The Development of Textbook Based on Constructivism in the Basic Mathematical Concept Course

Wilmintjie Mataheru[1], Novalin C Huwaa[2], Christi Matitaputty[3]

[1,2,3] Mathematics Education Study Program, Pattimura University

Email:chmatitaputty@gmail.com

Abstract. The purpose of this study was to know the validity of textbook in Basic Concepts of Mathematics course using constructivism approach. Subjects of this study were the Students Education Study Program of Primary School Teacher Education Pattimura University in the Academic Year 2019/2020. Type of the research was the develop using 4D development research design which includes four phases such as defining, design development, disseminate. The result show that the validity of textbook in basic concept of mathematics course on constructivism was very valid. By using the textbook, students become actively participate, independently learners, and active to develop their own knowledge.

Keyword: Constructivism, Basic Mathematical Concept Course

1. Introduction

Basic Mathematics Concept is a compulsory subject for students of Pattimura University Elementary School Teacher Education Study Program. This subject was put into effect when using the curriculum based on the Indonesian National Qualification Framework (KKNI) in 2017.

Based on the experience of researchers for two years teaching the course, namely in the academic year 2017/2018 and 2018/2019 shows the record data of student grades as in table 1 below.

Table 1. Recapitulation of Student Grades

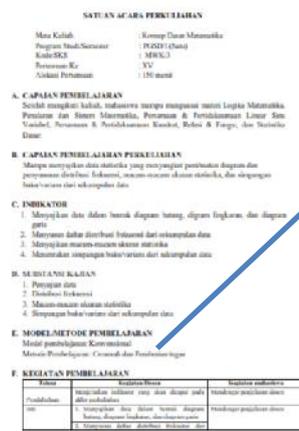| Academic Years	Grade and Persentages										Total	
	A	%	B	%	C	%	D	%	E	%	Students	%
2017/2018	3	3,40	11	12,50	34	38,64	23	26,14	17	19,32	88	100
2018/2019	4	4,49	5	5,62	38	42,70	26	29,21	16	17,98	89	100

Source: (PGSD FKIP Unpatti, 2019)

The data in table 1 shows that the average student who received grades A and B was smaller than the average student who received grades C, D, and E. This means that most students did not get the material in the course. One of the students' misunderstanding is the unavailability of textbooks that can help students to learn independently. The following is an example worksheet and lesson plan used by the lecture (figure 1);

The conventional learning model used has not yet helped students construct knowledge through learning activities

The worksheet is not interesting and structured, there are only examples of questions and instructions for solving similar problems.

Figure 1 examples of textbook and lesson plan

It is expected that having a textbook can help students to learn independently, whether requested or carried out lecture execution. According to [1], textbooks that contain all materials (whether information, tools, or texts) are arranged systematically, which contains a complete picture of the competencies controlled by students and used in the learning process by planning and studying learning plans.

Textbooks are tools for helping lecture to prepare their self before carrying out learning activities. Completeness of textbooks will help lecturers and students in learning activities. More than that, the textbook is a very decisive component for the achievement of learning objectives [2]. Lecturers as education implementers are required to be able to make quality textbooks. Quality textbooks meant are textbooks that can answer problems and meet the needs of students to achieve their learning goals [3]. Previously study had been stout contributed to the development of textbook learning of mathematics [4],[5][5], [6],[7]. Even [8], argue that mathematics textbooks as research themes continue to receive rapid international attention by opening new innovations in mathematics education. Therefore, textbooks should be able to provide knowledge, skills, and values and attitudes that students must learn to achieve predetermined competency standards.

Conceptually, the learning process if viewed from a cognitive approach, is not as an acquisition of information that goes one way from the outside into the student, but rather as giving meaning to the student through his assimilation and accommodation processes that lead to the improvement of his cognitive structure [2]. One learning approach that gives students the opportunity to construct their own understanding is the constructivism approach. Constructivism is an epistemological approach that assumes that knowledge and meaning result from interactions between actions, experiences, and subjective states of mind of people [9]. Learning constructivism is learning that requires students to participate actively, has a self-learning capability, actively develop their own knowledge. Even educators in the twenty-first century should be forced to accept the constructivism pedagogy [10]. Thus the lecturer only acts as a facilitator and mediator in the learning process.

