Validity of Introduction to Basic Mathematics Teaching Materials Based on Conceptual Understanding Procedures Models and Character Education

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Abstract. The purpose of this study was to develop a valid introduction to basic mathematics teaching materials based on conceptual understanding procedures models and character education. It aims to improve the student's understanding of concepts. Plomp’s development procedure was applied to conduct the study which consists of five stages, namely: (1) preliminary investigation, (2) design, (3) realization/construction, (4) test, evaluation, and revision, and (5) implementation. In the first year, this study has reached the stage of testing, evaluation, and revision to determine the validity of teaching materials. The validity of the content can be viewed on the suitability of teaching materials developed by the theory of the development and characteristics of the learning model. The validity of the construct can be viewed on the appropriateness of each component of teaching materials with the characteristics of the learning model obtained from the expert. The construct validity of teaching materials is very valid. Advice from validator used as a reference for the revision of teaching materials. The next step is doing limited implementation to see the practicality and effectiveness of teaching materials.

Keywords: introduction to basic mathematics teaching materials, conceptual understanding procedures models, character education.

1. Introduction

According to [1], teaching materials are a set of materials or substances of lessons arranged coherently, systematically and display a complete figure of the competencies that will be mastered by students in learning activities. With teaching materials, students can learn a competency systematically so that they can master all competencies in their entirety. An educator needs to have the competence to develop good teaching materials following the requirements and necessary needs so that teaching materials can be conveyed properly and students have good learning activities. A teaching material must contain material, messages/content of the lesson, learning experiences through the integration of learning models, and learning attitudes that support the achievement of learning objectives [2].

According to [3], teaching materials is the learning component that influences what happens in the learning process the most. A teaching material either explicitly or implicitly must contain the learning model component as a setting of learning activities and the learning attitude component as an effort to instill positive learning attitudes in achieving learning objectives. The function of teaching materials according to [4] are: (1) as a substance of competencies that should be studied and mastered; (2) as a guideline for activities in the learning process both management guidelines and learning attitudes that are expected to emerge; and (3) evaluation tools for learning achievement. Teaching materials need to
be developed and organized properly and maturely so that learning cannot be separated from the objectives to be achieved. Developing teaching materials is an activity of designing materials into teaching materials that are ready to be used in the learning process based on learning models that are relevant to the characteristics and can organize good learning attitudes. Based on this, in designing teaching materials the selection of learning models and learning attitudes are two important keywords. Learning models and learning attitudes that are integrated into teaching materials can condition learners in obtaining several learning experiences related to what material will be delivered and a good learning attitude in understanding the material. Thus, to obtain a good learning experience, an educator needs to develop appropriate teaching materials to achieve the desired goals. Teaching materials that are designed with an appropriate learning model and able to direct good learning attitudes are needed to form a strong understanding of concepts, especially on basic material/topics. One of the example is the basic introduction to mathematics as a basic course to help students understand the other subjects such as algebra, calculus, trigonometry, computational mathematics, etc. The basic concepts of mathematics that must be mastered by students in this course are the concepts of mathematical logic, sets, relations, and functions. This is the main reason why student's concept understanding in basic of introductory mathematics courses is a matter that must be considered properly. The student's concept understanding will be good if learning activities can direct students to activities to understand concepts through the development of teaching materials with innovative models. One of the learning model that can lead to concept understanding activities is the conceptual understanding procedures models. The conceptual understanding procedures models is based on a constructivism approach on the basis that students construct the understanding of a concept by expanding or modifying existing knowledge within themselves [5]. The conceptual understanding procedures models contains syntax that is relevant to the activities of developing concept understanding, namely: (1) the individual development phase, where students are trained to observe a material/problem individually; (2) the phase of developing small groups / triplets, where students exchange ideas with friends in their groups about temporary concepts that they form individually; and (3) large group / class development phase, where concepts formed in groups are conveyed at class discussion forums [6]. If each phase is developed with a social system and the principle of an appropriate reaction, it will be able to optimize the achievement of learning objectives. The development of social systems and the principle of reaction from the conceptual understanding procedures models can be done by integrating character education in learning activities. Character education within the scope of learning in higher education can be interpreted as an effort to design and implement a strategy aimed at developing academic abilities and building character [7]. The purpose of building character must be intentionally designed not as a acompaniment effect. These characters are values, abilities, beliefs, morality, emotional control, and behavior that are directly or indirectly related to the characteristics and nature of the course. The implementation of character education at the Ganesha Educational University (Undiksha) also continues to experience growth. This was carried out to realize the motto of Undiksha “Dharmaning saijana umerdhyaken widyaguna” which means “the duty of a wise person is to develop science and character.” To be able to appreciate and realize the meaning of the motto, it is necessary to integrate character education into tri dharma activities, one of them is in the teaching field. Moreover, the National Qualification Framework Curriculum (KKNI) as current curriculum states conceptually that each qualification level must contain the attitude parameters (affection) of a person that is grown through learning activities. Thus, the application of the conceptual understanding procedures models in the basic introduction to mathematics courses also needs to be optimized through the integration of character education.

