

# User-oriented Interface for Collaborative Learning Environment

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## Abstract

*In the collaborative learning environment, there are various kinds of information, such as faces of students and learning materials, and the interface which shows these information effectively is required. If the information is provided effectively, students would communicate with others smoothly and progress the learning efficiently.*

*When we study in the group, we tend to focus on what we are interested in or what we thought to be important in order to get meaningful information efficiently. Therefore, our objective is to construct a user-oriented interface which reflects preferences or characteristics of individual students and only provides meaningful information for students. In this paper, we propose factors that are needed as the interface of collaborative learning in order to support effective and smooth learning. Then, we introduce the example of user-oriented interface in which students are able to focus on a particular student in the group during the discussion.*

## 1. Introduction

Currently, it becomes possible for some students to study with other students through Internet without sharing the same physical space. We have proposed the agent-based collaborative learning environment in the web which consists of three kinds of agents: a coordinator who takes the role of teacher for the group; an assistant who helps student participating in the discussion; and a learner who is a pseudo student which corresponds to each student (Kojiri, et al. [1]). In this learning environment, there are various kinds of information, such as the faces of other students, learning texts, and interaction information. So, the learner should provide the interface that shows these information effectively to students. In addition, in order for students to communicate smoothly and acquire knowledge effectively, the interface needs to

be convenient or sufficient.

There are many researches that aim to construct real-world-like interface (Nakanishi, et al. [2]), such as to create the 3D classroom in which students are able to walk around using their own characters. However, when students study, they focus on what they are interested in or what they thought to be important in order to get meaningful information efficiently, but the physical aspect of the environment is not an important factor. Therefore, our objective is to construct a user-oriented interface which reflects preferences or characteristics of individual students and provides meaningful information for students. To eliminate unnecessary information makes it easier for students to acquire knowledge efficiently and progress the learning effectively.

In this paper, we propose factors that are needed as the interface for collaborative learning in order to support effective and smooth learning. Then, we introduce the interface that is provided by the learner, in which students are able to focus on a particular student in the group during the discussion.

## 2. Effective Interface for Collaborative Learning Environment

In order to achieve the effective interface, we should consider the following points.

- The interface should be convenient for students. If students need a lot of complex processes to interact with others, they cannot concentrate on the learning.
- Not only contents in the windows, but also their sizes or the locations should be transformed dynamically. Meaningful information needs to be added, unnecessary information should be removed, and all information needs to be balanced.
- Students are assumed to participate in the learning actively. Their preferences and

characteristics are able to be detected by their actions toward the interface.

Based on the above points, we propose the learner's mechanism for generating user-oriented interface as Figure 1. In order to identify the importance of information for the corresponding student, the learner needs to grasp the interest of the corresponding student. The module of inferring student's preference constructs student's model and determines the important information for the student. Module of interface control selects and manages the information that should be put in the interface dynamically according to the student's model. The learner assigns the information that students may be interested in to the best position and removes the information that may not be useful for the student. If the interface can provide appropriate information to students, students are able to acquire meaningful information efficiently and easily, and proceed learning effectively.

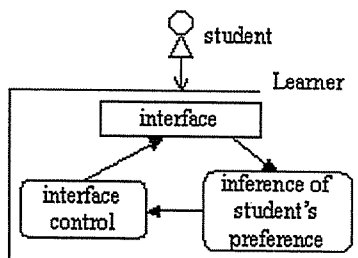


Figure 1: Learner's mechanism of generating user-oriented interface

### 3. Focusing Mechanism of Particular Student

We have introduced the user-oriented interface for chat-based collaborative learning environment in which students are able to focus on a specific student, whom the students are interested in (figure 2). During the discussion, we do not see all students all the times. We sometimes observe a speaker so as to grasp his intention or focus on other specific student to see his reaction. For the purpose, the learner determines the target student whom the corresponding student wants to focus on and shows the face of target student by using network camera automatically.

During the discussion, students judge other students according to their utterances. Based on the analysis, we found out that students tend to be interested in the student who is the target of the utterance, if students are speakers; or students focus on the speaker, if they are targets of the utterance. When students are not related to the utterance directly, whether students

focus on and to whom they want to see depend on the topic of the utterance. That is, if students are interested in the topics, they may be conscious of the student who is a speaker or who can give the good response to the utterance.

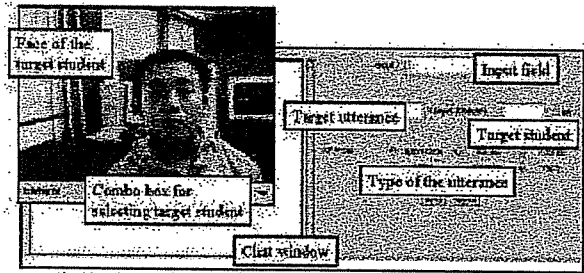


Figure 2: Interface for focusing specific student

In order to grasp the topic of the utterance, the learner holds topic trees in which the utterances are that are related to the same topic are structured based on their contexts. Since students may utter some opinions against the topics that they are interested in, the topic that the student is interested in is grasped by counting the number of the student's utterances toward each topic.

When the utterance is that the student is interested in, the learner determines the target student who the student focuses on by using the focusing rule. Focusing rule represents the ratio of the change of the student's interest toward other students according to individual utterances. The current target student is regarded as the student who gains the most interest of the student. Therefore, when the utterance has uttered, the learner calculates the student's interest to all other students based on the focusing rule and grasps the student who gets biggest value as the target student. If the current target student differs to the former target student, the learner acquires the face of the current target student and changes the photograph on the interface. By showing the face of appropriate student automatically, the student's unnecessary effort of finding the focusing student is eliminated, and also the student can communicate with other students and gain the knowledge easily.

### References

- [1] T. Kojiri and T. Watanabe: "Harmony: Web-based Adaptive Collaborative Learning Environment", *Proc. of ICCE/SchoolNet 2001*, pp.559-566 (2001)
- [2] H. Nakanishi, C. Yoshida, T. Nishimura, and T. Ishida: "FreeWalk: Supporting Casual Meetings in a Network", *Proc. of CSCW '96*, pp.308-314 (1996)