In mathematics education research, constructivists reshape key themes and topics according to constructivist philosophy [9]. Thus in this research a textbook based on constructivism will be developed, which not only contains a summary of material and exercises, but includes how students construct their knowledge. This book is made in stages to train and improve skills, as well as student understanding to solve the given problems. According to ISTE [11][11], students in constructivism

learning in the 21st century are required to: (a) Having creativity and innovation; (b) Can communicate and cooperate with others; (c) Using its ability to search for information and analyze the information obtained; (d) Think critically in solving problems or in making decisions; (e) Understand the concepts in technological development and be able to operate it.

Constructivism learning believes that each student is special, each student is unique and each student is a special human being who has different characteristics. Therefore, students must be seen and understood thoroughly not only from what is not. As Vygotsky points out, one's way of thinking must be understood from his social and cultural background not from what is behind his brain. Apart from that Vygotsky [4] we become ourselves through other people. The best known application of Vygotsky's theory is the collaborative learning model.

Based on the description above, this paper will examine the process of developing Constructivism Based Textbooks in Basic Mathematical Concept Lectures.

2. Research methods

This research method is classified as development research. According to Trianto in [2] research development is a research method used to produce certain products and test the effectiveness of these products. In this research, textbook is a product that will be developing to help the lecture in teaching and learning process.

Developing a learning device used in this study is a model of development of the 4-D (four-*D*), which include: *define, design, development and disseminate phases*. This study focused on the development stage, due to time constraints. This research develops learning tools in the form of Lecture Program Units (LPU), Textbooks (TB) and Student Worksheet (SW) in the Basic Mathematics Concept lectures for students of Pattimura University Elementary School Teacher Education Study Program.

The procedures performed for the three stages are as follows. (1) At define stage the activities carried out, namely: Analyzing LPU; (2) We were designed the teaching materials format at design stages. Each topic contains: learning outcomes, learning outcomes of lectures, subject matter, sample questions, activities (practice questions) to be done in groups during lectures, summaries, practice questions to be done individually at home, and answer keys; and (3) we produce *a final draft* of a good (valid) learning tool at the development phase. The activities at this stage are as follows. (a) Expert Validation / Rating. The development phase begins with validation by experts. Validation is performed on LPU, TB, and SW learning tools developed at the design stage. This activity was carried out to obtain input and suggestions from several validators in the field of mathematics. There were 6 validators, consisting of 3 lecturers of the Mathematics Education Study Program of Pattimura University and 3 mathematics teachers from Ambon Christian High School, Masohi 1 High School, and Ambon 4 Public High School. Based on the evaluations, corrections, and suggestions from this validator, a revision of the learning kit was carried out; (b) Learning Test Readability Test. The purpose of the readability test of the learning device is to obtain input on whether the learning device can be read clearly and can be understood. Subjects in the readability test of learning tools, namely 6 validators as mentioned above (3 lecturers and 3 teachers) and 3 students of Pattimura University Primary School Teacher Education Study Program. Test readability of learning devices; and (c) Trial of Learning Devices. The purpose of testing the learning device, namely to obtain input from the validator, students, and observers of the learning device that has been prepared. Subjects in the learning device trial, namely students who offer Basic Mathematics Concepts courses as much 20 respondents.

The research instrument used as a data collection tool in research as follows. (1) Validation sheet, used to obtain data about the quality of learning devices consisting of SAP validation sheets, TB validation sheets, and SW validation sheets. The validator is asked to provide a conclusion and write the appropriate score on the validation sheet of the learning kit; (2) Sheet readability test, aims to collect data on opinions or problems - problems that are not understood from the validator and students. Data about opinions or problems from the validator is collected using the Validator readability test sheet for LPU, TB, and SW. Data about student opinions were collected using a student readability test sheet against TB and SW; (3) The format of observation of the implementation of learning devices, which are

used to observe learning devices that are developed, can be applied/used in learning activities in the classroom; and (4) Questionnaire responses lecturer and student**.** The purpose of this questionnaire was to identify lecturers and students' responses of constructivism-based learning activities. The lecturer response questionnaire sheet contains questions about LPU, TB, and SW, while the student response questionnaire sheet contains questions about TB and SW.

