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The Influence of the Concept Map of Wimba Learning Model in Plant Anatomy for Increase The Result Learning of Biology Students Teachers

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Article info	Abstract
Keywords: concept map, learning outcomes, visuopatial, play doh, 3Ds Max. **Corresponding Author:** Purwati K Suprapto purwatik4@gmail.com	The purpose of this research was to determine the influence of concept map of wimba learning model (based visuospatial) of plant anatomy class with discusses plant tissue material. This research also focuses on increasing student result learning. This research method was quasi experiment. The population on this study was three classes of Biology Education Department, Siliwangi University who took courses plant anatomy on 2015. The samples were taken by purposive many as two classes. Lecture model of Wimba (based visuospatial) were divided into lectures in the classroom and laboratory. 3D media used in this research were play-doh and 3Ds-Max. Concept maps were assigned made before the lecture and they presented and discussed at the beginning of the lecture. Practical work was conducted in three dimension microscopic representation. Achievement test was carried out before and after the learning process. The results showed that concept maps assigned to students before the learning has been able to help students improve the result of learning for play-doh media, but not for 3Ds max. Results of student learning using play-doh in 3D representation tends to be better than the 3Ds Max.

INTRODUCTION

The concepts of plants structure in plant anatomy is difficult to understand by student, because the form between one cell with other cell is almost the same but actually different.As a biology teachers candidate, students should be able to understand that concept. But in fact the students have trouble to distinguish the plant cell.

Concept maps are effectively used to distinguish and connect one concept to another. Students must be able to choose key concept from book then they mapped it. So that the concept maps created by students can be used as prior knowledge before the lectures.Concept maps can be used as an assessment instrument for pre and post learning activities, to assist in the consolidation, clarification and strengthening knowledge [1]. Map concept generally use a hierarchical structure and relational phrases to help understanding of relationship [3].

Study of plant structure in college generally conducted in laboratory through two-dimensional observation, then it drawn. Through two-dimensional image is still incomplete, students is still not be able to distinguish between one cell with other cells, they can not fully describe the form and function of cell. Expected through 3D imagination, students are able to understand the plant structure. Thus the microscopic 3D representation becomes more important.

Wimba model is a 3D learning model or called visuospatial model. This model represents a 2D object into 3D object observation. In this study used a microscopic representation of plant tissue structure. 3D learning model (visuospatial) also called Wimba model have proved able to increase learning outcomes and level of logical thinking in plant tissue structure material[12].

3D media used in school and college generally is play-doh (PD). PD is a simple conventional 3D media that does not require special skill to use. 3D electronical media has actually been available, such as Autocad, 3Ds Max, and others, have been used in various field of science and technology, but it has not been used in biology learning process.

With advances in software technology of 3D that rapidly developed. 3Ds Max software is able to form a 3D objectmore flexible and can be rotated, so it can be seen from the top, bottom and front more real. The use of 3Ds Max is expected to enhance student's imagination to represent 2D objects into 3D objects. So it can increase the representation of microscopic skill, imagination, and conceptualization.

The purpose of this study is to know the influence of using map concept in students teachers learning outcomes in plant tissue material by using a 3D media play-doh (PD) and 3Ds Max.

RESEARCH METHODOLOGY

This research method is quasy experiment. The population in this study is the fourth semester students who take the plant anatomy course in 2015 in Biology Department Siliwangi University as many as 3 classes. Samples selected with purposive sampling many as two classes.

