PARTICIPATORY ANALYSIS OF SYNCHRONOUS COLLABORATIVE PROBLEM SOLVING USING THE OCAF METHODOLOGY AND TOOLS

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Abstract: This paper is an introduction to a CSCL2003 interactive event that has the objective to introduce the participants in analysis of collaborative problem-solving activities. The participants are going to be first involved themselves in collaborative modelling, subsequently analysing their activities using the OCAF (Object-oriented collaboration analysis framework) methodology and Collaboration analysis tools. During this event an analysis tool and a real-time collaborative modeling environment are going to be used. The target group of participants to this event are CSCL researchers and educators who are interested in obtaining hands-on experience with real time collaborative modelling and problem-solving tools and in gaining an insight in participatory collaboration analysis methods and tools. This paper describes the methodology applied in the interactive event and the tools to be used.

1. INTRODUCTION

This interactive event evolves in three phases: During the first stage, the participants are requested to form small groups of two to three partners and use real-time distance collaboration tools in order to solve a given problem. The location of the group members will be such within the lab that they can interact exclusively through the provided environment (ModellingSpace), thus simulating distance problem-solving conditions. Subsequently, in phase two, analysis of extracts of participants' activity using the supplied logged events analysis tool will be performed. This tool permits playback and annotation of the problem solving activity and it is based on the OCAF methodology. Through OCAF the exchanged text messages and the actions in the shared activity board during the first phase can be annotated and an abstract view of the collaboration and the roles of the participants can be defined. In phase three, the produced views are discussed and compared in an open session.

2. COLLABORATIVE MODELLING ENVIRONMENT

The first phase of the experiment involves use of the real-time collaboration environment MODELLINGSPACE (MS)[1] (Avouris et al. 2003b, Dimitracopoulou et al. 2003), supporting multiple reasoning modes; quantitative, semi-quantitative, qualitative, and multiple entity types. ModellingSpace is an open learning environment that supports real-time and asynchronous collaboration of small groups of students engaged in problem solving. This environment has been designed and built, based on experience with existing previous tools, like ModelsCreator 2.0 (Komis et al. 2002), which have been used in the past for teaching multi-disciplinary science subjects in various educational settings, see Komis et al. (2002), Fidas et al. (2002). Tools have been developed and integrated in the ModellingSpace environment, related to analysis of collaboration and problem solving, like the COLAT tools, used in the frame of the activity, discussed in section 3. The ModellingSpace (MS) software is a client-server distributed application, which comprises a suite of interconnected tools to support collaborative modelling activities.

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MS is an environment that supports individual and collaborative building of models. It includes tools that permit building and editing of primitive multimedia entities, building and exploring models that are constructed using these primitive entities, synchronous and asynchronous interaction of students, collocated or at a distance. The open character of MS means that students have access to an open set of primitive entities that can be used for building these models (Komis, Avouris & Fidas, 2003).

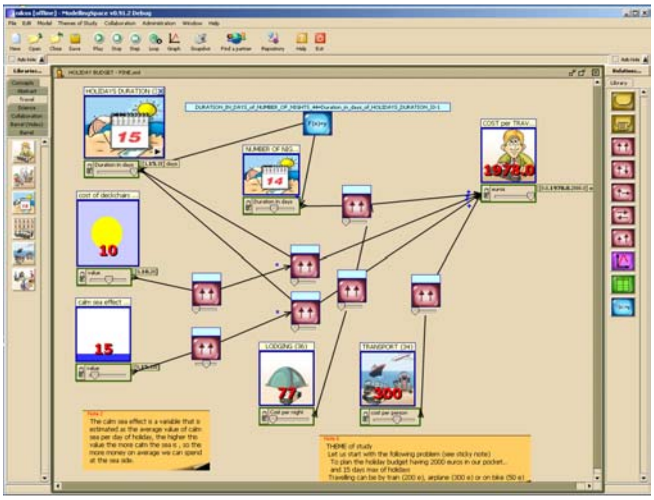

Figure 1. The Collaborative modeling Environment ModellingSpace: The shared space

The main functionality of the MS environment is described through figure 1, which shows a typical model building activity. MS is based on the concept of *shared artefact,* represented in a work surface. In this case the distant partners collaborate mainly by sharing the model in the work surface, which thus becomes a cognitive space. In this case the communication through the artefact is important, since one participant's manipulation of shared objects can be observed by the other participants. In addition support of direct communication among the participants through an instant messaging tool (*chat*) is provided.

