DEVELOPMENT OF GEOMETRY TEACHING MODULES BASED ON MATHEMATICAL LITERACY USING TESTS IN PARTIAL CREDIT MODEL SCALE FOR JUNIOR HIGH SCHOOL IN EAST KALIMANTAN

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ABSTRACT

The research aims to produce products in the form of Geometry teaching modules based on Mathematical Literacy with Geometry problems with a Partial Credit Model (PCM) scale at the junior high school level. The research subjects of junior high school students in the East Kalimantan region are represented by several district/city public junior high schools as the implementation of development and dissemination trials. The research and development process follows the flow of the 4-D model ((Define, Design, Develop, Disseminate) by involving several expert validators (material and language), as well as validation from several mathematics teachers and some students. The results of this development research show that the product in the form of a Geometry Teaching Module meets the criteria of feasibility, validity, practicality, and effectiveness. For further study, it is better to use geometry material and different school levels and development models, still using Partial Credit Model scale geometry questions to compare the quality of module products.

Keywords: Research and Development, Geometry teaching module, Partial Credit Model

INTRODUCTION

Teaching modules are a form of learning resources and teaching materials whose use is very flexible. This teaching module is a complementary tool for students who feel more comfortable learning mathematics individually. However, it can also be studied together in groups, either in a classroom, group study, or other places that allow learning. The deepening of the material through teaching modules provides students flexibility in their thinking to bring out creativity, independence, confidence, learning motivation, and others, which leads to the emergence of student potential in mathematics, especially Geometry. In addition to helping students in learning, it also helps teachers implement mathematics learning.

The results of observations in school learning or lectures show that the achievement of student learning outcomes in Geometry tends to be low. The difficulty of students or students in studying Geometry (Flat geometry, Space Geometry, Analytical Geometry, Transformation geometry) varies greatly. Students or students have problems in understanding and applying geometry concepts to problem-solving. This condition is under the results of the study Klancar et al. (2021), which states that student performance in Geometry tends to be weak in understanding the concepts of field geometry, spatial geometry, and solving problems related to geometry. Likewise, Pujawan et al. (2020) research finds that students struggle to understand

geometry material about spatial abilities. To run mathematical literacy successfully requires the ability to formulate, use, and interpret mathematics in various contexts, especially mathematical problems in everyday life, efficiently. Therefore, there is a need for a Geometry teaching module related to mathematical literacy.

One of the measuring tools in the field of Geometry that has been available is the Geometry field test question with Partial Credit Model (PCM) scaling at the junior high school level based on Mathematical Literacy that has been developed by Sugeng et al. (2022) In general, the measuring instrument used is an objective form test (multiple choice type complement), which makes it easy to prepare the answer key.

Several studies have been conducted about teaching modules. Alfiansyah & Hakiky (2021) conducted development research on mathematics teaching modules of Fractional material in Grade IV Elementary School, and this research used a 4-D development model. Likewise, Nesri & Kristanto (2020) also conducted development research on developing technology-assisted teaching modules to develop students' 21st-century skills using the ADDIE model. Setyawan & Wahyuni (2019) also researched the development of multimedia-based modules in the Educational Statistics course at the university level, using a two-stage development model, namely early-final analysis and formative analysis. Mardiah et al. (2018) researched the development of ethnomathematics-based mathematics learning modules using inquiry methods. Azka, Setyawati, & Albab (2019) research learning module development of the several development studies that other researchers have carried out, no one has emphasized geometry material whose measurements are based on Geometry field test questions with Partial Credit Model (PCM) scaling at the junior high school level. Therefore, it is necessary to conduct research and development (R&D) (Sugiyono, 2013) about developing geometry teaching modules based on mathematical literacy with Partial Credit Model scale problems using 4-D models at the junior high school level in East Kalimantan.

