

# Improving The Ability Of Literation, Collaboration, Democracy Attitude, And High Level Thinking Ability With Learning Based On Theory Of Constructivism

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***Abstract—The ability of literacy, collaboration, democratic attitudes, and higher-order thinking skills is very important for students, but has not been taught optimally in college. Previous research shows that the implementation of constructivist learning theory has the potential to improve literacy, collaboration, democratic attitudes, and higher-order thinking skills, but how much the implementation of constructivism theory still needs further investigation. This study aims to produce a learning model based on constructivism theory that is feasible and effective to improve literacy, collaboration, democratic attitudes, and higher-order thinking abilities and learning devices based on constructivism theory to improve literacy, collaboration, democratic attitudes, and higher-order thinking skills. The model and development procedure used is the Constructivist Instructional Design (C-ID) model of Willis. The model consists of 4 stages, namely (1) define, (2) design, (3) development, and (4) dissemination. The product model developed was validated by content experts and learning design experts. Next, it was tried out to Surabaya State University students. The results of the study show that (1) the learning model developed based on constructivism theory is feasible and effective to improve literacy, collaboration, democratic attitudes, and high-level thinking abilities and (2) learning devices that are developed based on constructivism theory can improve literacy skills, collaboration, democratic attitudes, and higher order thinking skills***

***Keywords—Learning model, constructivism, literacy, collaboration, democratic attitudes, and higher order thinking.***

## I. INTRODUCTION

The learning process in college has not been fully designed to prepare students to have the skills to enter life this time and in the future, such as literacy skills, collaboration skills, good attitude, and problem solving. The learning process needs to be developed to facilitate students to think, reason,

collaborate, and construct knowledge in accordance with the context of life and its needs. According to [1] students need the opportunity to build their own knowledge, the lecturer helps the process, by means of facilitating learning, designing information to be more meaningful and more relevant to the needs of students by giving them the opportunity to find or apply their own ideas, and invite them to realize and consciously use their own strategies for learning. Lecturers should give a "ladder" that can help students achieve a higher level of understanding, but it should be endeavored so that students themselves climb the ladder [2].

A new paradigm that provides opportunities for literacy processes, students build their own knowledge, use learning resources in a variety of ways, and provide opportunities for collaboration is learning based on constructivism theory [3]. According to [4] constructivism, students themselves are responsible for their learning outcomes. They bring their old understanding in new learning situations. They themselves make reasoning for what they learn by searching for meaning, comparing it with what is already known and resolving discrepancies between what they already know and what they need in new experiences. With their experiences, students make hypotheses, test the hypotheses, manipulate objects, solve problems, find answers, describe, research, dialogue, reflect, formulate questions, and express ideas to form new knowledge. Teaching is not an activity of transferring knowledge from lecturers to students, but an activity that allows students to build their own knowledge in order to have literacy, collaboration, democratic attitude, and problem solving skills in the life of the nation, society, and themselves.

This study aimed to produce a learning model based on constructivism theory that is feasible and effective to improve literacy, collaboration, democratic attitudes, and higher order thinking abilities and learning devices based on constructivism theory to improve literacy, collaboration, democratic attitudes and higher order thinking skills.

Another objective was to describe the implementation of learning models based on constructivism theory and its tools to improve the ability of literacy, collaboration, democratic attitudes, and higher order thinking skills.

The results of this study are expected to provide benefits to various parties, both theoretically and practically. Theoretically, it will produce new findings about learning models based on constructivism theory to facilitate learning. Practically, it will improve the ability of literacy, collaboration, democratic attitudes, and higher order thinking skills.

## II. METHOD

The instruments used to collect data were questionnaires and tests. Questionnaire was for learning technologists. Model product components assessed by learning technologists are (1) learning models, (2) Semester Learning Plans, (3) Learning Materials, and (4) Learning Assessment Sheets. Questionnaire for students was to get information on the ease and readability of Learning Materials and Task Sheets [9].

Tests were carried out before and after learning. Tests were given in the form of "essay test" for students in the class and done individually to measure higher order thinking skills. Performance assessment was used to obtain information on literacy abilities in demonstrating certain tasks. Observations were made to collect data on democratic attitudes and collaboration skills.

Processing data in this study was carried out using statistical analysis techniques. Data on student learning outcomes included literacy, collaboration, democratic attitudes, and higher order thinking skills were analyzed by using relevant statistical programs. To calculate the data of the observations and student responses was carried out with 100%.

