

# Developing Habits of Mind through Web Based Learning Approach

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**Abstract**—The purposes of this study to determine whether the web-oriented constructivism instruction approach can improve student's habits of mind. The method used in the study is pre-experiment method with one-group pretest-posttest design who applied to students in 10st grade of senior high school and total 38 students. Research data is collected using critical thinking test, creative thinking test, self-regulation questionnaires, and contributes a web-oriented constructivism instruction approach to habits of mind observation sheet. Data were analyzed using hypothesis test and gain calculation. The result of this study that there are significant differences in student's habits of mind score between before and after being applied the web-oriented constructivism instruction approach, and if based on the results of gain calculation, it was found that the most student an increase in the medium on gain category. Other than that, if judging from the contributes a web-oriented constructivism instruction approach to habits of mind category it was found the results of a very good interpretation.

**Keywords**—web-oriented constructivism instruction approach; habits of mind

## I. INTRODUCTION

Education is defined as a process, a change, a lesson, a form of consideration that makes a person more mature [1]. Education is a dynamic culture and full development, education means a change occurs continuously and actively developed in accordance with the times. Sukmadinata has told education is the interaction between educators with learners in order to achieve a goal that is taking place in a particular setting, thus it can be concluded that education is a container is important in order to develop the potential of every individual [2].

In the education process, of course, cannot be released by the term curriculum. If education is defined as a container or institutions that accommodate the change, the curriculum is defined as a learning design in the education process. Indonesia itself has made the curriculum as a guide, reference, and the direction which contains learning objectives in carrying out the educational process. All learning objectives are expected to induce changes in its behavior on the learner. Entering the 21st century national education system has faced challenges that are complex to prepare qualified human resources in order to meet future needs and to meet the golden generation of Indonesia in

2045. Therefore, in 2013 the ministry of education and culture have developed curriculum in 2013 as a new curriculum that is correct and enhance the previous curriculum [1]. The curriculum applied by the Indonesian government explained that there is more direct students on the domain of spiritual attitudes and social attitudes, domain knowledge, and domain skills, so based on the demands of the curriculum, in government regulations to establish a competency standards based on competency/ learning paradigm of the 21st century or the 21st century skills.

Griffin et al. divides into four learning 21st century thinking skills that consists of a way of thinking, way of working, tools for working and skills for living in the world [3]. On the one skill that is in learning 21st century that, there is one aspect of thinking skills the way of thinking that lead students to have critical thinking skills (critical thinking), creative thinking (creative thinking), and control (self-regulation), and according to the skills Marzano included into the habit of thinking that so-called indicator habits of Mind.

Critical thinking is a skill that engage students in improving reasoning and problem solving [2], while self-regulations a skill that emphasizes the importance of personal responsibility in the control of knowledge and skills acquired [4], and creative thinking is a skill that directs students to produce something new to look for solutions in resolving the problem [5] If a student has possession or control of the three skills, it can be said that he has had a habit of thinking (habits of mind) is good. Habits of mind are often interpreted as the behavioral characteristics of the highest intelligent thinking to solve problems. Habits of mind is the ability of students need to have in order to achieve success in life. Marzano suggests thinking habits (habits of mind) as a one-dimensional long-term learning outcomes (learning outcomes) [6]. The habit of thinking developed by Marzano is regarded as one of the dimensions of learning outcomes.

However, based on the results of preliminary through the interview subject teachers of biology, has obtained information that had not previously been carried out measurements specifically on critical thinking skills, skills of self-control, and creative thinking skills in students, and when viewed from the recapitulation of the value of learning and the lack of readiness of students to the learning process as carefree difficulties experienced by teachers have shown that the profile of the

habit of thinking in these schools are still low. It can also be reinforced by the lack of applied learning approach during the learning process, especially when learning a difficult and extensive material such as the concept of biodiversity.

Based on the foundation of the advantages of critical thinking skills, self-control skills, and creative thinking skills that have been described previously, a learning approach can be used as a solution for realizing the habits of mind skills. Nurma argues that the approach can be interpreted as a starting point in implementing the learning to achieve the learning objectives, and a constructivist approach is considered as an approach that is able to build the habit of thinking in students [7]. Constructivism learning approach is an approach which focuses the student at the center of the learning process, this approach was used to further stimulate and provide opportunities for students to develop their potential in a more optimal [8]. Constructivist approach is based on process-oriented learning to make the project work, and the results according to the interests of students who require their skills of self-control is high, so that later they will understand his own knowledge, understanding the importance of their own business and also exercise patience to solve problems on their own [9]. With the implementation of learning activities like this, then the learning process will be more lively and the students will be central in learning activities.