Based on the description above, there are the following research questions: (1) how is the physical teaching module of Geometry as the final product, and (2) how is the feasibility, validity, practicality, and effectiveness of the Geometry module based on mathematical literacy with measurement problems using the Partial Credit Model scale at the junior high school level in the East Kalimantan region. This research aims to produce products in teaching modules based on mathematical literacy that are feasible, practical, valid, and effective as research problems.

Teaching Modules. The teaching module is one of the essential parts of implementing learning managed by teachers. The module is a self-instructional teaching package containing a concept or unit of a learning material that prioritizes independent involvement and student experience in utilizing module media (Riadi, 2013). The teaching module focuses more on

essential material in learning and provides flexibility for teachers in carrying out teaching and learning activities (Mulyanto et al., 2023) and student learning. Therefore, the role of teaching modules is beneficial for teachers in developing student competencies in literacy and numeracy.

There are two principles in the development of teaching modules, namely (1) module development based on the results of needs and conditions analysis, and (2) module structures and components must meet existing needs and conditions (DIPP Direktorat Inovasi dan Pengembangan Pendidikan), 2022). In addition, it also provides the steps of the module preparation process, namely (1) determining the appropriate learning strategy and learning media, (2) producing physical modules, and (3) developing assessment tools to assess all aspects of competence (related knowledge, skills, and attitudes), based on established standards.

Deepublish (2022) and Riadi (2013) guide module components so that module writing becomes more precise and as needed, namely (1) Explicit and specific instructional objectives, (2) Teacher instructions, (3) Worksheets, (4) Student activity sheets, (5) Worksheet keys, (6) Evaluation sheets; and (7) Bibliography. From the module components, learning purposes are formulated in the form of specific and measurable behavior. Teachers need to guide various activities that will be carried out during the teaching and learning process. The teacher's instructions include allocating time to learning, the tools required in education, and others to complete the module successfully and appropriately within the specified time. Worksheets are a place to work on problems and create charts, tables, and more for students. Student activity sheets include activities following the teaching material students need to master. In addition, it is also necessary to include the sourcebook of the material studied. The worksheet key is intended as a means for students to make corrections to questions that have been done by themselves. Evaluation sheets are essential to be prepared to determine the level of student success (final test) and the achievement of the purpose of using the module from students.

According to DIPP (Direktorat Inovasi dan Pengembangan Pendidikan) (2022), Learning modules need to pay attention to several essential elements that point to the quality of modules, namely (1) Module Format, including (i) column formats (single or multi) proportionally; (ii) paper format, whether vertical or horizontal, and (iii) signs that are easy to understand and aim to underline important information, and the icon may be an image, bold, italic, or otherwise; (2) Organization, including (i) the appearance of maps or charts showing the scope of module material; (ii) systematic organization of teaching content/materials so as to make it easier for students to understand teaching materials; (iii) manuscripts, drawings or illustrations are arranged regularly so that the information presented is accessible for students to understand; and (iii) headings, sub-headings, paragraphs and descriptions are well organized so that students can easily follow; (3) attractiveness; includes (i) front cover, using colors, images, or illustrations, font shapes and sizes; (ii) the contents of the module, which is equipped with

images, font printing (italics, bold, underline), and (iii) assignments and practice questions are neatly packaged so that they are attractive.

Geometry is one branch of mathematics that studies points, lines, and shapes in the second dimension, three dimensions, and the relationships between concepts, facts, principles, and objects learned. Learning geometry directs students to be able to think constructively so that the potential for critical and creative thinking arises. According to Rianto et al. (2021), Geometry learning is inseparable from the geometry learning phase based on Van Hiele's theory to increase students' geometric thinking levels. The idea examines the developmental process that students go through in studying geometry. Students, as learning persons, are directed to think in a tiered and analytical manner, ranging from simple to complex, according to the level of students' thinking abilities.

Mathematical literacy. Literacy involves a series of learning that places a person to achieve goals, develop knowledge and potential, and play a role in the group community. According to OECD-PISA (2012), Mathematical literacy is an individual's capacity to formulate, use, and interpret mathematics in various contexts, especially about everyday life problems efficiently. Therefore, a student can solve the problems at hand, especially those related to mathematics, if the student can apply the varied and previously acquired knowledge to the everyday situation.

