worthy
Assessment Instrument	74	20	45	4.9	5	4.5	Very worthy

The self-directed learning teaching module developed through the draft I stage was validated by experts. The results of the validation also showed that the learning activities in the developed teaching module were learning activities that directed students to learn independently and according to their interests and learning styles.

Discussion

Based on the results of the study, it shows that the self-directed learning teaching module that was developed can direct students to learn independently and according to their interests and learning styles. The teaching module is designed based on the 4D development model and has received an assessment from expert validators, so it can be said to be very feasible and can support learning activities in the independent curriculum and can foster independent character in students. The use of the self-directed learning model in the independent curriculum teaching module is an innovation in learning in the independent curriculum. This is because the concept of the self-directed learning model has similarities with the concept of the independent curriculum. The self-directed learning model views students as subjects in learning. The concept of self-directed learning is a learning model in which students decide for themselves what needs to be learned, identify or diagnose their learning needs, formulate learning objectives, find learning resources according to their needs and monitor and reflect on their learning activities (Mentz & Lubbe, 2021; Wasyilah, Yusrizal, & Ilyas, 2021). This is in line with previous findings that found that the attitude of Self-directed learning that grew from the existence of e-modules included students having the confidence to be able to control their learning methods independently, and determine the right strategy to carry out their learning activities, have the ability to organize their learning schedules, try to understand the material independently, and find their own solutions to solve the problems faced according to their learning style and characteristics (Hanik, 2020; Rasmawan & Erlina, 2021).

Independent curriculum learning expects learning that frees students to carry out learning activities according to their abilities (Aisyah, Rizqiqa, Putri, & Nulhaq, 2022; Yose Indarta et al., 2022). The concept of the independent curriculum is in line with the teachings of Ki Hadjar Dewantara, where the independent learning curriculum emphasizes the important elements of the principle of independence for students, education does not only fill students' heads with materials that are still abstract or just provide knowledge, but education must also provide opportunities for students to develop their potential so that they can stand alone but with the supervision of teachers and parents so that their competence does not lead to negative things (Kahfi, 2022; Santoso et al., 2023). From the statement above, it is known that the main focus in the independent curriculum is the freedom of students to seek an experience in a creative way with or without help from others in this case, namely learning resources.

In this case, the two concepts, namely self-directed learning and independent curriculum, have similarities. The common thread that can be drawn in these two concepts is the independence and freedom given to students and teachers. In addition to these similarities, the self-directed learning model can also form an independent character in students at the same time. Learning using the self-directed learning model can make students active and independent in learning.This is also a match if learning in the independent curriculum uses a self-directed learning model, because the independent curriculum also focuses on providing reinforcement for character and competency development (Fauzi, 2022; Hanik, 2020). The character development is implemented through the Pancasila student profile project in intracurricular, extracurricular and co-curricular. The self-directed learning model that leads to learning using an

independence system can become a trend and become one form of future learning (Baharuddin et al., 2022; Karatas & Arpaci, 2021).

In this study, researchers tried to compile a teaching module that suits the needs of students in the field. In addition, learning success can also be overcome by compiling learning devices that use approaches, strategies or models that are appropriate to conditions in the field (Gresita & Panduwinata, 2022; Inscription of Abrar, Salam, & Suharti, 2021). With the right learning model, the direction of learning will be directed according to the objectives. This is in line with previous research which stated that the Pancasila-based learning model in learning the geometry of lines and angles can be useful for developing independent, creative, noble, knowledgeable, and responsible attitudes (Hanik, 2020; Kusmaharti & Yustitia, 2022). The development of self-directed learning-based teaching modules is flexible in learning, which means that the SDL module provides flexibility for students to learn according to their respective learning styles, be it visual, auditory, or kinesthetic. They can choose the most appropriate learning materials and organize their learning time according to their needs. So that this learning is in accordance with the current curriculum, namely independent learning. By implementing learning that is in accordance with students' learning styles, it will have an impact on increasing student motivation in learning.

The results of this study are strengthened by the results of previous studies which stated that the application of the self-directed learning model is more effective in increasing students' learning independence and abilities (Gresita & Panduwinata, 2022; Wasyilah et al., 2021).The manual arc welding electronic module based on the self-directed learning model can improve students' learning outcomes in understanding learning materials, so that the teaching module can be used in learning (Hanik, 2020; A. Ramadhan et al., 2021).Other research states that the self-directed learning model with the help of the Notion website makes students more active, for example, in learning, students can use their thinking skills, search for information, and study the material and practice questions on the Nation website (Baharuddin et al., 2022; Karatas & Arpaci, 2021).Based on the theoretical study, empirical studies that have been presented by the researcher above, the researcher found that self-directed learning can be applied in independent curriculum learning activities at the elementary school level. This is based on the similarity of concepts and syntax in the self-directed learning model. From the two subjects, it was stated that students are given the freedom to carry out learning activities according to their abilities, interests, talents and learning styles. In addition, the application of this self-directed learning model can foster independent character in students in line with the character in the Pancasila student profile. The implication of this research is that teachers are expected to be able to develop and use appropriate learning models, strategies and media according to the characteristics and environment of the school. In order to increase student motivation and learning outcomes.

4. CONCLUSION

Overall, the study revealed that the self-directed learning teaching module developed is valid and very feasible to be used in learning and can foster independent character in students based on the validation questionnaire assessment and theoretical studies found. In the research conducted by the researcher, it can be concluded that the self-directed learning model which is usually implemented in adult learning can also be implemented in elementary school students, especially in the independent curriculum.

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