Data analysis techniques in this study were conducted on some data as follows:

2.1 Analysis of general validator assessment data

Analysis of general validator assessment data on learning tools and assessment of each device (including: LPU, TB, and SW) were analyzed based on average scores. In [2] the formula used, i.e.

$$Z = \frac{\text{(Number of assessments of all validators)}}{\text{(number of validators)}}$$

with:

Z: average validator rating

Average Score (Rs) using the formula, which is:

$$Rs = \frac{\text{(Number of validator assessments}}{\text{(the total number of observation items)}}$$

The mean score (Rs) are classified by reference se like following.

$$1.00 \leq Rs < 1.50 : \text{bad}$$
$$1.50 \leq Rs < 2.50 : \text{enough}$$
$$2.50 \leq Rs < 3.50 : \text{good}$$
$$3.50 \leq Rs < 4.00 : \text{very good}$$

Learning devices are said to be valid, if each device is classified in the **"good"** category. The results are used as guidelines for revision.

2.2 Data Analysis of Readability Test Results.

Data on input/suggestions for improvement from lecturers and input from students, if there are likely sentences in the learning device that are not clearly read or not understood, will be selected and considered to revise the learning device.

2.3 Analysis of Tooling Test Result Data

Trial Result Data Based on Lecturer Activity

According to data from the results of trials in class, analyzed using the average score of the implementation of learning tools based on the activities of lecturers in class, used the formula in [2]:

$$Akd = \frac{\text{(the number of observation items carried out by lecturers)}}{\text{(the total number of observation items)}} \times 100\%$$

With:

Akd: Implementation of lecturer activities

Accomplished item: 1

Not implemented item: 0

$$90\% \leq Akd \leq 100\%: \text{Very high}$$
$$75\% \leq Akd < 90\%:: \text{High}$$
$$6\% \leq Akd < 75\%: \text{Medium}$$
$$40\% \leq Akd < 60\%: \text{Low}$$
$$0\% \leq Akd < 40\%: \text{Very low}$$

Lecturer activities in learning are said to be carried out in class, if the percentage of lecturer activities is more or equal to 70% ($Akd \geq 70\%$), then if lecturer activity is less than 70% ($Akd < 70\%$), then it will be considered for revision.

2.4 Test Result Data Based on Student Activities

The formula used to analyze the activities of each student in [2], is as follows.

$$Amm = \frac{\text{(the number of observation items of student activity carried out)}}{\text{(the total number of observation items)}} \times 100\%$$

With:

Amm: The implementation of each student's activities.

After the results of the analysis of the implementation of learning devices based on the activities of each student are obtained, then the implementation of the learning tools of each group can be analyzed using the following formula in [2] .

$$Amk = \frac{\text{jthe total number of implementation of learning in class of each group}}{\text{the total number of students in each group}} \times 100\%$$

With:

Amk: The implementation of each group's activities

Furthermore, the feasibility of learning tools in the classroom can be analyzed based on the results of the analysis of the feasibility of students in groups. Using the formula as follows in[2].

$$Pdk = \frac{\text{the total number of implementation of learning in class of each group}}{\text{the total number of groups in class}} \times 100\%$$

With:

Pdk: Implementation of learning in class.

$90\% \leq Pkd \leq 100\%$: Very high

$75\% \leq Pkd < 90\%$:: High

$6\% \leq Pkd < 75\%$: Medium

$40\% \leq Pkd < 60\%$: Low

$0\% \leq Pkd < 40\%$: Very low

Student activity in learning is said to be carried out in class, if the percentage of student activity is more or equal to 70% $(Pkd \geq 70\%)$then if student activity is less than 70% $(Akd < 70\%)$, then it will be considered to make revisions.