Based on the results of observations on the learning activities of the basic introduction to mathematics courses in Mathematics Education Study Program at the Ganesha University of Education (Undiksha), it was found that the availability of teaching materials that can support the achievement of learning objectives is still lacking. This is a concern because it can have an impact on not achieving learning objectives and even student mastery of other mathematics subjects. Furthermore, based on the score of the results of the Midtest students who take the basic introduction to
mathematics courses in odd semester of academic year 2018/2019 obtained data understanding student's concepts in the material of mathematical logic, sets, and relations as shown in Table 1 below.

Table 1 Percentage of Understanding of Basic Mathematical Introduction Concepts

| No. | Question                                                                 | Percentage of Concept Understanding |
|-----|---------------------------------------------------------------------------|-------------------------------------|
| 1.  | Determine whether the following statements are equivalent? Use the mathematical logic rules to prove it! \((\sim p \lor q) \land (p \lor \sim r) \land (\sim p \lor \sim q) \equiv (p \land r)\) | 58.33%                             |
| 2.  | Suppose the universe is \(S = \{1,2,3,\ldots,10\}\), Determine the value of the statement below! Explain it! a) \((\forall x)(\forall y) x^2 + y^2 \geq 2\) b) \((\exists x)(\forall y) x > y\) c) \((\exists x)(\exists y) x^2 < y + 1\) | 40.28%                             |
| 3.  | Two sets are disjoint if the intersection is \(\emptyset\). Are the following sets disjoint? Prove it by using the set rules! \(A \cap (B \cup C)\) and \(B \cap (A \cup C)\) | 56.25%                             |
| 4.  | Is the following relation an equivalence relation? Explain it! a) \(mRn \iff m + n\) even b) \(mRn \iff m \cdot n\) even | 49.31%                             |

The average of concept understanding 51.04%

Based on the data in Table 1, student’s understanding concepts of the basic introduction to mathematics classically at 51.04% is included in the less category. Based on the results of a questionnaire distributed to 24 students who took the basic introduction to mathematics courses, we obtained data 66.67% of students disagreed that the learning design that has been used in the basic introduction to mathematics courses makes it easy for them to understand the material, 79.17% of students agree that learning resources for the basic introduction to mathematics courses are still lacking, and 70.83% of students disagree that the basic introduction to mathematics teaching materials used so far make them able to understand concepts well. From these data, it is necessary to strive for innovative solutions so that students' understanding concepts in the basic introduction to mathematics courses becomes better through the development of the basic introduction to mathematics teaching materials with the conceptual understanding procedures models and character education. In this case, the quality of teaching materials developed must be in accordance with applicable standards. There are three aspects that need to be considered in assessing the quality of a product that is validity, practicality, and effectiveness [8]. Here, the product that we mean are teaching materials. Therefore, in the process of developing the basic introduction to mathematics with the conceptual understanding procedures models and character education the attention is focused to aspects of validity, practicality, and effectiveness of teaching materials to be able to improve students' understanding of concepts. Based on the description, it is seemed necessary to conduct research as an effort to develop the basic introduction to mathematics teaching materials under the title "Validity of Introduction to Basic Mathematics Teaching Materials Based on Conceptual Understanding Procedures Models and Character Education" The formulation of the problem to be solved in this research is how validity of introduction to basic mathematics teaching materials based on conceptual understanding procedures models and character education to improve students' understanding of concepts?