This research was a development research. The product developed was a learning model based on constructivism theory and learning devices. Learning devices which were developed included 4 components, namely semester learning plans, learning materials, student activity sheets and learning assessment sheets. The development design used was the structure of the C-ID model [5]. The model consisted of four stages, namely (1) define, (2) design, (3) development, and (4) dissemination.

### A. Define

At the define stage a development team was formed. This team was in charge creating and supporting participation teams, making progressive problem solving, and developing pronesis. The development team consisted of representatives of students, lecturers, designers, graphic artists, and so on. The team worked from the beginning of product development to the end. Team members could involve 1 to 3 people from diverse perspectives. They are expected to provide input from different perspectives.

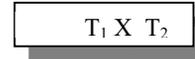
### B. Design and Development Focus

There are 4 activities carried out in design and development, namely (1) choosing the environment, (2) choosing the product and media formats, (3) determining the format of the assessment, and (4) designing and developing the products. In choosing the environment and media format it was necessary to pay attention to 3 important characteristics, namely power, flexibility, and

accessibility with 2 components, namely (1) tools of design, such as charts, videos, computers, etc. and (2) process of design. Evaluation procedures emphasized formative evaluation with a qualitative approach. The data collection was conducted by using observation and documentation [7].

Product development generally consisted of 3 components, namely (1) surface design (draft), for example in the form of screen layout, typography, language, graphics, illustrations, and sound; (2) interface design, for example in the form of views or interactions, and (3) scenarios, namely the sequence of learning activities.

The design of the try out was one group pretest - posttest design [8] with the following designs:



Where:

T1: Pre-test

T2: Post-test

X: Treatment

Procedure:

(1) Providing a pre-test (T1), to measure four dependent variables, (2) Treating subjects with X, namely through learning based on constructivism theory, (3) Providing a post-test (T2), to measure four dependent variables

### C. Dissemination Focus

The dissemination focus consisted of 4 activities, namely (1) evaluation, (2) final product, (3) diffusion, and (4) adoption. At this stage the development product was used in school / campus learning in the actual classroom. It should be stressed that the product of development may only be suitable for the local context, not for all learning contexts [9]. In accordance with the type of data needed in the pilot activities (formative evaluation).

## III. RESEARCH RESULT

In utilizing and disseminating product models, the research results that can be submitted are as follows.

### A. Feasibility of Development Products

1. Feasibility of learning models based on constructivism theory

The feasibility of a learning model based on constructivism theory was based on a test of the learning designer expert who masters the theory and practice of learning models. Based on the expert test results, the learning model based on constructivism theory was the answer to overcome the learning problem, the learning model developed has been based on appropriate learning and learning theory, there was a coherency of elements of the model with model assumptions, the models developed were suitable with the characteristics of subjects and student characteristics, the learning models were non-linear and contextual in nature. In conclusion, the learning model was declared feasible to be used to facilitate learning [10].

2. Feasibility of Semester Learning Plans

The results of testing the learning implementation plan produced several findings. First, learning objectives have been formulated in general statements to achieve high level competencies (analysis, synthesis, evaluation) and have been directed towards achieving goals simultaneously

/ integrated and oriented towards efforts to help students so that they can build their own knowledge [11].

Second, the description of learning learning material is appropriate with the learning objectives, but the assessment did not reach the depth and breadth of the material that should be mastered by students. Learning material was suitable with the development of science and in accordance with the demands of life.

Third, the learning syntax were in accordance with the contemporary learning theory. The conformity indicators, among others were (1) learning was directed at efforts to study actual problems in a context that fitted life, (2) learning was designed in such a way as to challenge students to get a deeper understanding, not just completing tasks, (3) learning was directed at the ability of students to build their own knowledge, and (4) learning was carried out with collaborative learning patterns.

Fourth, the semester learning plan has described the utilization of learning resources, namely (1) diverse learning resources, (2) primary learning resources, (3) learning resources tailored to student interests, and (4) learning resources sought, found, and used according to the student's way.

Fifth, in the assessment design, students were given the opportunity to find and use their own learning resources in accordance with the choice of strategies and study time that were the choices of students. The assessment design has fulfilled 3 aspects, namely (1) assessing the learning process, (2) assessing learning outcomes, and (3) using various assessment instruments according to the learning objectives.