2.5 Lecturer Response Data

Data about the lecturer's response to the learning process in class using the following formula in [2].

$$Prg = \frac{\text{(total number of positive responding by lecturers)}}{\text{(total number of lecturers)}} \times 100\%$$

With:

Prg: presentation of lecturer responses to aspects in question

Responded positively items: 1

Not responded items: 0

Lecturer responses are categorized positive, if the percentage of responses strongly agrees (SS) and agrees (S) of at least 70%.

2.6 Student Response Data

Student response data to the learning process in class using analyzed using the following formula in [2].

$$Prs = \frac{\text{(total number of positive responding by students)}}{\text{(total number of students)}} \times 100\%$$

With:

Prs: presentation of student responses to the aspects being asked

Responded positively items: 1

Not responded items: 0

Student responses are categorized positive, if the percentage of responses strongly agree (SS) and agree (S) of at least 70%.

Based on the data analysis techniques above, it can be said that the constructivist-based textbooks are valid in the Basic Mathematics Concept lectures in the Elementary School Teacher Education Study Program Pattimura University which is good (valid), if it meets the following criteria. (1) All validators give an assessment of each learning device, minimally good, that is ≥2.50; (2) Lecturer activities in learning are carried out in class, if the percentage of lecturer activities is more or equal to 70%; (3) Student activities in learning are carried out in class, if the percentage of lecturer activity is more or equal to 70%, (4) Lecturers give positive responses, if the minimum percentage of responses is more than or equal to 70%; and Students give positive responses, if the minimum percentage of responses is more than or equal to 70%.

3. Results and Discussion
3.1. Research result

The result of the development of valid constructivist-based textbooks in the lectures of the Mathematical Basic Concepts of the PGSD FKIP Unpatti Study Program that are valid, the research results are described at the defining, designing, and development stages as follows.

At the stage of defining (*define*) activities have been carried out: (1) Analyzing LPU. LPU includes: (a) Learning Outcomes (*Learning Outcome*), namely students are able to master the material: Mathematical Logic; Reasoning and Mathematical Systems; Linear Equations and Inequalities of One Variable; Quadratic Equations and Inequalities; Relationship and Function; Permutation, Combination and Opportunity and can learn it; (b) Course Learning Outcomes (CPMK); (c) indicators; (d) study material (material); (e) learning models / methods; (f) student learning experiences; (g) time allocation; (h) valuation; (i) weights; and (j) references. (2) Analyzing LPU. LPU contains indicators for these materials.

Furthermore, to the design phase *(design)*, has produced a textbook format. While on stage p Developing *(develop)*, the general assessment of the validator against learning device, obtained a mean score of 3.3, in table 2 which means that the device is learning based on constructivism are located on both the criteria and can be used with little revision. Revisions are made according to the validator's suggestions and comments.

Table 2. the result of general assessment of validators

No.	Kinds of Learning Materials	Validators			Z
		1	**2**	**3**	
1	Learning Program Unit (LPU)	4	4	4	4
2	Textbook (TB)	4	2	3	3
3	Students Worksheet (SW)	4	2	3	3
	Rs				3,3

The results of LPU validation obtained the average score given by the validator, which is 3.5, which means that LPU is in good criteria, and can be used with a little revision. Revisions are made based on the validator's suggestions and comments (table 3).

Table 3. SAP Validation Results

No	Aspect Assessed	Validator			Z
		1	**2**	**3**	
1	Format:				
	1. Systematic preparation	4	3	4	3,7
	2. Layout settings	3	3	4	3,3

	3. Appropriate type and size of letters	4	3	4	3,7
2	Languages:				
	1. Grammar	4	2	4	3,3
	2. Simplicity of the structure	4	3	4	3,7
	3. Communicative	3	3	4	3,3
	4. Easy to understand.	4	3	4	3,7
3	Contents:				
	1. Learning objectives in accordance with indicators	4	3	4	3,7
	2. Appropriate learning tools and resources	4	2	4	3,3
	3. Constructivism-based learning activities	4	2	4	3,3
	4. Clarity in the description of the activities of lecturers and students.	4	2	4	3,3
	5. Appropriate time allocation used	4	2	4	3,3
	6. Details of the time spent at each stage of learning	4	2	4	3,3
	Rs	3,8	2,5	4	**3,5**

Revisions are based on corrections and suggestions from the validators, as in Table 4 below.