2. The Conceptual Understanding Procedures Models

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The conceptual understanding procedures models is a learning procedure designed to develop an understanding of concepts that are difficult for students by increasing the active role of students in learning activities and building approaches based on the belief that students build their understanding of a concept by developing existing views [6]. The syntax of the conceptual understanding procedures models is (1) The individual phase. In this phase, each student is faced with a problem and they are required to be able to solve the problem individually. The purpose of this individual stage is to ensure the involvement of each student before the discussion process and to find out the student's initial knowledge. (2) Group phase (triplets). In this phase, students join a group of 3 members with different abilities. The division of the group is done by the lecturer / class coordinator, after which students discuss with their respective groups to solve the mathematical problems encountered. Each group member contributes to discussing the problems presented. (3) Phase of class discussion. In this phase, all students discuss the results of group discussions so as to provide conclusions about the given problems. In this case, the lecturer acts as a guide for the course of the discussion and gives opportunities to students to be able to build their own conceptual knowledge. The lecturer guides the students so that no concept errors occur. In the final activity the lecturer evaluates by giving a test.

3. Character Education

According to the [9], character education is interpreted as education that seeks to develop the nation's character in learners so that they have national values and character in themselves, apply these values in their lives, as members of society, and religious citizens, nationalist, productive and creative. A long-time before, the character education already exists in law No. 20 of 2003 article 3 concerning National Education System states that national education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation. This education function implies that the quality of character education is very important to be improved. According to [10], character education can be integrated into learning in each subject. This means character values not only in the cognitive order, but touches on internalization and real experiences in the daily lives of students in society. There are 18-character values that needs to be instilled in students who come from Religion, Pancasila, and National Education Objectives. The eighteen values are: 1) religious, 2) honest, 3) tolerance, 4) discipline, 5) hard work, 6) creative, 7) independent, 8) democratic, 9) curiosity, 10) nationalism, 11) patriotism, 12) appreciate achievement, 13) friendly / communicative, 14) peace-loving, 15) bibliophile, 16) nature-loving, 17) care for the social, 18) responsibility. Although there are 18-character values as mentioned, in each education unit can choose the character values that are the priority of development based on the characteristics of students and learning material. Implementing character education for students requires specific strategies, for example by designing teaching materials that are able to bring up and develop appropriate character values. Character values that are applied in higher education especially LPTK as an institution that produces teachers only choose core character values that will be developed in the implementation of character education [11] including: thinking smart, being honest and responsible, physically tough, and have care. Character values that need to be developed in higher education can be illustrated based on Figure 2.1 below.
4. Research Methods

This research aims to develop the introduction to basic mathematics teaching materials based on the conceptual understanding procedures models and character education for students of the Undiksha Mathematics Education Study Program, so that this research is a type of development research. The development of this research refers to the development models which includes: 1) the initial investigation phase; 2) design phase / design; 3) realization / construction phase; 4) test, evaluation & revision phases; and 5) implementation phase. The subjects of this research were the first semester students (odd) Undiksha Mathematics Education Study Program. Subjects were chosen based on the problems faced by students and lecturers related to the lack of understanding of student concepts in introduction to basic mathematics courses. The research procedures are divided into four stages (a chart of the research procedures can be seen in Appendix 5), each of which is described in more detail as follows.

(1) Initial Investigation Stage. The activity at this stage is to analyze the situations and problems faced by students and lecturers in the introduction to basic mathematics courses. The things to do are: (1) Reviewing the introduction to basic mathematics courses midtest results of 24 odd semester students in the 2018/2019 academic year, on the material of mathematical logic, sets, and relations; (2) Analyzing the results of student responses to learning and learning resources introduction to basic mathematics by questionnaires; and (3) Doing interviews with lecturers about the constraints in the introduction to basic mathematics lectures and reviewing the teaching materials used.

(2) Design Stage. At this stage, an attempt is made to design a possible solution to the problem that has been defined at the initial investigation stage. The things done at this stage are: (1) Reviewing theories that support to improve the quality of learning. From the results of this review, an attempt was made to develop introduction to basic mathematics teaching materials based on the conceptual understanding procedures models and character education. (2) Designing teaching materials that are in accordance with the characteristics of the conceptual understanding procedures models and character education.

(3) Realization Stage. At this stage, the solution that has been designed is realized to be able to produce an initial prototype. The resulting prototype is still in the form of prototype 1, which
is the introduction to basic mathematics teaching materials based on the conceptual understanding of procedures models and character education, which subsequently needs to be tested for validity, practicality, and effectiveness.