Problems with Partial Credit Model (PCM) Scaling in Geometry. The partial credit model (PCM) is one of the polytomous IRT models developed by Masters (1982) and is an improvement of Rasch's model for dichotomous dichotomous dichotomous test data into final results expressed over two categories of ordered responses (polytomous). Embretson & Reise (2000) revealed that PCM was developed to analyze test questions that require multiple stages and to provide partial credits for completed steps in the process of completion. The Partial Credit Model (PCM) has an algebraic model (Masters, 1999) follow:

$$P_{nix} = \frac{1}{1+\sum_{k=1}^{m_i}\exp\sum_{j=1}^{k}(\beta_n - \delta_{ij})} \qquad \text{for } x = 0, \qquad (1)$$

$$P_{nix} = \frac{\exp\sum_{j=1}^{x}(\beta_n - \delta_{ij})}{1+\sum_{k=1}^{m_i}\exp\sum_{j=1}^{k}(\beta_n - \delta_{ij})} \qquad \text{for } x = 1, 2, 3, \ldots, m_i \qquad (2)$$

Location competency level βn), a continuum of n students, is estimated based on students' answers to relevant items. The solutions of each item are arranged by group into final result categories *x* ordered from 0.1,..., *mi*.

PCM Scaling on Geometry. Responses to an item of Geometry PCM (i) grouped into (mi+1) sequential categories. The score of category x on the Geometry (i) question item is round and sequential, x = 0, 1, 2, ..., mi. The category score represents respondents' choice of alternative answers regarding the concept of Geomey contained in the alternative solution in multilevel so that the scale construction or category x score on the Geometry question item i is round and sequential, x = 0, 1, 2, ..., mi. A scale or score of category 0 pertains to the choice of alternative answers that contain the least amount of Geometry elements and that answer is correct. A category one score relates to a selection of solutions that include more geometry elements. That answer is more accurate than a category 0 score until m is the highest. Thus, the category score of each item of the Geometry problem is 0, 1, 2, 3, or 4, and score category 5.

METHODS

This development research was carried out in grade VIII of the State Junior High School level in the East Kalimantan region, even in the 2022/2023 academic year semester. The subjects of the study were students of SMPN 5 Kota Samarinda (N = 21, during a development trial with small classes); students of SMP Negeri 4 East Kutai Regency (N = 23, during the dissemination stage with large classes); SMP Negeri 7 Kabiupaten Panajam Paser Utara (N=29, when the setting is disseminated with large classes). The object of research is the Geometry teaching module based on Mathematical Literacy with Partial Credit Model Scale Problems.

Development research uses a 4-D development model, including Define, Design, Develop, and Disseminate (Thiagarajan et al., 1974). The stages are as adapted by Akbar & Hartono (2017).

Module Development Design

a. Define stage, which includes several activities that eventually lead to forming an initial model (prototype), starting from the Analysis of the Curriculum and analysis of student characteristics to the Formulation of learning objectives. Activities in this first stage are a form of needs analysis and through literature studies.

b. Design stage: activities at the design stage include the selection and determination of the format of learning tools. The structure includes a title, study instructions, essential competencies or subject matter, supporting information, assignments/exercises or work steps, and assessments. Initial design (initial draft) according to a pre-selected format.

c. **Develop stage**, as a step to realize the design to produce the final product following the specified specifications. This stage includes two activities, namely

1) **Expert assessment**, including stages: (a) Expert validation and (b) Product revision. Material experts and Indonesian experts carry out the validation of learning modules. This validation aims to determine the product's feasibility before being tested in the learning

process. Furthermore, the results of expert validators are material for revision and improvement of the initial product. Once the product is improved according to the improvement suggestions of the material and language validators, it becomes development material later.