Table 4. LPU Revisions Based on Validation Results

No	Items	Before Revision	After Revision (reasons for revision)	Comments and suggestions Validator
1	Lecturer activities for each SAP.	There is no activity, the lecturer directs students to the correct answer, if there are still wrong student answers.	The lecturer directs the students to give the correct answer, if there are still wrong student answers (the core activities are not complete in each SAP).	Lecturers provide opportunities for students to draw conclusions from class discussions. After students draw conclusions, lecturers must provide reinforcement about the material.
2	Time allocation	Every 100 minutes meeting	Every 150 minutes meeting	Indicators are placed in the assessment section which also contains instruments / questions, so questions are made according to indicators.

The results of TB validation obtained the average score given by the validator, which is 3.5, which means the TB is in good criteria, and can be used with a little revision. Revisions are made based on the validator's suggestions and comments (table 5).

Table 5. TB Validation Results

No	Aspect Assessed	Validator			Z
		1	2	3	

1	Format:				
	1. Systematic arrangement in general	4	3	4	3,7
	2. Attractive general appearance	4	2	4	3,3
	3. Appropriate type and size of letters.	3	3	4	3,3
	4. Clarity of illustrations / images	4	2	4	3,3
2	Languages:				
	1. The truth of grammar	4	3	4	3,7
	2. Simplicity of sentence structure	4	3	4	3,7
	3. The language used is communicative	4	2	4	3,3
	4. Sentences are easy to understand	4	3	4	3,7
	5. The sentence in the example problem does not contain the double meaning	4	3	4	3,7
3	Contents:				
	1. Material coverage	4	3	4	3,7
	2. Determination of the material in accordance with the indicators and objectives of the chase	4	2	4	3,3
	3. Clarity and order of material	4	2	4	3,3
	4. Conformity based learning constructivism	4	2	4	3,3
	5. The use of letter variations is not excessive.	4	3	4	3,7
	6. BA can make students study independently.	4	2	4	3,3
	Rs	3,9	2,5	4,0	**3,5**

Readability test activities carried out for a day. Readability test subjects, namely 3 students of Elementary School Teacher Education Study Program Pattimura University. The three students said that they could understand the sentences contained in TB and SW but there were some unclear pictures. Based on the readability test results, the researchers decided to revise the TB and SW. From the results of the revision, the learning tool can be used in trials.

The trial activities were carried out for 10 meetings. The subjects of the learning kit were 20 students of Elementary School Teacher Education Study Program Pattimura University. The 20 students have heterogeneous academic abilities, namely high, medium, and low ability.

The instructor in the learning device testing activities, namely a lecturer included in the research team. In the learning process, students are grouped into 5 groups. Each group consists of 4 students. The grouping of students is regulated by the lecturer who teaches them, because he knows better the ability of his students in class.

Data obtained from the trial in the form of data analysis to revise the final draft learning kit, is based on the results of: (a) observation of lecturer activities, (b) validator responses to LPU, TB, and SW and (c) student responses to TB and SW as follows.

Based on the results of observations of the lecturers' activities during the learning process for 10 meetings, are listed in the following Table 6.

Table 6. Results of Analysis of Implementation of Learning Devices Based on Lecturer activities

Meeting	Learning Implementation
1st	84,2 %
2nd	86,3 %
3rd	91,7 %
4th	91,9 %
5th	100 %
6th	100 %

7th	100 %
8th	100 %
9th	100 %
10th	100 %

Based on the data in Table 8, it can be concluded that the activity of the lecturer in the process of testing the learning device is said to be carried out.

Based on the results of observations on student activities during the learning process for 10 meetings, are in Table 7 below.