Test, Evaluation, and Revision Phase. At this stage the quality of teaching materials that is realized. The things need to do are: (1) Test the validity of teaching materials which are still in the form of prototype 1 by two experts as validators. Based on the results of the validity test, a revision is made so that teaching materials are obtained in the form of prototype 2. After prototype 2 is obtained, then a field trial is conducted. (2) Field trials are conducted to determine the practicality and effectiveness of the teaching materials developed. Field trial activities are divided into two cycles. Each cycle consists of the stages of implementation, observation and evaluation, and reflection to see whether the teaching materials developed meets the desired criteria.

The instruments used in this study are: 1) validation sheets of teaching materials; 2) observation sheet of practicality of teaching materials in the form of questionnaires for student responses about the learning materials; 3) observation sheet of practicality of teaching materials in the form of questionnaire lecturers' responses for the teaching materials; 4) the observation sheet of the effectiveness of teaching materials in the form of tests of students' concepts understanding in the form of descriptions; 5) observation sheet of student activities during the courses.

The quality of teaching materials is measured from three aspects: validity, practicality, and effectiveness. The validity of the teaching materials developed is based on a development theory which is used as a guideline and in accordance with the demands of the characteristics of the applied learning model. To find out the validity of teaching materials, expert opinion is needed. The assessment was given by two experts in mathematics education. The practicality of teaching materials is measured by the implementation of teaching materials in class. Data on the practicality of teaching materials were obtained from a questionnaire about student responses and lecturer responses to the developed teaching materials. Measurement of the effectiveness of teaching materials is done based on the achievement of learning objectives using teaching materials that are developed. To assess the effectiveness of teaching materials is done by collecting data through a score of students' concepts understanding tests given after students follow lectures using teaching materials that have been developed. In addition, the effectiveness of the teaching material developed was also seen based on the score sheet observing student activities during the lecture. The data collected is processed descriptively.

To know the validity, a validation sheet is used. In the validation sheet, the validator's opinion is then categorized into four categories, very valid (score 4), valid (score 3), invalid (score 2), and very invalid (score 1). The validity of the developed teaching material is known by changing the total validator average score to a qualitative value using the following criteria.

| The Average | Categories   |
|-------------|-------------|
| 3.5 ≤ Sr ≤ 4.0 | Very valid |
| 2.5 ≤ Sr < 3.5 | Valid      |
| 1.5 ≤ Sr < 2.5 | Invalid    |
| 1.0 ≤ Sr < 1.5 | Very invalid |

The teaching materials in this research is at least in a valid category to be used in learning.

5. Result and Discussion
Based on the problem to be answered in this research is "how validity of introduction to basic mathematics teaching materials based on conceptual understanding procedures models and character education to improve students' understanding of concepts for students of undergraduate program of Mathematics Education that are valid, practical, and effective? then on this occasion the development process and the quality of teaching materials that have been developed will be presented. As explained in Chapter IV, the development process used in this research is based on the Plomp development model. The development process used is as follows.

(1) Initial Investigation Stage. This stage is also called a needs analysis or problem analysis. At this stage, an information gathering and analysis activity are carried out, context analysis, defining the problem, reviewing the ongoing learning model, and planning a follow-up activity. In accordance with the problem to be answered in this research that is "how to develop and obtain the introduction to basic mathematics teaching materials based on the conceptual understanding of procedures models and character education for undergraduate students of Mathematics Education that are valid, practical, and effective to improve understanding of student concepts", then on this occasion the development process and the quality of teaching materials that have been developed will be presented. Preliminary data on students 'understanding of concepts in the introduction to basic mathematics courses', obtained from the score of the results of the Midterm Examination of students who took the introduction to basic mathematics courses in odd semester Academic Year 2018/2019 obtained data on students' conceptual understanding of mathematical logic, set, and relations. Based on the analysis of the initial test results obtained data that the classical understanding of student concepts by 51.04% included in the category of less. Based on the analysis of the results of tests conducted obtained facts: (1) Students have not been able to use the mathematical logic rules to show two propositions of equivalent value; (2) Students still do not clearly distinguish the uses of the universal and the existential quantifier in some cases in the set; (3) Students have not mastered the set rules well, and (4) The concept of relations is still weak so that students have not been able to prove the nature of the given relationship.

Based on the results of the questionnaire distributed to 24 students who took the course, data obtained that 66.67% of students disagreed that the learning design that had been used in the introduction to basic mathematics lectures made it easy for them to understand the material, 79.17% of students agreed that the source learning the introduction to basic mathematics courses is still lacking, and 70.83% of students disagree that the introduction to basic mathematics teaching materials used so far make them able to understand concepts well. In addition, through interviews with lecturers supporting the introduction to basic mathematics, the lack of success of students in lectures in addition to being caused by the limitations of relevant teaching materials is also caused by low student interest and learning attitudes. Curiosity, creativity, responsibility, unyielding attitude, and hard work of students when they are faced with problems are still lacking. In this case, the attitude and character of students still need to be developed in order to be able to support the achievement of the expected goals.