2) **Development trials** at the end of the experiment at the end of the trial
   a) **Field trials**. After the product has been revised, the Geometry teaching module is piloted to students. At the end of the experiment, students were given an instrument to find out their feedback on this geometry teaching module. Results of development trials to analyze effectiveness, validity, and practicality. Products, as well as repair materials.
   b) **Final product revision**. After the product is repaired, if the results are ineffective, it is tested again until it obtains effective results. After improvements are made from the effects of product trials, then the final product is printed.

3) Disseminate stage (dissemination). At this stage is applying teaching modules (products) in actual learning practice. Teachers and students apply geometry teaching modules in teaching and learning activities

The process of preparing a module prototype follows steps from various sources. It includes: (a) Front cover, (b) Introduction, (c) Table of contents, (d) Module Usage Instructions, (e) General Competencies, (f) Specific Competencies, (g) Study Instructions, (h) Concept Map, (i) Learning activities 1, (j) Student worksheets, (k) Key worksheets, (l) Evaluation sheets, (m) Bibliography.

Data Collection and Analysis Techniques

Data in the dvelopment of this teaching module includes qualitative and quantitative data. Expert validators, teachers, and students obtain qualitative data from module validation. Quantitative data in this development research is in the form of scores of the results of working on the Evaluation Sheet in the module and product validity scores by expert validators. In addition, questionnaire response data for teachers and student questionnaires were on the Likert scale. Validity scores from validators, teachers, and product assessment scores through student questionnaires are used to determine the feasibility of the Geometry teaching module.

Research data analysis includes qualitative data and quantitative data. Qualitative data analysis is intended to make decisions based on qualitative data related to module validation. In this study, material and language expert validators provide qualitative judgment on the quality conditions of learning modules by deciding whether it is feasible with revision. Quantitative data analysis through response scoring is then confirmed to specific categories, especially on aspects of module quality such as feasibility, practicality, and others.

The feasibility of the teaching module was determined based on qualitative responses collected through questionnaire instruments on the Likert scale with five options. Scoring was carried out on the five options. The initial steps determine the eligibility percentage (x), and then The calculation result x is confirmed against the eligibility criteria disclosed by Wahyuni et al. (2020).

Quantitative analysis of practicality is carried out by first determining the percentage of teacher questionnaire responses (P) using rules.

$$P = \frac{\sum TSe}{\sum TSh} x100\%$$

where P is the percentage of the practicality of the module; TSe is the sum of students' overall response scores; TSh is the maximum possible number of scores from a student's overall response. The results are interpreted according to the following criteria

Table 1. Module Practicality

No	Practicality Criteria	Level of practicality
1	80% < P ≤ 100%	Very Practical
2	60% < P ≤ 80%	Practical
3	40% < P ≤ 60%	Less Practical
4	20% < P ≤ 40%	Impractical
5	0% < P ≤ 20%	Very impractical

Source: Nesri & Kristanto (2020)

Validity analysis based on data in the form of teacher questionnaire responses classified on a Likert scale to 5, then converted into percentages with the following rules.

$$V = \frac{\sum x}{\sum xi} x100\%$$

Where ∑x is the sum of all scores of responses, and ∑xi is the sum of all maximum scores of responses. The calculation results match the table Nesri & Kristanto (2020) disclosed.

The effectiveness of using modules in learning is reviewed through indicator indicators using percentage techniques. Then, it is necessary to confirm the results of the questionnaire data analysis with the criteria for the effectiveness of the application of media or modules (Daryanes & Ririen, 2020). The results of the percentage calculation are consulted against the module effectiveness criteria from Fitria, Ramdani & Hadiprayitno in Sugeng & Hidayati (2023).

Analysis of the level of mastery of the material from the teaching module is carried out based on the results of working on test questions at the end of the module. The level of student mastery of the material in the module using rules:

$$\text{Mastery Level} = \frac{\text{Number of correct answers}}{\text{Number of questions}} x100\%$$

Then, it is confirmed in the table as disclosed by Suryanto (2014). When using KKM (MCC, Minimum Completeness Criteria), the reality is that the completeness of learning for mathematics lessons at each school level tends to have different MCC.

