Knowledge Publishing Method for Knowledge Refinement in Self-Directed Learning

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Abstract: In self-directed learning, learners often finish their leaning with insufficient or incomplete knowledge. This is a serious problem for learners because they could not have an opportunity to improve their knowledge. One approach to improve their knowledge is to present their knowledge to others. In our research, we have focused on both of acquisition and publishing processes of knowledge and propose a method to specify and revise the errors of acquired knowledge. In this paper, we describe the method to specify the incomplete or insufficient knowledge through a computerized presentation, the design of a framework and the prototype of our supporting system.

Keywords: self-directed learning, knowledge publishing, presentation rehearsal

Introduction

Learning in a self-directed way has been more and more important along with opportunities for Web-based learning [1]. On the other hand, learners often finish leaning with an incomplete knowledge state [2]. It is hard for them to be aware of the incompleteness of the knowledge. As one of the solution to solve the problem, it is effective for learners to publish their knowledge to others to get criticisms and make refinement of their knowledge. This kind of an activity is commonly executed through a peer review. The presentation rehearsal is a kind of a peer review. The presenters can be aware of incompleteness or insufficiency of their knowledge by reviewer's comments and refine their knowledge through a revision of their presentation.

To get sufficient effect of the presentation rehearsal, it is quite important for the presenters to accurately recognize what knowledge are the causes of the criticisms from the reviewers. In our research, we propose the framework to specify the causes of insufficiency or incompleteness presenter's knowledge from reviewer's comments to presentation slides. And also, we are developing a prototype system of a support system for a presentation slides authoring, equipped with a function to verify knowledge state and detect the part of the knowledge, which should to be refined.

1. Process of Knowledge Publishing through Presentation Rehearsal

To discuss about an execution of the efficient presentation rehearsal, we focused on the following three processes in a cycle of the learning with a presentation rehearsal.

(1) Knowledge Acquisition Process
(2) Presentation Slides Authoring Process
(3) Reflection Process

The learners organize their knowledge acquired in the learning process of self-directed learning in knowledge acquisition process. In general, the author often takes notes to refer in a term of an authoring for presentation slides. There are many tools to take and store notes on computers, but in almost cases, it is hard to trace relevance between slides and stored notes. In the authoring process of presentation slides, the authors make slides using acquired

knowledge, and the authors often refer accumulated notes in the last process to make drafts in certain format such as "items" or "concept map" etc. In many cases, the final version of the slides is not exactly same to the draft at the end. Therefore, after the presentation rehearsal and the presenter revises the slides, the draft is no longer be used, and the explicit relevance between notes and slides are completely lost. In this case, the notes includes the defective knowledge of the cause of the revision are left unsolved.

2. Knowledge Refinement Model through Presentation Rehearsal

To propose the method of specification of insufficient and incomplete knowledge through the revision of presentation slides, we define the process model of knowledge refinement through a presentation rehearsal. The cycle of knowledge refinement is consists of two processes in the opposite direction.

(1) Knowledge Publishing Process: The first step of the cycle is started from the presenter's self-directed learning. In the step, the presenters make explicit representations of their knowledge. These knowledge representations are stored in some format and utilized as resources to compose the presentation slides.

(2) Knowledge Verification Process: After the presentation rehearsal, the presenter examines the comments to specify defective knowledge should be refined. In the process, if the slides are maintaining the relevance to the knowledge representations as resources, it is possible to verify what is the cause of the defect. In ordinary way, the knowledge consists the slides are embedded implicitly.