Sixth, based on the results of the try out as described above, the developer carries out consultations and discusses the depth, breadth and suitability of learning materials with the level of development of students. Improvements in elements (1) of learning objectives are designed so that they can be achieved simultaneously / integrated and oriented towards efforts to help students to develop their own knowledge, (2) learning resources designed so students can search, find and utilize their own learning resources accordingly with a choice of strategy and time that becomes his own choice, and (3) the assessment of learning outcomes is focused on achieving learning outcomes in an integrated manner.

### 3. Feasibility of Learning Materials and Students' Worksheets

Based on the presented table of data it was found that the material aspects described in the learning material and the assignment sheet were in accordance with the learning objectives. The conformity included the following: (1) the material was in accordance with competencies that must be mastered by students, (2) the assignments given to the students were in accordance with competencies that must be mastered by students, (3) the explanatory examples were in accordance with competencies that must be mastered by students, and (4) the exercises and questions were in accordance with the competencies that must be mastered by students. Learning materials and task sheets have fulfilled aspects of adequacy, covering several things, namely: (1) the depth and completeness of material descriptions in accordance with students' abilities, (2) explanation of material was sufficient to meet curriculum demands, and

(3) the number of assignments / exercises were sufficient. In terms of the accuracy of the material, learning materials and task sheets, (1) the material presented was with scientific truth, (2) the material presented was in accordance with the development, (3) the material presented was in accordance with daily life, and (4) the packaging of material was in accordance with the scientific approach. The learning material developed fulfilled the feasibility in terms of content, because (1) it presented competencies that must be mastered by students, (2) it presented benefits and importance of mastery of material for student life, (3) it presented functional images / illustrations, (4) the material descriptions followed the flow of thinking from simple to complex. Judging from the suitability of the contents of the presentation with the demands of student-centered learning, the learning materials that were developed according to the learners: (1) have not yet described that learning materials could encourage students to build their own knowledge, (2) have not illustrated that learning materials could encourage students' interaction with learning resources, and (3) have not described the learning material as being able to encourage students to learn at the center of the surrounding community activities.

The format / method for presenting learning materials was appropriate, namely (1) supporting social awareness, (2) supporting legal awareness, (3) supporting logical thinking, and (4) supporting the development of human values. Improvement of learning materials needs to be done so that the length and structure of the sentence and the natural structure are in accordance with the learner's abilities. Language also needs to be improved so that learning materials are easier to understand

The preparation of learning materials is improved so that it is in accordance with the rules of Indonesian that are good and correct. These improvements include (1) the use of spelling, (2) structuring the sentence, (3) the accuracy of the use of the term, and (4) the suitability of the language for the characteristics of students

### 4. Feasibility of Learning Assessment

Tests on learning assessment yielded findings that (1) test material was suitable with learning objectives, (2) test material was in accordance with student life, (3) test material measures higher order thinking skills, and (4) test material measures student ability in an integrated manner.

Judging from the aspects of the adequacy of the test material, it was obtained an illustration that the depth and completeness of the test material were not in accordance with the abilities of the students. But describing that the test material was sufficient to meet the demands of the curriculum. Whereas in terms of the accuracy of the test material, it could be seen that (1) the test material was in accordance with scientific truth, (2) the test material was in accordance with the development, (3) the test material was in accordance with the demands of life, and (4) the test material was in accordance with the scientific approach.

The use of subjective tests was in accordance with the demands of student-centered learning, with indications that (1) assessing students' ability to build their own knowledge, (2) assessing student interactions with learning resources, (3) assessing learning outcomes, and (4)

assessing students' abilities to analysis the problem contextually.

The spelling and structure of the sentence used in the preparation of the test material was not yet in accordance with the rules of good and correct Indonesian. But the terms used were correct. The language used was in accordance with the characteristics of students. It was judged that the aspects of readability, length and sentence structure, as well as the preparation of the paragraph were in accordance with the ability of students. The language used was easy to understand (communicative).

Based on the results of the try out above, the researcher reviewed the depth and completeness of the test material to fit the students' abilities and revised the spelling and sentence structures to fit the rules of good and correct Indonesian.

