Students Engaged in Collaborative Modeling

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Abstract: The chat communication between students engaged in a collaborative modeling task, using a system dynamics modeling approach, was analysed. The analysis revealed a pattern to how students begin new problems in a chat and the analysis of the objects of learning identified issues with both communication between students and the design of one of the tasks. We describe a number of the emerging interactional practices and draw conclusions regarding the instructional use of modeling problems.

Introduction

This paper presents an in-depth qualitative analysis of three online groups learning about a system dynamic concept. Despite sourcing the materials from a well-known, well-resourced group (Maryland Virtual High School, 2001; Verona, Ragan, Shaffer, & Trout, 2001), our previous analysis revealed that the three groups' online collaboration did not produce the necessary opportunities to achieve the anticipated learning outcomes (Reimann, Thompson, & Aditomo, Submitted 31/10/2008). In this paper, we use an in-depth analysis informed by conversation analysis to examine the groups' interactional dynamics. This analysis seeks to reveal how the students' organised their interaction to render it meaningful (i.e. their meaning making practices), with the hope of gaining some insights into why the students did not achieve the anticipated learning outcomes. Consequences for both the design of the activity and moderation of the collaborative online learning environment are then discussed.

Methods

Interaction analysis

In conducting this analysis, we followed the methodological recommendations of Heritage (2005) and ten Have (1999). One researcher (the second author) read the transcripts to gain preliminary observations about the overall organisational structure of the conversations. Data sessions were then held with the other authors, who had also read the transcripts, to discuss the initial observations. After examining the transcripts' overall organisation, subsequent analysis focused on particular segments which were seen as interesting for the current purpose/context. This was followed by more detailed turn-by-turn analysis of certain sequences of the conversation.

Participants and task context

Using a synchronous chat-based tool, three groups were given 15 minutes to collaboratively address three questions, posted in the chat environment, about a simple model of deer population in a certain habitat. These questions were:

1. This model includes a carrying capacity. What are the implications of this for the behaviour of the model?
2. Change the birth rate and death rate in order to find a combination that will result in a decline in the deer population despite unlimited habitat.
3. In real life, there is a limit to the size of the available habitat. Choose a size of the habitat. What kind of growth does this illustrate? What is the carrying capacity of your habitat?

Students were required to download this model an external website, which contained not only the relevant model, but also a web-based simulation about the same phenomena (why this is important will become clear later).

The collaborative task focused on the "S-shaped" behaviour or growth, which is a basic pattern typical of many complex systems (Sterman, 2000). This pattern is produced by a system dynamic model which includes a "carrying capacity" which sets a limit to the growth of a population. In the model examined by the students, the deer's death rate was formulated as a function of the habitat's density (i.e. the death rate increases as the habitat becomes more populated). When density was low, death rate was lower than birth rate, giving an exponential population growth. However, as the population and density rises, the death rate also rises, which