(2) Design Stage. At this stage, an attempt is made to design a possible solution to the problem that has been defined at the initial investigation stage. The lack of understanding of students' concepts in learning the introduction to basic mathematics courses is due to the lack of student learning activities that are appropriate to the characteristics of the course. One learning model that fits the characteristics of the introduction to basic mathematics courses and is intended to foster understanding of concepts is a model of conceptual understanding procedures. The conceptual learning model understanding procedures contain 4 principles, there are: (1) In the learning process each student constructs his own understanding; (2) An atmosphere of trust supports good learning; (3) Inactive learning that takes place the person responsible is more facilitating the discussion than providing the correct answer; and (4) A concept that is easiest
to understand if learned in a real-life context. The social system is an atmosphere and norms that apply in learning. In the conceptual learning model understanding procedures developed the democratic atmosphere. Interaction between students in conducting learning activities gets an important emphasis in this model. Lecturers facilitate interaction between students in learning activities to run well. Lecturers need to organize learning as best they can in order to work together and allow for the construction of knowledge.

The learning objectives of learning in the introduction to basic mathematics courses through the conceptual understanding procedures procedure will be optimally achieved if supported by a good learning attitude and student character. The implementation of character education in Undiksha Undergraduate of Mathematics Education needs to be integrated into learning activities to realize Undiksha's motto, "Dharmaning sajjana umerdhyaken widyaguna", which means: the obligation of wise people is to develop science and character. " Character values are applied in universities especially LPTK as a producer only chooses core character values that will be developed in the implementation of character education [11], there are: be intelligent, be honest, be tough, and be respect. Moreover, the current National Qualification Framework (KKNI) curriculum also states conceptually that each level of qualification must contain the attitude parameters (affection) of a person that is grown through learning activities. Character in learning activities in higher education is an important thing that must be implemented to support the success of student learning. Given the limitations of the introduction to basic mathematics teaching materials and to maximize learning with the conceptual understanding procedures models and character education in the Mathematics Education of Undiksha, it is necessary to develop teaching materials for Undiksha courses in accordance with these learning characteristics.

(3) Realization Stage. After designing the solution of the problem found in the initial investigation phase, the design of the solution that has been designed is realized in the form of teaching materials which are still in the form of prototype 1 which needs to be seen in terms of its validity. Prototype 1 is realized by referring to the development design according to Plomp and the learning model applied is the conceptual understanding procedure and character education model. Besides referring to this, prototype 1 was also realized by referring to the characteristics of the basic introductory mathematical material and targets to be able to improve students' understanding of concepts.

(4) Test, Evaluation and Revision Phase. The prototype 1 which was realized was then tested for validity by 2 experts from the undergraduated program of Mathematics Education at Ganesha University of Education with the consideration that both of them have researched about the development of teaching materials in order to improve the quality of lectures in the undergraduated program of Mathematics Education Study Program. Based on the results of the validity test, prototype 1 can be categorized as very valid but needs to be revised by taking into account the suggestions/comments of the two validators, besides the instruments that will be used in this study such as student response questionnaires, lecturer response questionnaires, and observations of the implementation of teaching materials also meet the criteria feasible to use. Prototype 2 which is the result of the revision of prototype 1 is then used in the limited trial phase which has been carried out in the introductory basic mathematics course for the academic year 2019/2020 which is carried out in 2 cycles.

The activities in this research have succeeded in developing Introduction to Basic Mathematics teaching materials with a conceptual understanding of procedures and character education models in the form of prototype 2 that meets very valid criteria. Four main subjects are taught in this teaching material, namely: 1) mathematical logic; 2) the set; 3) relations; and 4) function.

Teaching material is said to be valid if it has fulfilled two aspects of content validity and construct validity. Meeting the content validity means that the product, in this case, is the basic introductory teaching material in mathematics with the conceptual understanding model
and character education models arranged or developed based on a development theory that is used as a guideline or a development theory proposed by [13] and in accordance with the demands of learning characteristics applied. Then the construct validity can be seen from the consistent linkages of each component of teaching material developed with the learning characteristics applied. To see the construct validity, an expert / expert opinion (validator) is requested. In this validation process, the validator reads and evaluates teaching materials on the validation sheet. The following is a summary of the results of the validator assessment in Table 3 below.