**B. The effectiveness of learning models based on constructivism theory to improve the ability of literacy, collaboration, democratic attitudes, and higher order thinking skills.**

1. The use of learning models based on constructivism theory to improve literacy skills.

From calculations with SPSS 20 with the Paired Sample Test, it was known that the value of t count > t table (-23.209 > 2.006) and P value 0.00 < 0.5. It indicated that there is a difference between the average value of literacy skills using the learning model based on constructivism that has been developed. This can be seen in table 1 as follows:

Table 1 : Output of SPSS 20 Paired Sample Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	76.22	54	3.888	.529
	POSTTEST	81.37	54	3.651	.497

		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	54	.908	.000

	Paired Differences				t	df	Sig. (2-tailed)		
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower				Upper	
Pair 1	PRETEST - POSTTEST	-5.148	1.630	.222	-5.593	-4.703	-23.209	53	.000

2. The use of learning models based on constructivism theory to enhance the ability of collaborative abilities

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	76.89	54	3.580	.487
	POSTTEST	81.56	54	3.750	.510

		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	54	.589	.000

	Paired Differences				t	df	Sig. (2-tailed)		
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower				Upper	
Pair 1	PRETEST - POSTTEST	-4.667	3.325	.452	-5.574	-3.759	-10.313	53	.000

From the results of SPSS with the Paired Sample Test above, it is known that the value of t count > t table (-10.313 > 0.679) and P value 0.00 < 0.5 indicating that there was a difference between the average value of student collaboration ability before using the learning model based on constructivism theory and after the use of learning models based on constructivism theory that has been

developed. Judging from the average value, there was an increase from pretest (76.89) to posttest (81.56).

3. Use of learning models based on constructivism theory to improve democratic attitudes

From the results of SPSS with the Paired Sample Test, it is known that the value of t count > t table (-8.416 > 0.68) and P value 0.00 < 0.5 indicating that there is a difference between the average value of democratic attitudes before using the based learning model constructivism theory and after the use of learning models based on constructivism theory that has been developed. Judging from the average value, there was an increase from pretest (79.44) to posttest (83.6). Based on table 8, the SPSS 20 calculation was obtained as follows:

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	79.44	43	3.026	.461
	POSTTEST	83.60	43	2.162	.330

		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	43	.253	.102

	Paired Differences				t	df	Sig. (2-tailed)		
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower				Upper	
Pair 1	PRETEST - POSTTEST	-4.163	3.244	.495	-5.161	-3.165	8.416	42	.000

4. The use of learning models based on constructivism theory to improve the ability of higher order thinking skills

From the results of SPSS with the Paired Sample Test above, it is known that the value of t count > from t table (-21,082 > 0,68) and P value 0,00 < 0,5 indicating that there was a difference between the average value of thinking level before using Learning models are based on constructivism theory and after the use of learning models based on constructivism theory that has been developed. Judging from the average value, there was an increase from pretest (76.59) to posttest (79.57). Table 6 with the SPSS 20 calculation shows the following results

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	76.59	49	2.597	.371
	POSTTEST	79.57	49	2.923	.418

		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	49	.943	.000

	Paired Differences				t	df	Sig. (2-tailed)		
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower				Upper	
Pair 1	PRETEST - POSTTEST	-2.980	.989	.141	-3.264	-2.695	-21.082	48	.000

The results of analysis with Independent Sample Test showed that there was an increase of higher order thinking skills after using learning models based on constructivism theory.

**IV. CONCLUSION**

Based on data presentation and data analysis the results of the development and implementation of learning models

based on constructivism theory can be summarized as follows. First, the learning model based on constructivism theory is feasible to improve literacy, collaboration, democratic attitudes, and higher order thinking skills. Second, the learning model based on constructivism theory is effective to improve literacy, collaboration, democratic attitudes, and higher order thinking skills.

In utilizing and disseminating product models, the suggestions that can be submitted are as follows. First, the learning model based on constructivism theory is suggested to be implemented institutionally as one of the learning innovations, because theoretically and empirically it can improve the quality of learning processes and outcomes. Second, learning models based on constructivism theory need to be disseminated in the form of seminars and/or written in educational journals. With the implementation and dissemination the model is expected to have implications in 3 things, namely (1) lecturers use learning theory that is more relevant to the demands of the development of science, (2) lecturers use new perspectives on learning, and (3) lecturers use new assumptions as a foothold in designing, implementing, and assessing learning.

For further product development, the following things can be done, First, developed by learning designers and developers in (1) other subjects, (2) other study program students, (3) elsewhere, and (4) continuous development time. Second, literacy, collaboration, democratic attitudes, and higher order thinking skills are skills that are needed in the present life therefore allied research needs to be done now and in the future.

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