3. COLLABORATION ANALYSIS

During the second phase, the collaborative activity data are going to be analysed using the OCAF methodology and a relevant tool. The *Collaboration Analysis Toolkit (ColAT)* is a software environment that is going to be used for off-line analysis and processing of the generated field data, collected during phase one of the event. The proposed methodology allows both analysis of the quality of collaboration and quality of problem solving

Screen capturing facilities, are going to be used to generate stream of information relating to the activity at the workstation display, which can be mixed to event log files, overcoming the problem of monitoring at the single group in the context of a large context, like the interactive event proposed here. This stream of events is the main source of data. From these field data, the higher-level interpretative entries and annotations can be created using the tool. The ColAT editor, shown in fig.2, is the component of the environment through which this operation is effected. In this context, the events of task level can be generated out of a number of lower-level activity events. In the task level the Object-Oriented Collaboration Analysis Framework (OCAF), (Avouris et al. 2002 and 2003a), is going to be used. This framework is has been proven particularly suitable for analysis of collaborative learning activities, which involve interleaving of actions and dialogue. OCAF puts emphasis on the objects of the jointly developed solution. Every object is assigned its own history of events (actions and messages) related to its existence. The history of each one of these objects is a sequence of events that refer to an actor and an action that may be categorised according to the functional types like I=Insertion of the item in the shared space, P=Proposal of an item or proposal of a state of an item, C=Contestation of a proposal, R=Rejection/ refutation of a proposal, X=Acknowledgement/ acceptance of a proposal, T=Test/Verification by using tools or other means of an object or a construct. As an example of an OCAF event, the introduction of a new relation in the model, is indicated as *Relation (T)*= I_{U1}, i.e. the user U1 inserted the Relation (T) in the shared space.

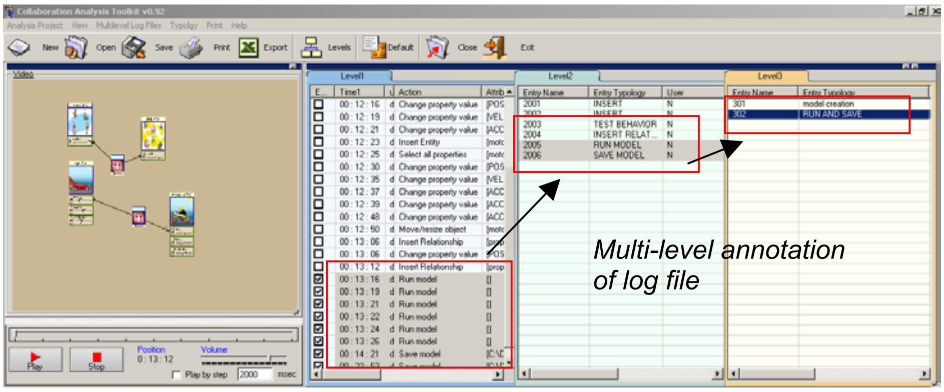

Figure 2. Overview of the Collaboration Analysis Toolkit (ColAT) environment

4. CONCLUSIONS

In this paper we provided of an overview of the tools and methods to be used in this interactive event. During this event the subjective nature of analysis is expected to emerge, since the activity is going to be analysed by more than one participant, and these results will be compared in phase three of the event. During the discussion in the final phase, issues related to the analysis points of view are expected to be covered. For instance analysis oriented to the quality of problem solving, in combination to collaboration modes adopted by participants, to exploitation of analysis tools by researchers, and teachers, to the generality of the approach, to usability of the tools etc.

5. REFERENCES

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