Table 7 Results of Analysis of the Implementation of Learning Devices Based on Student activities

Meeting	Learning Implementation
1st	74,2 %
2nd	76,3 %
3rd	75,3 %
4th	74,3 %
5th	73,4 %
6th	74,2 %
7th	72,5 %
8th	71,8 %
9th	75 %
10th	74,6 %
Average	74,16 %

Based on the average percentage, the student activities during the process of testing the learning device can be said to be implemented / effective.

Table 8 Results of Lecturer Responses to Learning Tools

Learning Tools	Teacher Response				
	Very Agree (VA)	Agree (A)	Doubt (D)	Disagree (DA)	Very Disagree (VDA)
1. Textbooks (TB)					
a. BA attractive cover display	1	0	0	0	0
b. Teaching materials are made, it looks interesting and is easily understood by students	0	1	0	0	0
c. BA helps students discover material concepts	0	1	0	0	0
d. BA makes students study independently.	0	1	0	0	0
e. The contents of BA reflect constructivism-based learning.	0	1	0	0	0
2. Student Worksheet (SW)					
a. LAM is easy for students to understand.	0	1	0	0	0
b. LAM facilitates students to solve mathematical problems in their own way	0	1	0	0	0
c. LAM makes it easy for students to study	1	0	0	0	0
3. Learning Implementation					
a. With constructivism-based learning, learning becomes active.	1	0	0	0	0

b.	The learning atmosphere in the classroom looks new and fun	0	1	0	0	0
c.	Students are enthusiastic in the learning process	0	1	0	0	0
	Prg (%)	**27**	**73**	**0**	**0**	**0**

The data in Table 8 shows that constructivism-based learning in Basic Mathematics Concept lectures is responded to positively by 100% (the sum of the SS and S categories). In conclusion, learning in the classroom takes place effectively. Data on student responses to learning tools as in Table 11 below.

Table 9. Questionnaire Results of Student Responses Against Learning Media

Learning Tools	Teacher Response				
	Very Agree (VA)	Agree (A)	Doubt (D)	Disagree (DA)	Very Disagree (VDA)
1. Textbooks (TB)					
a. TB attractive cover display	35	65	0	0	0
b. Textbooks are made, look interesting and are easily understood by students	25	75	0	0	0
c. TB helps students discover material concepts	25	75	0	0	0
d. BA makes students study independently.	25	75	0	0	0
2. Student Worksheet (SW)					
a. SW is easy for students to understand	25	70	5	0	0
b. SW facilitates students to solve mathematical problems in their own way	10	85	5	0	0
c. SW makes it easy for students to study	10	85	5	0	0
3. Learning Implementation					
a. With constructivism-based learning, learning becomes active	20	70	10	0	0
b. The learning atmosphere in the classroom looks new and fun	30	60	10	0	0
c. Students are enthusiastic in the learning process.	20	70	5	5	0
d. Lecturers do not dominate learning, and students are free to develop their ideas in understanding the material taught	25	60	15	0	0
Prs (%)	**22,7**	**71,8**	**5**	**0,5**	**0**

From the data in Table 9 shows that learning using TB based on constructivism in the lectures of Basic Mathematical Concepts was positively responded by students by 94.5% (the sum of the SS and S categories). In conclusion, learning in the classroom takes place effectively.

3.2 Discussion

Based on the results of research on constructivism-based textbooks, using the 4D model which includes the stages of defining, designing, and developing the discussion of research results is described as follows:

At the defining stage, the Lecture Program Unit (SAP) is analyzed. Based on the results of the analysis, lectures on basic concepts of mathematics are still considered difficult, by some students of the

Teacher Education Study Program. This is due to the lack of understanding of the prerequisite concepts, so students tend to experience difficulty and confusion in solving problems.

One alternative to overcoming student problems in the learning process is to use Constructivism Based Textbooks, so students can construct their own knowledge. The student's own construction of knowledge will last a long time in his memory so that it can be used in solving various problems related to the basic concepts of mathematics. In line with the start of the application of the Indonesian National Qualification Framework (KKNI) [12], as a development of the tertiary level curriculum, the learning process is more interpreted as a scientific process by using constructivism-based textbooks. This means students are required to be more active in the learning process and lecturers only as facilitators and mediators. Constructivism Based Teaching Books are believed to be the golden bridge in the development of students' attitudes, skills and knowledge.

