Chapter 7

SCRIPTING COLLABORATIVE LEARNING IN AGENT-BASED SYSTEMS

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Abstract: The chapter discusses an agent-based perspective of scripting for CSCL environments. It presents two approaches for supporting scripting collaborative learning in agent-based systems: (1) on the macro-level of collaborative learning, where agents may support the organization of the learning process through facilitating group configuration and task selection; and (2) on the micro-level of collaborative learning, where agents may support awareness and coordination of activities. Both approaches are presented for two kinds of domains: (i) pedagogically structured and (ii) not pedagogically structured domains. For both cases, the types of support on the macro and micro levels are examined.

1. INTRODUCTION

Cooperation scripts can be designed for organizational processes, at the macro level, and for detailed work processes, at the micro level. Both approaches have their differences when we have a pedagogically structured knowledge domain or a non structured knowledge domain. These two approaches are complementary; at the macro level, scripts support the structure of the collaborative process in order to promote productive interactions, and at the micro level by coordinating the collaboration. This chapter discusses the role of software agents for these two approaches, from the computer science perspective of scripting for CSCL environments, supporting communication, cooperation and coordination, which are the fundamental issues for effective collaborative learning.

From the computer science perspective of scripting, cooperation scripts are integrated in the components of the learning environment and may be imposed or induced. An imposed cooperation script is presented explicitly to the learners, who have to carry out a set of activities in a specific order. It
may cause in the learner a loss in motivation due to a loss of autonomy in the learning activity. An induced cooperation script is embedded in the design of the learning environment, and provides learners with a high amount of freedom, but it is based on the assumption that learners have an internal culture-acquired cooperation script, and are aware of the learning opportunities and benefits of collaboration.

Following an imposed script implies a coercion degree, which is the degree of freedom that the learners have in following the script (Dillenbourg, 2002). It is reported in this volume, by Lauer and Trahasch, that, for adult learners, a high degree of coercion might affect motivation. Also it is believed that scripts in a CSCL environment increase the cognitive load of the learner and have the risk to make the groups interact in a non natural way (Dillenbourg, 2002).

1.1 Software agents and cooperation scripts

One of the benefits of implementing software agents is that they can release the cognitive load of the user. The semiautonomous nature of interaction between the learners and software agents provides a low coercion degree, providing one step towards a shift from paternalism to autonomy in inducing cooperation scripts, as proposed by Runde, Bromme, and Jucks in this volume. From this perspective of semi autonomy in user-agent interaction (Norman, 1994) a software agent presents proposals and the user decides among those.

Considering the risk that cooperation scripting in CSCL environments can lead us away from the genuine path of collaborative learning (Dillenbourg, 2002) we believe that the role of agents should be to induce collaborative scripts that regulate collaborative learning without interfering with the social dynamics of the group.

Software agents must support collaborative scripts that are simple to follow and easy to adopt. Therefore, the role of software agents supporting scripting in CSCL environments should be:

- Work on behalf of the learner in order to reduce her cognitive load while she follows a cooperation script.
- Distribute the coercion load over the interaction, coordination and task levels, maintaining a low coercion degree by inducing the appropriate collaborative interaction patterns in the learners.
- Keep the learner aware of activities, resources and the collaboration opportunities by following a cooperation script in the activities of a collaborative learning task.