RESULTS AND DISCUSSION

Results

Two validators validate the results of the initial preparation (prototype), namely the mathematician validator validating the mathematical material (Prof. Dr. Azainil, M.Si.) and the Indonesian language validator validating the language (Dr. Syamsul Arifin, M.Hum.). Both validators provided an assessment and decided that the geometry taught module was worth continuing in development research. After the Product Revision, a development trial was carried out using a sample of students of SMP Negeri 5 Kota Samarinda (N = 21), as well as validated by mathematics teachers (through questionnaires) and students (through questionnaires and test questions). Some inputs from teachers and students can be concluded that the module contains complete, attractive, easy-to-understand material, material according to what is learned, and others. The teacher suggested giving examples of AKM (MCA, Minimum Competency Assessment) questions. This suggestion is fulfilled by using the form of PCM problems based on mathematical literacy.

In the trial of developing teaching module samples measuring N = 21, based on student responses using questionnaires, it showed that 30.95% of students stated that the teaching module was Excellent, and 38.10% of students stated Good. Thus, most students (69.05%) said the Geometry teaching module has indicators of modules with Very Good or Good categories. In addition, the student's geometry test questions showed that questions 1, question 2, question 4, and question 5 were answered correctly by 47.62%, 76.19%, 66.67%, and 42.85% of the total students, respectively. Question 3 includes difficult questions so that only a few students can do it correctly. Final Product Revisions are carried out based on input/suggestions on development trials.

The results of the development trial phase related to the validity of the teaching module, found by using responses from five junior high school mathematics teachers through questionnaires, and the final results showing Very Valid, can be seen in the following table.

Table 2. Module Validity

Validity	Number 0f score	Max Score	Validity (%)	Category
Geometry Module	652	700	93,14	Highly Valid

Source: Research results

Implementation of the dissemination phase based on the results of the final product revision. This stage follows the condition of the module after the final product revision, namely (a) expert validators decide the module is feasible, (b) involve a prominent enough sample (21 students), and (c) teacher and student suggestions state that the module content is complete, attractive, easy to understand and others. This stage follows the condition of the module after the Final Product Revision, namely (a) expert validators decide the module is feasible, (b) involve a large enough sample (21 students), and (c) teacher and student suggestions state that the module content is complete, attractive, easy to understand and others.

The results of the final product revision of the module become the basis for the implementation of the dissemination of geometry teaching modules in the actual class. Applying teaching modules in learning involves SMP Negeri 4 Kabupaten Kutai Timur (N = 23) and SMP Negeri 7 Kabupaten PPU (N = 29). Both are included in the territory of East Kalimantan Province. In dissemination, there is one trial class each, so there are two trial classes.

Figure 1. The teacher (Mrs. Amdini) explained how to learn to use modules at SMPN 4 East Kutai Regency

Figure 2. The teacher (Mrs Desi) gave an explanation accompanied by writing at SMPN 7 North Penajam Pasir Regency

Table 3. Practicality of Modules According to Student Responses of SMP Negeri 4 Kutim Regency

Modul	Practicality (%)	Category
Geometry Module	81,45	Very Practical

Source: Research results

The dissemination implementation at SMP Negeri 4 East Kutai Regency showed that the Geometry teaching module had a practicality score of 81.45%, according to the criteria of product practicality in the Very-practical category (Nesri & Kristanto, 2020). These conditions can be seen in Table 3 above. Students give a very practical response to using Geometry

teaching modules in classroom learning. However, around 18.55% of the rest still needs to be considered regarding teaching modules, both from the content, material description, and others which, if used, are not student expectations.

