Analysis of Collaborative Learning Behaviors and the Roles of Collaborative Learning Agent

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Abstract: Collaborative learning is one of the learning approaches that promote interactions and complementary roles among learners in order to maximize achievement of individual learners’ and groups’ goals. The current research inquired the collaborative e-learning models and behaviors that can improve cognitive and social interactions demanded in the various platforms such as personal computing, mobile computing, and digital TV environments. Furthermore, it suggested the roles of collaborative learning agent.

Introduction

Collaborative learning (Johnson & Johnson, 1992; Wellington, 1994) is one of the learning approaches that promote interactions and complementary roles among learners in order to maximize achievement of individual learners’ goals and groups of learners’ common goals. This approach had been increasingly valued in e-learning environment. Currently, there are increasing concerns that major collaborative e-learning programs and services have not been based on relevant learning-instruction models so that various interactions are not well supported. Considering the current trend and problems, we, through a foundational research, inquires collaborative learning behaviors and activities to be applied into developing basic API technology for collaborative e-learning multi-platform environments.

Research Goals

The current research intends to inquire the collaborative e-learning models and behaviors that can improve cognitive and social interactions demanded in the various platforms such as personal computing, mobile computing, and digital TV environments. As the first year of 3 year consecutive research project, the specific goals of this year research are as follows: (1) comprehensive review of collaborative learning-instruction models, (2) inquiry into a generalizable collaborative e-learning model, (3) analysis of collaborative e-learning behaviors and activities, and 4) analysis of the roles and functions of collaborative learning agent.

Review of Collaborative Learning Models

1996; Steeples, 1993) Bianchini, 1997; Blackler, 1995; Fischer, Bruhn, Grasel, & Mandel, 2002; Kang, & Bynn, 2001; Linn & Burbules, 1993; Rahman & Salim, 2001) learners’ voluntary and active interaction, (2) focusing on collaboration rather than cooperation, (3) systematically structured and specified learning processes, (4) explicit emphasis on affective interaction as well as cognitive interaction, and (5) valuing on individual activities as well as community activities.

**Figure 1: Learning Processes of Various Collaborative Learning Models**

In addition, this review and analysis identified one most generalizable learning process in collaborative learning as follows (Figure 2). Regardless the models, there are basically the process of preparing, planning, performing, and reporting/reflecting. In terms of specific learning steps, there are preparing, organizing and arranging teams, identifying learning goals, deciding learning plans, performing individual learning, performing team-based collaborative learning, sharing and recording learning results, and reflecting & evaluating.
Analysis of Collaborative e-Learning Behaviors and Activities

By analyzing one further depth the most generalizable collaborative learning process, we identified learning behaviors and activities, which can be more directly used for identifying the roles and functions of collaborative learning agents in e-Learning environments. In this proposal, we present only one sample of the learning behaviors and activities, appeared in the stage of ‘team-based collaborative learning’ (Refer to Table 1), due to the page limit.
In collaborative e-learning environment, the roles of agent can be considered in two different categories: facilitating learning process and facilitating the social interaction. The current research identified agents’ roles and functions that might support learners for collaborative behaviors and activities (Figure 3). We will continue to develop more comprehensive and specific framework of collaborative learning agent’s roles and functions during the last half of this year.

### Table 1: Sample of Collaborative e-Learning Behaviors and Activities

<table>
<thead>
<tr>
<th>Steps</th>
<th>Process</th>
<th>Activities</th>
<th>Activity Elements</th>
<th>Supporting Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-arranging Team</td>
<td>Team-based Collaborative Learning for Task Solving</td>
<td>Planning</td>
<td>Tools for Recording Individual Learners’ Materials/Resources Collecting Schedules, Individual Tasks, and Collective Tasks in a Scheduling Tool</td>
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<tr>
<td>Sharing Personal and Social Knowledge</td>
<td>Setting the Term for Learning and Collecting Data</td>
<td>-Verifying Learning Task and Posting Priority for Task Solving</td>
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<tr>
<td>Comparing and Analyzing Personal and Social Knowledge for Each Team</td>
<td>-Posting “How to Solve a Task” according to Priority</td>
<td>-Exchanging and Sharing Learned Information</td>
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<tr>
<td>Social Interaction</td>
<td>-Reviewing Information from Another Team</td>
<td>-Giving Feedback to other Teams</td>
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<tr>
<td>Searching and Collecting Information</td>
<td>-Utilizing Web Bulletin Boards</td>
<td>-Utilizing e-Mail</td>
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<tr>
<td>Exchanging and Sharing Information</td>
<td>-Classifying and Analyzing Learned Information</td>
<td>-Classifying Core Data</td>
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<td></td>
<td>-Analyzing Core Data</td>
<td>-Writing a Report of</td>
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### Analysis of Roles and Functions of Collaborative Learning Agent

In collaborative e-learning environment, the roles of agent can be considered in two different categories: facilitating learning process and facilitating the social interaction. The current research identified agents’ roles and functions that might support learners for collaborative behaviors and activities (Figure 3). We will continue to develop more comprehensive and specific framework of collaborative learning agent’s roles and functions during the last half of this year.
Implications and Further Research

The current research has suggested a foundational model for collaborative e-learning technology development, especially agent technology development. More specifically, this provides a model for interaction between learner-instructor and learner and learners, fluent communication flow, and sharing of learning materials. In addition, it provided a foundation model for developing collaborative learning agents and metadata required in collaborative learning.

This research will be continued for two more years. In the near future, our research team will suggest a collaborative learning behaviors and activity model inter-operated in the multi-platform based e-Learning environments, including personal computing, mobile computing, and digital television environment.
References


