Study of Group-Learning Support based on Keyword-Map Structural Modeling

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Abstract
e-Learning is able to realize effective education by low cost, it also has problem it is difficult to know for teacher situation of learners. As a related idea, concept map has been presented in pedagogical literature, and it can more easily and rapidly represent a part of learner’s understanding without written and oral examination. In our research, we have studied supporting individual learning based on modeling “keyword-map” that is a kind of “concept map”, and especially focuses on transitive relation among keywords. We call such modeling KMSM (Keyword map structural modeling). In this paper, we propose and consider applying KMSM to group learning.

1. Introduction
e-Learning is important for school education and corporate in-service training. However, in e-Learning, teacher might not be easy to grasp the state of the learners because they cannot communicate like a face-to-face talk. We consider that grasping the learner’s understanding is one of the most important subjects and concept map might become useful and powerful tool in such a field [1]. Concept map can more easily and rapidly represent a part of learner’s understanding than the written or oral examination, so that the teachers have often used it as a method of the examination [2].

In our research, we have studied supporting e-Learning based on modeling “keyword-map” that is a kind of concept map [3]. We call such modeling KMSM (Keyword map structural modeling), and construct the prototype system to learn based on it. Learners might get some supports to construct the consistent keyword map, and to combine some keyword maps constructed by them into a consensus model. Teacher can know a minimum leading point by comparing his/her keyword map with a consensus model among learners.

In this paper, we propose and consider applying KMSM to group learning.

2. Keyword Map Structural Modeling

2.1 Keyword map
Keyword map is a two-dimensional diagram, it consists of keywords show learning contents and their links. It includes two types those are (a) nonhierarchical map based on resemblance among keywords and (b) hierarchical map based on transitive relation among keywords.

2.2 Learning processes of KMSM
In this research, we assume teacher’s map, which map is constructed by teacher is always true, and propose following group learning process.

[Learning processes]
1. Expression of keywords with explanatory note;
2. Decision of relations among keywords on a keyword map. It corresponds to draw keyword map.

[Teaching processes]
i. Construction of teacher’s map (Drawing keyword map);
ii. Identification of keywords among teacher and learners.

Figure 1. Learning processes of KMSM
3. Group-Learning Support System based on KMSM

Now, we are constructing the prototype system for group learning support system based on KMSM.

Teacher can see and edit learners’ KM Editor to draw keyword map, and learners create a keyword map using editor. It is only natural that learners’ cooperative map might not be teacher’s map, so that learners or teacher and learners will discuss differences between teacher’s map and learners’ map. The system can show them minimum leading point, which is a keyword on each map to close to teacher’s map.

4. Example of Learning in KMSM

In this section, we explain about a case of group learning between a teacher and two learners in simple classification problem of the rock. Here, teacher indicates twelve keywords, and learner1 expresses ten keywords, and learner 2 expresses fourteen keywords.

In the first place, teacher and learners express the plural keywords with explanatory note concerning the rock. Next, teacher identifies his/her keywords with learners’ them by referring nonhierarchical keyword map that is drawn based on the similarity among explanation of keywords [3] (figure 3).

In next process, Teacher draws the keyword map to decide the relations among the keywords. Learners discuss and decide relations among the keywords on a keyword map shown figure 4. The System supports learners to crate consistent keyword map based on consensus model in FISM [3] by comparing teacher’s map with learners’ map.

5. Summary and future works

In this paper, we proposed applying KMSM to group learning, and explained prototype system based on it. In group learning, teacher and learners are supported by KMSM by followings.

1. Expression and identification of keywords with explanatory note;
2. Construction of consistent keyword map;
3. Calculation of the minimum leading point.

To learn using system based on KMSM, the leaning domain must be satisfied following conditions.

I. To express keyword and its explanatory note;
II. To decide transitive relationship between keywords.

As future works, we will consider and realize cooperative tools for effective group learning, and complete the system, and then we will research effectiveness of system for group learning by comparison of individual learning.

References