The Software “KDM” Used by WebGIS Technology for Educational parts and its possibility

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Abstract: The WebGIS Application software named “KDM” used by J-STIMS Web Version was designed by Authors in August 2004 and developed. The “KDM” is an abbreviation of Keitai-De-Mapping that means mapping software with cellular phone thru World Wide Web and GIS function. With this application software, we carried out experimental class applied to constructivism in attached middle school of Nagasaki University. In this paper, we provide an explanation about function and merit or demerit of this software for middle school class. In this paper, we discussed about experimental class that was based on constructivism. Especially the useful tool with cellular phone is first challenge for constructivism class.

Keywords: KDM, WebGIS, Cellular Phone, Distance Learning, Constructivism

1. Introduction

As the population ages and fewer babies are born, "the quality of learning" make be a largest demand rather than before. Nowadays, as we can see the information technology has very high-speed progress. And also now, it is becoming one part of life that many students access the Internet sites. The result of some search shows that the cellular phones are now a student's essential machines. We can use this useful tool (cellular phone) for middle school class.

How we can apply this tool to the education? In this research, we proposed one test case used by this tool to the constructivism. Because of the important element of an educational design is not only technology but the study environment which students' need. We hoped that the framework "constructivism" could be offer a new viewpoint.

In this research, we discussed about experimental part. In the experimental part, we adopted "KDM" software that was created by Nagasaki University and RYOIN, Inc. And it used for the actual experiment for middle school class.

2. Constructivism, Distance Learning and Class Design by “KDM”

1) Constructivism

This approach to learning has its roots in the epistemology of the interpretive or Verstehen tradition (Weber 1949). Thus the sense made of any event is seen to be dependent not only on the situation itself but also on the individual’s purposes and active construction of meaning. The constructions are seen as tentative models, which are continually tested against, experience and if necessary modified. This tradition is concerned with the intents, beliefs and emotions of individuals as well as their conceptualizations, and recognizes the influence that prior experience has on the way phenomena are perceived and interpreted.

In the educational theory of constructivism, it is focused on how the student will concern himself with study activities and volition at the subject. It has the following three viewpoints to knowledge or study.

(1) Study is process in which the student itself builds knowledge.
(2) Depend for knowledge on a situation.
(3) Study is performed through the interaction in the inside of a community.
2) Distance Learning

What is distance learning? As defined by Michael Moore, a director of the American Center for the Study of Distance Learning, Penn State University: “Distance learning is planned learning that normally occurs in a different place from teaching. As this result, it requires special techniques of class design and special methods of communication by some electronic and the other technology, as well as organization and administrative arrangements”.

Recently, the telecom infrastructure, such as a communications satellite and the Internet has been quickly progressed. Therefore, also in distance learning, communication and the various educational methods are progressed. In our research, the important point of distance learning is that we use a network and a computer as a tool. We think that the foundations of "learning" are in communication. As the method, we utilize participated type study, such as a debate and discussion. Moreover, the role of the teacher at this time must become to the supporter for a student's activity.

As stated above, the educational theory of constructivism is considered that study is performed through the interaction in the inside of a community. Moreover, the role of the teacher in the educational theory of constructivism is only assistance. As for constructivism and distance learning, above point and concept is common.

3) Class Design by the Software “KDM”

The "KDM" software is one educational tool used by WebGIS technology. This software has one functional capability that some still pictures captured by cellular phone could be registered named place on the map with user comment. Moreover, it has a time information in this software. In this research, we used Shobunsha map of full options as a base. This map data was constructed by using DXF format, DM form, and one-twenty five hundred scale maps. The applied constructivism class by "KDM" software was planed at the attached junior high school of Nagasaki University. Firstly, the teacher explains, "KDM" software to the student. Afterwards, the student divided into the group with ten people, and took a picture with cellular phone. At the same time, one assistance support with the group. In the theory of constructivism, the others existence is necessary. The communication with others is promoted greater understanding, and it is stimulated some study. In a word, it is thought that the discussion with each other student is very important. Moreover, it is thought that the student understanding is processed more from actual experiences.

In September 27 and October 22, the educational experiment for 72 students who attended the technology on class attachment junior high school of Nagasaki University. They are explained the “KDM” system, and took picture actually with cellular phone. Afterwards, the “KDM” system evaluated by them, and they are filled out the questionnaire. We tried to check the opinion of student using the method of questionnaire survey for this class. There are two questionnaires for GIS as like Figure 2.

Fig. 1 Composed image of “KDM” software
3. Results and Discussion

1) About GIS and WebGIS

In figure2 (a), it shows that the degree of understanding about GIS is low in a junior high school student. However, in a member of a high school student and over, it can be said that the degree of understanding of GIS is formed to some extent. Figure2 (b), compared with GIS, we can realize that the degree of understanding about WebGIS is very low.

2) About "KDM" Software

In figure3 (a), the good evaluation occupies 67% and 64%, respectively. From this result, it can be said that “KDM” system is good and easy to use. From figure3 (b), (c), this “KDM” system is concerned greatly in order to use a cellular phone. Moreover, 35% or more of people have answered that it is hard to use "operation on a map" respectively. From this answer, it can be said that the improvement in operation of this “KDM” software is a future subject.

![Graph of Do you know GIS?](image1)

(a) About GIS

![Graph of Do you know WebGIS?](image2)

(b) About WebGIS

Fig.2 Results of general Questionnaires for GIS
Did you tend to use "KDM" software?

(a) About “KDM” Software

Where is the easy place to use?

(b) About “KDM” Software function-1

Where is the hard place to use?

(c) About “KDM” Software function-2

Fig.3 About “KDM” Software and its functions
3) About Constructivism

In figure 4 (a), (b), it turns out that both items are proportional. From this, when an opinion comes out, it is expected that the volition of talks increases again. In the experiment of this "KDM" software, it carried out in the form near the theory of constructivism. Consequently, talks deepened an understanding and made future study volition increase. This, it can be said that information exchange and the means of communication are required.
4) Comprehensive Evaluation

Finally, in figure 5, it was investigated about relation of operation and the actual availability of “KDM” software. Figure, The availability and merit of software “KDM” operation or convenience is high. Moreover, The availability of badness of operation or convenience is not low. Therefore, we can find that the “KDM” software is good for evaluation, and can be said that an availability of “KDM” software is good.

Finally, it was investigated about relation of operation and the actual availability of “KDM” software. The availability and merit of software “KDM” operation or convenience is good for user. In this result, we can find that the “KDM” software is good for constructivism class, and can be said that an availability of “KDM” software is good for class evaluation with constructivism.

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