3. Knowledge Representation and Presentation Slides Authoring

We represent the state of learner's knowledge by following three types of knowledge representations as shown in figure 1.
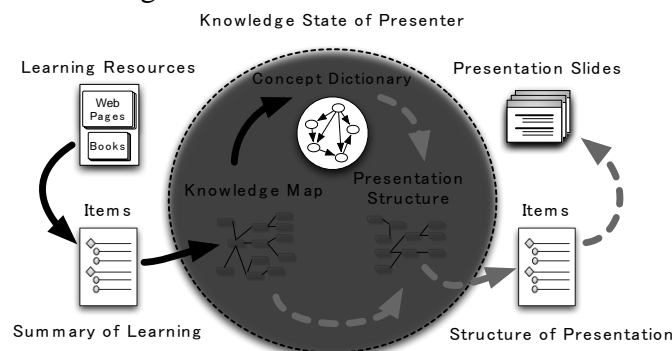

Figure 1: Knowledge Representations

(1) Knowledge Map: This representation is to describe knowledge acquired in learning processes as the form of a concept map. A certain amount of items can be organized into a concept map by adding relations between each item according to a purpose or a theme of learning. Consequently, the map is composed of items earned for each learning situations and stocked explicitly.

(2) Concept Dictionary: This is an organized knowledge representation in the form of concept map of important concepts extracted from the knowledge map above-mentioned. This is an actual kind of map of the presenter's knowledge and always extended or updated through leaning.

(3) Presentation Structure: To make presentation slides, the presenter makes use of pre-stored knowledge maps and concept dictionary. The presentation structure is knowledge to represent an outline or a scenario of the presentation.

4. Knowledge Refinement Support System

Figure 2 illustrates the configuration of the knowledge refinement support system. The system equipped with the functions to support the each processes mentioned in chapter 2. The system consists of four types of tools as application software as follows.
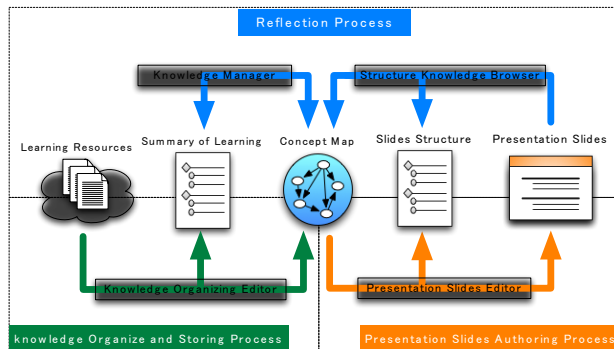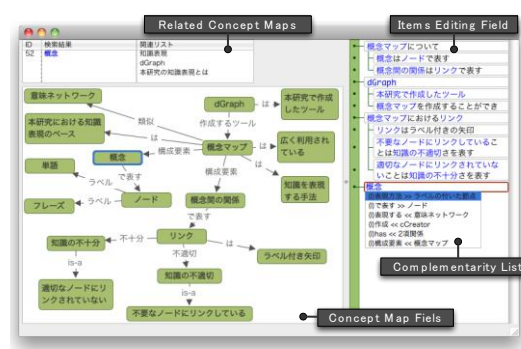

Figure 2: System Configuration   Figure 3: Presentation Slides Editor

(1) Knowledge Organizing Editor: The learner makes summary of the learning in a form of items and select a required concepts for concept map in this editor. This editor equipped with all kinds of editing functions for the work.

(2) Presentation Slides Editor: All the created data by the knowledge-organizing editor can be used to compose the presentation slides for presentation rehearsal in this editor. Figure 3 is an example of an interface of the editor. The editor equipped with functions to examine the concept map and making outlines of a slide contents.

(3) Structure Knowledge Browser and Knowledge Manager: These tools are designed to verify the source knowledge, which is used in the slides pointed, out as defective slides by reviewers. The tools enable the presenter to reflect their own knowledge and specify the knowledge in the state of insufficient or incomplete. If the presenter specifies the knowledge, the concept map concerned with the knowledge should be revised.

5. Conclusions

In this paper, we propose the framework to specify the causes of insufficiency or incompleteness presenter's knowledge concerned with the comments by the reviewers in the presentation rehearsal. And we also describe the configuration of the support system for it. We have developed the tools for knowledge organizes and storing process and presentation slides authoring process partly. This project is ongoing, and we are developing the other tools continuously.

Acknowledgements

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