Wimba learning model (based visuospatial) divided into two activities, that are classroom lectures and laboratory experiment. 3D media uses in this study are play-doh (PD) and 3Ds Max. Because of the limitation of computer that meet the specification of 3Ds Max, then this study carried out in groups. Students were divided into 5 groups. Each group consist of 5 students.
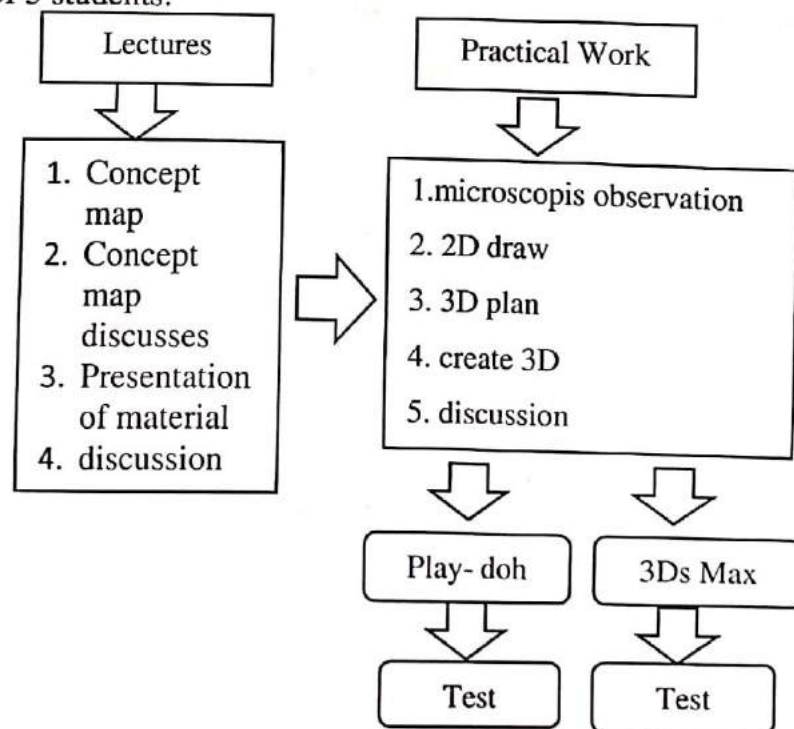

Figure 1. Learning processes

Concept maps were assigned made before the lecture and they presented and discussed at the beginning of the lecture. Course materials covered are :

1. Ground Tissue
2. Vascular Tissue
3. Dermal tissue

After discussion of the concept map, then followed the presentation of material by selected group, then discussion and ends with a confirmation. Assessment of concept maps based on scoring criteria of concept maps [9] as follows:

1. Proposition : two or more concept which connected by verbs and form a meaningfull sense, if valid score = 1
2. Hierarchy : at first, general concept forming a branch toward a more spesific concept, each sub ordinate shows the more spesific concept. Scores for each level = 5
3. Crosslink : if map shows the cross-connection between one segment with other segment, score = 10
4. Example : giving a valid example, score = 1

Practical work held after the lectures. The steps in this practical work are microscopic observation, observation of preparation. The result of their observation, shown in a 2D image, and then creating 3D form through drawing and continued making 3D with play-doh and 3Ds Max.Learning outcomes data obtained through pretest and postest plant tissue materials. N-gain calculation based [8]. Data processing was performed using SPSS 21.

RESULTS AND DISCUSSION

Lectures of plant tissue sturcture with Wimba models, first starts with making a concept map. Concept maps were made based on plant anatomy course reference book. Students have been trained to make a concept map in three times in previous meeting. The result of concept maps created by students are presented and responded by their friend in class and discussed. Thus students are expected to understand the concepts that will be learned. Lectures conducted by presentation by a group that has been assigned to do the presentation, and then conducted a discussion and confirmation. Furthermore 3D practical work conducted.
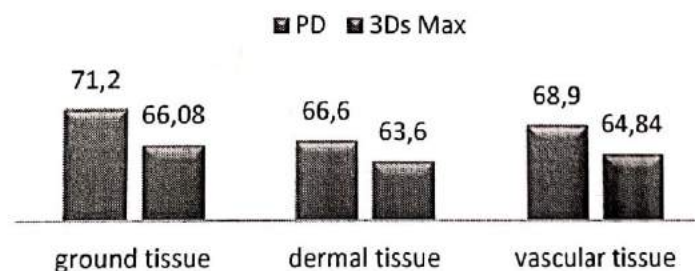

■ PD ▨ 3Ds Max

| | ground tissue | dermal tissue | vascular tissue |
71,2 66,08 66,6 63,6 68,9 64,84

Figure 2. Average of concept maps assessment that using play-doh and 3Ds Max media.

Result of concept maps created by students showed that concept map in PD group are better than concept map in 3Ds max group (figure 2). It seems that the PD group more serious when do the task of concept maps. 3Ds Max group seems create a map concept more simple and using common words that are less precise. T-test result showed that there is a difference between the result of PD concept maps and 3Ds Max (Tab. 1)

Cognitive result learning in plant tissue material shows that there is slightly difference learning outcomes between using PD and 3Ds Max. Posttest result showed that the Wimba learning model assisted with concept maps in PD group tend to be better than 3Ds Max group (Figure 3.).PD group seemed to be more focused on the 3D task, because the number of PD media is available in a rather large stock so that every student can actively participate in designing and creating 3D plant tissues.Students can represent their observation of 2D (visual) and then creation of their 3D imagination (visuospatial) into 3D plant tissue product. There are still many students who are less precise in making 3D tissue model. The increasing of learning outcomes (N-gain) students were counted and classified by Meltzer (2002) still in low category.

