A Role-Based Approach to Group Support in a Collaborative Learning Environment

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Abstract

This article describes preliminary work on a research environment called Virtus that is a web-based learning system tailored to enhance group working and collaborative learning. We discuss the main issues of introducing group contracts based on roles and rules to support social regulation in collaborative learning environments. Based on this role-based approach, we propose a system architecture which the main attention is given to the group support in order to provide some automatic group management features.

1. Introduction

The scope of our research work is to study and to propose a role-based coordination technique as it may be applied to support group management in collaborative learning environments.

Although usual Learning Management Systems (LMS) support sometimes the planning of collaborative work and provides tools to carry it out, most of them do not fully support the organizational aspects of group work and are mainly based in communication features.

Our proposal remains in adding group contracts for automatic management of some substantial tutor's work and specially to create and to maintain mutual commitments between users and their working groups. This group regulation using contracts represent a strategy solution effort to respect group commitments in order to do well accomplished learning activities.

This paper is organized as follows. Section 2 discusses social regulation. Section 3 introduces our approach for automatic group management using group contracts by means of the proposed system. Finally, in Section 4 we will address the work-in-progress and indicate some perspectives.

2. Group coordination and social regulation

Mainly the unsuccessful cases of distance education using web-based learning solutions can be normally assigned to three main factors [1]: (i) a poor follow-up and support by the tutor; (ii) the absence of a well-defined schedule of activities and (iii) the poor engagement of the students. Our system attempts to reduce the impact of these issues with an intuitive organization of members' roles in group contracts. Our work concerns social and functional regulations aspects using roles and rules expressed in terms of a group contract [2].

A similar approach has been developed by [3] to propose a framework of regulation components and a component management service for enabling users to develop regulated collaborative applications. Furthermore [4] proposes a "participation model" that takes into account the social aspects of collaborative work. It is a conceptual model to describe joint activities, their relationships and the structure of exchanges within the group.

Our aim is to increase group efficiency adding an automatic group management service which reminds the users their commitments and applies the terms of the contract. Using explicit contracts in learning environments will encourage the learners to commit themselves in the learning process.

3. Virtus: automatic group management using role-based contracts

Virtus is a web-based collaborative platform that we are developing to handle with group coordination using contracts. One of the objectives is to decrease group malfunction with an automatic management service that will be used to monitor the learners, to suggest directions and to take some decisions in a predictive mode. In order to provide self-management capabilities we designed a contract model. This contract is a set of

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constraints, rules and roles that the system will use to guide learners and groups within the virtual learning community.

Besides the schedule organization (tasks and events), the resource repository (learning objects), history and profiles (individuals and groups) and the communication features, the system has a group management module. This module is the service responsible for analyzing the group behavior and taking some decisions in accordance with the group contract.

The users actions are considered individually to update the user and groups models databases, but all the decisions are made targeting the group, i.e. the focus is on the group commitments.

The system is time and event driven. Any modification in the user profile starts a respective verification of the respective group contract rules - this is the event driven execution of the inference engine associated with the group management module. There is also a time triggered execution that tries to figure out the activities and supposed assigned task for each participant, according to his role in the group - this is the time driven execution of the inference engine.

As a result of the execution group management module, either a notification mechanism previously filled with the adequate message is started or an intervention in the group constitution and group profile is made. Anyway, in extraordinary situations a default message to the group leader, class tutor or system administrator could be send.

The group contract represents the mutual engagements and assigned roles and rules to handle the activities according to the established schedule. This role-based approach to social regulation will be the group working guidelines to achieve the group goals. The contract respect will give some quality indications about group working. Thereby a disorder in this case could represent a possible group dysfunction or an inadequate contract. When this kind of situation is frequently observed a feedback is given in order to avoid a complete group failure.

The schedule section of the group contract demands some time-triggered actions and notifications that are previously programmed. As a result of this time dependencies between planned activities, the system has to execute a process to review and to maintain the global coherency of activities' interdependence of the planning according to the new inferences. For example, if a member withdraws from the group, the notifications and actions planned for his role must be reconsidered. Another example is the situation in which a virtual meeting is cancelled; in this case the upload of the minutes and the validation of this draft need to be erased of the planning.

4. Conclusion and future work

The goal of our project is to improve group learning using an intuitive role-based coordination mechanism. We are searching ways to increase the efficiency of group management using group contracts. The group contract is composed of sections that represents the participants roles and rules that will be used to specify the activities, actions and notifications associated with each desired commitment between participants and group (or institutional) goals.

The problems we are immediately facing are the constraint language and the inference engine. The language is been designed to express the rules and to associate the available templates and scripts with the respective roles. The knowledge-based system with the inference engine that executes the group contract is also under development.

We are interested in cases where the group work tends to move away from the expectations expressed in the group contract because there is a possibility to use this metrics to revise the adopted contract during the group life-cycle.

One of the challenges in further developments is to provide the system with some knowledge of what it knows and what it is doing. This will allow it to help tutors better assist the students and help the group members to better find their collaboration opportunities.

5. References

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