As one of the efforts are best suited to support this approach is one that can be correlated with instructional materials that are self-taught. It can be seen that the learning that integrates technology able to bridge the knowledge gap between students, so learning to integrate this technology can support a constructivist approach. Integrated learning is a learning technology that has been supported by the attributes and internet resources. We are in the era of the Internet, the development of electronics is so fast and so wide use in various fields of life will give birth to the development of information very quickly, it is also certainly help to facilitate in the material master biodiversity.

Based on the description that has been described above, conducted a study on "The Web-Oriented Constructivism Instruction Approach to Improve Student's Habits of Mind on The Biodiversity Concept with the formulation of the problem "Is learning approach constructivism oriented web can improve habits of mind the students to the concept of biodiversity". The main purpose of this research was to determine whether the application of learning approaches constructivism oriented web can improve habits of mind students on the concept of biodiversity

II. METHODS

This study uses a pre-experimental design with one group pretest posttest design. Sugiyono says that the pre-experimental method is a method used to fix a problem with applying the solution to one class experiments alone without any control class or so-called class comparison [10]. The description of the design or the research design used can be seen in the following table:

TABLE I. DESIGN RESEARCH

Group	Pretest	Treatment	Posttest
Class A	O1	X	O2

Information:

Class A class that is used as a → research; O1 → Doing pretest before implementation approach; X → Web-oriented constructivist learning approach; O2 → Doing post test after the applied approach.

Subjects of research include populations originating from the 10<sup>th</sup> grade students in Senior high school with the samples used were 38 students. Data obtained from the results of the study then analyzed using hypothesis testing to determine whether there are significant difference in the scores before and after the implementation of learning approaches and N-gain calculation to determine the extent of the increase in scores before and after the implementation of learning approaches.

III. RESULTS AND DISCUSSION

The results of research regarding on habits of mind were obtained through questions and questionnaires given before and after the implementation of a web-oriented constructivist learning approach, which was later changed in the form of scores, below a comparison table of scores obtained in each category of habits of mind (critical thinking, self-regulation, creative thinking):

TABLE II. THE RESULT OF RECAPITULATION ON HABITS OF MIND CATEGORY

Level of Assessment	Critical Thinking		Self Regulation		Creative Thinking	
	Pre	Post	Pre	Post	Pre	Post
Average score	40	70	66	77	47	72
Maximum score	60	90	79	91	67	93
Minimum score	20	50	40	67	20	53

Table 2 shows the results of the study on the average score of critical thinking skills, self-regulation skills, and creative thinking skills before and after the learning approach is applied. The comparison diagram of the results of research on the habits of thinking in the three categories can also be seen in the graph below:

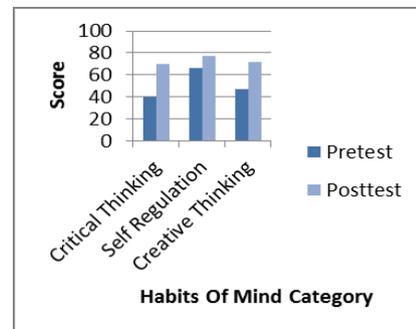


Fig. 1. Graph of average score on habits of mind category.

Figure 1 shows a graph of the acquisition of scores on each habits of mind category before and after the implementation of a web-oriented constructivism learning approach. From the

graph, it can be seen that the average score of critical thinking skills before learning reaches a number of 40 and the average score of critical thinking skills after learning reaches a number of 70. The average score of self-regulation skills before learning reaches a number of 66 and the average score of self-regulation skills after learning reached 77, the average score of creative thinking skills before learning reached 47 and the average score of creative thinking skills after learning reached 72.