Table 3 Summary of teaching materials Validation Results

| No | Rated aspect          | Average Validator Score | Sum | Average |
|----|-----------------------|--------------------------|-----|---------|
|    |                       | I           | II          |    |         |
| 1  | Content               | 3,70        | 3,80         | 7,50 | 3,75    |
| 2  | Serving method        | 3,71        | 3,86         | 7,57 | 3,79    |
| 3  | Physical form         | 4,00        | 4,00         | 8,00 | 4,00    |
| sum|                       |             |              | 11,54|         |
| average|                   |             |              | 3,85 |         |

Based on Table 3 it can be concluded that the construct validity value of teaching materials developed in this study fulfills the very valid criteria because the average validity score is at intervals of $3.5 \leq Sr \leq 4.0$. Besides, the validator also assessed the appropriateness of the instruments used in this study included a student response questionnaire to teaching materials, a lecturer response questionnaire to teaching materials, and an observation sheet of the implementation of teaching materials using a validation sheet. The summary of the results of the validation of the instrument can be seen in the following Table 4. Based on Table 3 it can be concluded that the value of the construct validity of the teaching materials developed in this study fulfills the very valid criteria because the average validity score is at intervals of $3.5 \leq Sr \leq 4.0$. Besides, the validator also assessed the appropriateness of the instruments used in this study included a student response questionnaire to teaching materials, a lecturer response questionnaire to teaching materials, and an observation sheet of the implementation of teaching materials using a validation sheet. A summary of the results of the instrument validation can be seen in the following Table 4.

Table 4 Summary of Research Instrument Validation Results

| No | Research Instruments                             | Validator I | Validator II |
|----|-------------------------------------------------|-------------|--------------|
|    | Average score | categories | Average score | categories |
| 1  | Student response questionnaire | 4,00        | Feasible to use | 3,73        | Feasible to use |
| 2  | lecturer response questionnaire                 | 3,80        | Feasible to use | 3,87        | Feasible to use |
| 3  | Observation sheet implementation of teaching materials | 4,00        | Feasible to use | 3,93        | Feasible to use |
Based on Table 4, the instruments that will be used in the trial activities which include student response questionnaires, lecturer response questionnaires, and observation sheets of the implementation of teaching materials have met the eligibility criteria.

The practicality of teaching materials developed in this study was measured from the average questionnaire score of student responses and the average score of lecturer response scores to the teaching materials used. Both the student response questionnaire and lecturer response questionnaire will be given at the end of the trial cycle.

The effectiveness of teaching materials is measured based on the achievement of learning objectives using teaching materials that have been developed. To assess the effectiveness of teaching materials, it is done by collecting data on students' concept understanding test scores that are given after the student follows the learning using the developed teaching material. Teaching material testing activities carried out in 2 cycles in which cycle 1 has been tested teaching materials with mathematical logic material, while cycle 2 will be tested on set material. The results of the mathematical concept understanding test will then be reported in the final report of this study because it is still in the process of implementing the concept first period understanding test.

Meanwhile, after the trials that took place in cycle 1, observational data were obtained on the implementation of teaching materials from the observer as in Table 5 below.

| Observer            | Average score at ... meeting | Sum  | Average |
|---------------------|------------------------------|------|---------|
|                     | 1   | 2   | 3   | 4   |      |      |        |
| Observer lecturer   | 3,00| 3,00| 3,20| 3,27| 12,47| 3,12 |
| The researcher      | 2,80| 2,87| 3,07| 3,20| 11,94| 2,99 |
| sum                 | 5,80| 5,87| 6,27| 6,47| 24,41| 6,11 |
| average             | 2,90| 2,94| 3,14| 3,24| 12,22| 3,06 |

6. Conclusion

Based on the results and discussion of the procedure for developing Introduction to Basic Mathematics teaching materials based on the conceptual understanding model and character education models in this study through 4 stages: initial investigation; the design; realization; and tests, evaluations, and revisions until finally found a final prototype of teaching materials that are ready to be implemented. Based on the results and discussion of the quality of teaching materials, obtained Introduction to Basic Mathematicsteaching materials based on conceptual understanding procedures models and character education in this research meet valid criteria to improve students' understanding of concepts.

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