In 3Ds Max group to create 3D using 3Ds Max software, in which it requires high specification laptop. Not all student's laptop can be used, so that in group not all member or students actively participate in creation their 3D imaginations. Using 3Ds Max also requires special skills, it need more practice until their skilled to used 3Ds Max software. Because of the limitation of tools not all students can do it well. This affects their learning outcomes, because students are not experience the internal cognitive process individualized.
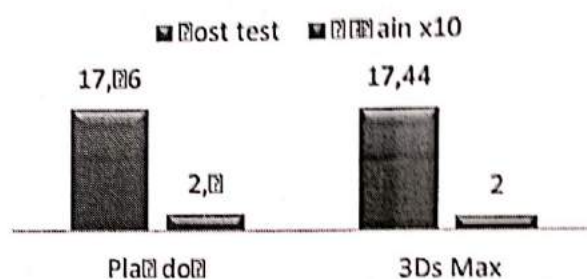

Figure 3. Average of cognitive learning that using PD and 3Ds Max

According to [2], designing is a cognitive process that consist of several activities such as visuospatial thinking, sketches and models, all three of these activities involve visuospatial representation. In other words, constructing a visuospatial representation refers to visual and spatial modeling from the elements that required to use in which this model constructed internally (mentally) or external (physical).

Table 1. Result of statistical test

No	Statistical test	Testing criteria	Calculation results	Analysis result
1	T-test learning outcomes PD and 3Ds Max	acceptance Ho, $-t_{table} < t_{value} < +t_{table}$	$T_{value} = 0{,}982$ $t_{ttable} = 0.680$.	There are differences learning outcomes in PD and 3Ds Max
2	T-test scores concept maps of PD and 3Ds Max	acceptance Ho, $-t_{table} < t_{value} < +t_{table}$	$T_{value} = 1{,}950$ $t_{table} = 0.680$	there are difference concept maps score in PD and 3Ds Max
3	Correlation test concept maps and learning outcomes in PD media	acceptance Ho, probability$_I > 0{,}025$.	probability = 0,015	There are correlation between concept maps and learning outomes
4	Regression test concept map and learning outcomes in PD media	-	$y = -0{,}741 + 0{,}014\,x$	There are influence of concept maps towards lerning

No	Statistical test	Testing criteria	Calculation results	Analysis result
				outcomes
5	Influence Significance test of concept maps towards learning outcomes in PD	acceptance Ho, $-t_{table} < t_{value} < +t_{table}$.	$t_{value} = 2{,}615$ $t_{table} = 0.680$	There are significance influence of concept maps towards learning outcomes
6	Correlation test of concept maps and learning outcomes in 3Ds Max media	acceptance Ho, probability$_i >$ 0,025	probability = 0,302	There are no correlation between map concept and learning outcomes

Visuospatial thinking, sketches, and models include highly dynamic internal and external models related to perception, reason and planner activity. Creating 3D plant tissue also through designing 3D products activities.

The result of correlation test in PD group, shows that there is a correlation between a concept map with result learning (table 1). This shows that making concept maps related with increased result learning. After knowing there is a correlation of two variables, then performed a regression analysis, after calculation of simple regression test by using SPSS there is significance influence in creating concept maps with increased in learning outcomes in PD group. So in learning outcomes of PD group is influenced by creating concept maps. Whereas the result of correlation test for 3Ds Max group, showed that there is no correlation between the concept maps with increased result learning in a 3Ds Max group.

CONCLUSION

Based on the result of this study about the influence of the concept maps of wimba learning model for increasing learning outcomes of biology students teachers can be concluded as follows.
1. There are difference results of concept maps between PD group and 3Ds Max group.
2. The average of assessment of concept maps in PD group is better than 3Ds Max group.
3. There are differences in cognitive result learning in plant tissue material between PD group and 3Ds Max group. Result learning shows that wimba learning model assisted with concept maps in PD group tends to be better than 3Ds Max group.
4. in PD group there is a significance influence between a concept maps toward increase of students result learning and in 3Ds Max group showed that there is no influence between concept map toward increase student learning outcomes.

SUGGESTION

The suggestion in this study are as follows.
1. In creating of 3-dimensional, students must experience internal cognitive processes individually.
2. Student's Plant anatomy reference books should be based on 3-dimensional .
3. Training using 3Ds Max software needs to be optimized, because it can help students represent 3D.
4. Using 3Ds max requires a computer with high spesification, need to upgrade the computer facility, so that all students can be active in 3D learning activities.

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