After the research data on habits of mind category is obtained in the form of score, the data then continued by using hypothesis testing analysis and gain calculation. However, before testing the previous hypotheses, an analyst prerequisite test is conducted first, because the prerequisite test analysis will be used as a determinant for the type of hypothesis testing used (parametric hypothesis test or non-parametric hypothesis test). The prerequisite test referred to in this study is the normality test and homogeneity test, the following can be elaborated on the results of the prerequisite test analysis on research data about habits of mind obtained from the questions for critical and creative thinking skills, as well as questionnaires for self-regulation skills:

**A. Normality Test**

The normality test was conducted to see whether the data scores of each habits of mind category before and after the implementation of a web-oriented constructivism learning approach had a normal distribution or not. The normality test is done by using the Shapiro-Wilk test on the SPSS 21 application. 0 for window with the sig test criteria. Calculate  $\text{sig} \geq \text{reference sig } 0.05$ , it can be said that the data comes from a population that is normally distributed, while  $\text{Count sig} < \text{reference sig. of } 05$  it can be said that the data does not come from a population that is normally distributed [11].

TABLE III. THE RESULT OF NORMALITY TEST ON HABITS OF MIND CATEGORY

No.	Type of skills	Count Sig. on Shapiro-Wilktable	
		Before	After
1.	Critical Thinking	0,056	0,112
2.	Creative Thinking	0,088	0,082
3.	Self Regulation	0,074	0,574

Table 3 shows the results of the data normality test for habits of mind category before and after the implementation of a web-oriented constructivism learning approach. From the table above, it can be seen that all data in each habits of mind category have a calculated significance number greater than the 0.05 reference significance number, so it can be concluded if the data has a normal distribution.

**B. Homogeneity Test**

Homogeneity test is carried out to see whether the data of each habits of mind category before and after being applied web-oriented constructivism learning approach has a homogeneous distribution or not. Homogeneity test is done using the levene test on application of SPSS 21. 0 for window with sig test criteria of  $\text{Count sig} \geq \text{Reference sig. of } 0.05$ , it can be said that the second variant of the data group is equal,

while  $\text{sig. Count sig} < \text{reference sig. } 0.05$  can it is said that the second variant of the data group is not as large [12].

TABLE IV. THE RESULT OF HOMOGENEITY TEST ON HABITS OF MIND CATEGORY

No.	Type of skills	Count sig. on levene statistic table
1.	Critical thinking	0,203
2.	Creative thinking	0,268
3.	Self regulation	0,017

Table 4 shows the results of homogeneity test data of habits of mind categories before and after the implementation of a web-oriented constructivism learning approach. From the table above it can be seen that critical and creative thinking skills have a calculated significance number greater than the 0.05 reference significance number, so that it can be concluded that the two skills data have a homogeneous distribution, while the self-control skill data shows a higher number of counts small from the 0.05 reference significance number, so it can be concluded that the skill data has a homogeneous distribution.

**C. Hypothesis Testing**

Based on the results of normality and homogeneity test results obtained results that data critical thinking skills and creative thinking have a normal and homogeneous distribution pattern, so the hypothesis testing is continued with the parametric hypothesis type using paired sample t test. Whereas based on the test results of the prerequisites of normality and homogeneity in the data of self-regulation skills obtained the results that the data has a normal but not homogeneous distribution pattern, so that the data of self-control skills hypothesis testing is continued with the non-parametric hypothesis type using Wilcoxon test. Testing of parametric and non-parametric hypotheses has the same test criteria, namely  $\text{Count sig} \geq \text{Reference sig. of } 0.05$ , it can be said that the second variant of the data group is equal (does not have a significant difference), while the  $\text{Counts sig.} < \text{reference sig } 0, 05$  it can be said that the second variant of the data group is not as large (has a significant difference)

TABLE V. THE RESULT OF HYPOTHESIS TEST ON HABITS OF MIND CATEGORY

No.	Type of skills	Asymp. Sig. (2-tailed) On Hypothesis Test Table
1.	Critical thinking	0,000
2.	Creative thinking	0,000
3.	Self regulation	0,000

Table 5 shows the results of hypothesis testing in the habits of mind category before and after the implementation of a web-oriented constructivism learning approach. From the table above it can be seen that all data in the habits of mind category either by paired sample t test or Wilcoxon test have a calculated significance number smaller than the 0.05 reference signify number, so that it can be concluded that there is a significant difference between the data before and after applying the learning approach to each habits of mind category.