In addition, students also give responses that tend to be very effective in applying geometry teaching modules in learning practice. This situation is indicated in the response to each of its indicators. Content Feasibility Indicators, the presentation of the material, and the language showed very effective categories, each having an indicator effectiveness percentage of 82.26%, 80.87%, and 85.87%. Another indicator, module design, has an effectiveness percentage of 76.74% in the Effective category. The effectiveness of each component can be seen in Table 4.

Table 4. Module Effectiveness Based on Response from Student of SMP Negeri 4 Kutim Regency

Module Indicators	Effectiveness of Indicators (%)	Category
Eligibility of contents	82,26	Highly effective
Presentation of material	80,87	Highly effective
Language	85,87	Highly effective
Module design	76,74	Effective

Source: Research results

The SMP Negeri 7 North Penajam Paser Regency trial showed that the Geometry teaching module had a practicality score of 84.10% and was in the very practical category according to product practicality criteria (Nesri & Kristanto, 2020). More details can be seen in Table 5 below.

Table 5. Practicality of Modules According to Responses from Students of SMP Negeri 7 Kabupaten PPU

Module	Practicality (%)	Category
Geometry Module	84,10	Very Practical

Source: Research results

Students respond to geometry teaching modules with predicates effectively applied in classroom learning. The effectiveness of each indicator in categorizing the module using criteria is shown in Table 6 below.

Table 6. Module Effectiveness According to Responses from

Students of SMP Negeri 7 Kabupaten PPU

Module Indicators	Effectiveness of Indicators (%)	Category
Eligibility of contents	85,66	Highly effective
Presentation of material	80,69	Highly effective
Language	85,86	Highly effective
Modul Design	84,66	Highly effective

Source: Research results

The Feasibility of Content, Material Presentation, and Language indicators show very effective categories, each of which has an indicator effectiveness percentage of 85.66%, 80.69%, and 85.86%. Another indicator, module design, has an indicator effectiveness percentage of 84.66% in the Very Effective category.

Students' success in dissemination schools tends to differ in doing math problems in the Geometry teaching module. Student score achievement can be compared with MCC (Minimum Completeness Criteria), as shown in Table 7 below.

Table 7. Achievement of Results of Taking Tests on Modules

	MCC	Achieving MCC	
		Student	%
SMPN 4 Kabupaten Kutim	65	16	70
SMPN 7 Kabupaten PPU	75	24	82,75

Source: Research results

The average achievement for all students of SMP Negeri 7 Kabupaten Penajam Paser Utara (76.9%) is higher than that of SMP Negeri 4 Kabupaten Kutai Timur (67.17). In addition, the percentage of students who achieve KKM in each school is also different (Table 7). If the average score of the two dissemination schools is combined, the combined average score reaches 72.03, and the average achievement of MCC is 76.85%. The material mastery of the two schools was also different, with an average score of 67.17. According to Suryanto (2014), the category is Less, and the 76.9 category is Enough, and the conditions follow the number of students who can reach MCC.

Discussion

At the expert validation stage, Material and Language validators state that these initial modules are generally feasible for research activities. In addition, based on questionnaire responses from five mathematics teachers showed that the Geometry teaching module was Very valid. From the two initial validations, the geometry teaching module meets the requirements of Feasible and Valid. Likewise, the results of dissemination in the two public junior high schools

mentioned above, each school show the value of the practicality of modules and that the effectiveness of teaching modules is fulfilled. Thus, module requirements related to Feasibility, Validity, Practicality, and Effectiveness are met so that this Geometry teaching module can be used widely.

A teaching module's feasibility, validity, practicality, and effectiveness requirements must be met to maintain the quality of teaching modules produced through research. This study supports the research of Wahyuni et al. (2020), whose research results that the requirements for a good module product include (a) material expert validation (with an average score of 4.28, Very decent category), and (b) media expert validation (with an average score of 4.01 Very attractive category). The study also concluded that REACT-based mathematics learning modules are feasible, interesting, and effective for learning teaching materials. Suastika & Rahmawati (2019), in their research, also revealed that student learning activities can be improved through the use of modules or media that are categorized as effective.