The Development of Textbooks Based on Constructivism is a challenge for lecturers, about how to develop student activities so that (1) students can be active in listening to or paying attention to what is contained in the textbooks, (2) students can formulate questions in accordance with what has been listened, (3) students can find solutions to problems provided by lecturers by means of other sources or recall material related to the material being studied, (4) students can process the results of information gathering by discussing with classmates or group friends , and (5) students can submit results from the four previous stages.

Based on the description expected from constructivism-based learning, students look for solutions to a problem. This is an application of Vygotsky's theory of the need for collaboration in learning. This is where students collaborate with each other, so that new ideas emerge within the students themselves. This is in accordance with the opinion of [9], that constructivism is an epistemological approach that assumes that knowledge and meaning result from interactions between actions, experiences, and subjective states of mind of a person.

At the design stage, researchers designed a textbook format consisting of (1) Learning Achievements, namely students are able to master the basic concepts of mathematics and can learn them: (2) Learning Achievements in Lectures, ie students are able to use the basic concepts of mathematics in problem solving; (3) subject matter, (4) sample questions, (5) student activities, (6) summaries, (7) individually practice questions at home, and (8) answer keys.

As it is known that if the textbook is well designed, then naturally students can study independently or in groups. Lecturers' duties are as motivators and facilitators to their students. As lecturers must know that each student has diverse academic abilities, so that their diversity in groups determines overall student success. This means that students with higher academic abilities can help their middle or low classmates with their ability to construct knowledge. This is in accordance with the opinion of [11], that in constructivism learning in the 21st century students are required to be able to have creativity and innovation and be able to communicate and cooperate with others.

At the development stage, a revised learning tool was tested. This needs to be done to find out whether the learning device is valid or not. In fact, even though the learning kit has been revised, there are still shortcomings in the learning process, namely that at the end of the lesson, the lecturer does not give an opportunity for students to conclude the material being studied. Based on this after the learning process the research team held a discussion to discuss the process of implementing the learning device test.

Nevertheless, it can be said that learning by using Constructivism Based Textbooks is not too difficult to apply in the learning process in the classroom. This means the activity of lecturers who teach in the process of testing the learning device is effective.

Based on the results of the analysis of student activities, it was concluded that the activities of students during the process of implementing the learning device trials were effective. This is based on observations of student activities during the process of testing the learning tools from the first meeting to the tenth. Overall, students are very enthusiastic and active in discussing with their respective group friends. This means that BA is based on constructivism to make students motivated and actively construct their knowledge in the learning process. According to [11] students are able to use their

abilities to search for information and analyze the information obtained, as well as critical thinking in solving problems or in making decisions. The same thing, [12] that the construction of students' own knowledge, will last a long time in their memories so that it can be used in solving various problems related to the basic concepts of mathematics.

In addition, the results of the questionnaire responses given by lecturers and students showed that learning using BA was responded to positively.

Based on the discussion above, it is known that all the criteria of a learning device are said to be valid have been met. This means that the textbook based on constructivism in the Basic Mathematics Concept Lectures, developed by researchers is valid.

4. Conclusions and suggestions

Based on the results of the study it can be concluded that the Development of Constructivism-Based Textbooks in Basic Mathematics Concept Lectures in the FKIP Unpatti Elementary School Teacher Education Study Program after being validated, tested read, and tried out is good (valid), because it meets the validity criteria as mentioned previously.

Based on the conclusions, the following are suggested. (1) This research has produced a valid Constructivism Based Textbook, so the researcher recommends that mathematics lecturers who also teach Basic Mathematics Concepts courses, so that they can use this textbook in the lecture process, as a stage of dissemination in the 4-D development model (four -D); and (2) For other researchers, to develop Constructivism-Based Textbooks on other material or to use other learning device development models.

5. Acknowledgements

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