#### D. Gain Calculation

The calculation of the Gain is done to find out how far the improvement in the habits of mind category of students before and after the implementation of a web-oriented constructivism learning approach. The calculation of Gain is obtained from the results of the difference in the data score of each skill after and before learning. The students experienced an increase in the medium category both in critical thinking skills, self-regulation skills, and creative thinking skills.

So based on the results of the analysis of testing hypotheses that show, there is a significant difference in data scores before and after the implementation of constructivism learning approach to web-oriented for each skill in the habits of mind category and based on the results of the N-gain calculation analysis which shows an increase in the data scores before and after with the medium category, which is also strengthened by the results of processing the average score data on the observation sheet regarding the contribution of web-oriented constructivism approach to the habits of mind category, the number of interpretations is very good. It can be concluded that the web-oriented constructivism learning approach can improve the habits of mind of students on the concept of biodiversity, and that means the research hypothesis is accepted.

The increase of each skill in the habits of mind category after the implementation of this web-oriented constructivism learning approach is in line with the theory which states that the constructivism approach is one approach that focuses to the students as centers in the learning process [8]. This approach used to stimulate and provide opportunities for students to develop their potential optimally, thus also indirectly a constructivism approach is an approach that is in line with the direction of learning in the 2013 curriculum which makes students as centers in the learning process. The approach of constructivism is an approach that directs students to build a knowledge, this means that in the learning process that implements constructivism approach students do not only act as a container that is ready to receive the material provided by the teacher, but students are also involved in building and finding knowledge that is being learned. The learning process that involves students to participate in finding out, building, and expressing knowledge, can certainly build a mindset and ultimately can improve habits of mind in students.

The constructivism approach also has several advantages [1], one of them can provide opportunities for students to find and apply their own ideas and be able to make students aware of their own learning strategies. If it is associated with one of the habits of mind categories regarding self-regulation skills, the advantages of this learning approach can trigger students to improve these skills, because constructivism approaches will indirectly trigger students to always prepare material they will learn and can motivate to students to always make effective plans to achieve learning because teaching and learning activities are no longer dependent on the teacher.

In addition, based on the results of the study also obtained information that the constructivism approach can increase students' critical thinking skills. This is in accordance to Iskandar, regarding the other advantages with the application of

constructivism learning approaches, namely the constructivism approach will be able to encourage students to think, process knowledge, solve problems, find ideas, and make decisions [13]. Knowledge built by students will certainly encourage them to think critically whether new knowledge that has been built can be accepted or not in accordance with the mindset and understanding that was previously owned. A person who has an understanding of a material in more depth will be able to have an assessment of new material received.

Rusman understanding the constructivism approach does not mean to regard concepts as something that is not important from the process of learning experience, but a meaningful learning experience is a learning experience that can direct students about how each concept or knowledge owned can provide real guidelines and can be actualized in everyday life [14]. Therefore, constructivism learning approach can also provide opportunities for students to create new ideas by using various contexts so that eventually can motivate students to think creatively, imaginatively, and introduce ideas at the right time, so as to improve creative thinking skills in students.

The increasing thinking skills in each category of habits of mind can also be supported because of the application of an approach oriented to the web [2]. Web-oriented learning, learning is not only to learn a knowledge and information, but also can train students to analyze, sort out, reorganize, package, create new forms, and use them for various purposes and problem solving. The web can be used as a tool in building knowledge. The web provides a lot of information that students can use when making an observation to build knowledge in the learning process with a constructivism approach.

The learning process oriented to the web can support students to build various types of information and knowledge. The web can provide space for students to gain experience and knowledge without time constraints. The web can bridge the knowledge gap in students [15].

#### IV. CONCLUSION

Based on the results of the analysis and discussion on the research on "The Web-Oriented Constructivism Instruction Approach to Improve Student's Habits of Mind on the Biodiversity Concept" we can conclude that a web-oriented constructivism learning approach can improve students' habits of mind on the concept of diversity in Senior High School. This is obtained based on the results of testing hypotheses that have been carried out on each category of habits of mind (critical thinking skills, self-regulation skills, and creative thinking skills) which shows that there is a significant difference between skills scores before and after applied constructivism learning approach with a significance number of 0,000, and the results of gain calculation have also shown an increase in the average score of skills before and after the implementation of the constructivism approach to web-oriented learning in the medium category, with the interpretation of the contribution of constructivism-oriented web learning approaches in the very good category.

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