In the results of his research, Setyawan & Wahyuni (2019) revealed that the assessment from validators of the developed teaching modules had a validity of 81.14% in the very valid category. The teaching module also has a practicality rate of 86.93% in the Very practical category. Both aspects (validity and practicality) meet the requirements, showing that the learning media developed is very easy for students to use in the learning process.

Through research, Al Azka et al. (2019) developed a mathematics learning module for public junior high school students with a PMRI approach whose results showed that the module quality requirements were met. The requirements relate to (a) material validation test assessment (86.25% with the Very good category), (b) learning media validation test assessment (86%, the Very good category), (c) media practicality (87.8%, the Very practical category), and (d) learning effectiveness using modules.

In her research, Nieveen in Nuryadi & Khuzaini (2017) AAA revealed that the product quality from the development research must meet valid, practical, and effective criteria. The validity of the module can be observed from its relation to the resulting product development objectives. The Development of Geometry teaching modules meets valid, critical, and effective requirements. Thus, the module teaches geometry as a quality product.

At the Dissemination stage, learning activities using geometry teaching modules occur effectively. The implementation of effective learning activities greatly supports the activities of teachers and students in exploring Geometry materials. In the context of classroom learning, apart from being a learning medium, modules are also a learning resource for students to make learning activities effective. This research supports Damopolii et al. (2020) in their research on the effectiveness of mathematics learning in State Junior High School using media and involving four indicators, namely (a) Ability of teachers to manage learning, (b) Student activities during

learning, (c) Student learning outcomes, and (d) Positive student responses after participating in learning using Quadrilateral Multimedia. The results showed that using Multimedia Quadrilateral (Build Geometry) in mathematics learning can run effectively, as shown by student responses (84%) in the effectiveness category.

Fitra & Maksum (2021) conducted research and development. The results show that its research products meet the requirements of (a) media validity, (b) media practicability, and (c) media effectiveness in teaching and learning activities, each with very valid, very practical, and effective categories, so that research products (in the form of learning media) are worthy of being used as learning media, especially to improve learning activities and student learning outcomesAAA conducts research and development, and the results show that its research products meet the requirements of (a) media validity, (b) media practicability, and (c) media effectiveness in teaching and learning activities, each with very valid, very practical, and effective categories, so that research products (in the form of learning media) are worthy of being used as learning media, especially to improve learning activities and student learning outcomes. In teaching module development research, Al Azka et al. (2019) concluded that the junior high school mathematics learning module with the PMRI approach is valid, practical, and effectively used as a medium for learning mathematics on the Two Variable Linear Equation System material.

In his research, Parlindungan et al. (2020) conclude that learning using video-based media (so that it can be said to be a learning resource as a teaching module) is effective in teaching and learning activities. Student learning activities through videos become more focused so that students have no difficulty understanding the material. Teacher activities have also become more creative and innovative in learning, even though they are carried out online.

The weakness of the teaching system is that it places student learning activities passively, can be helped by using learning modules, and is very dependent on the teacher's ability to understand the material learned and others. With modules, students must actively learn independently and be more creative in preparing themselves, cognitive, affective, or psychomotor, regarding the teaching material learned. This teaching module also encourages teachers to increase creativity in managing learning practices, providing the necessary tools and facilities, and serving individual learning.

For further research, this geometry teaching module product needs to be refined using geometry material and different school levels, as well as different development models, still using Partial Credit Model scale geometry test questions, so that a comparison of the quality of the module products is obtained.

CONCLUSION

Modules are a form of learning resources and teaching materials simultaneously, as well as a learning medium for teachers to transfer knowledge to students. Geometry teaching modules are developed using 4-D models (Define, Design, Develop, Disseminate) and module quality requirements, including feasibility, validity, practicality, and effectiveness as modules are met. Thus, this geometry teaching module can be applied in school learning for junior high school students.

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