Learning Game Assessment Review
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Review the method used, and discuss what was learned, what was not learned, or where the assessment method was faulty if you feel it is. Be ready to discuss your article in class with implications for our own game design.

Cristina Conati, Xiaohong Zhao, Building and evaluating an intelligent pedagogical agent to improve the effectiveness of an educational game.

Prime Climb is a two-person network game. Playing on different computers, the two players' characters are joined by a rope, and they must climb the mountain of numbers without falling. If each player lands on numbers which share common factors, they will fall and lose the game. By collaborating strategically and using the game's hint-giving tools, the team can reach the summit safely. This game is currently aimed at Grade 6 and Grade 7 students, and can be used in a classroom model to reinforce the mathematical concept of factorization.

The Prime Climb agent is implemented with the Microsoft Agent Package. There is a pedagogical agent for each of the two players involved in the game. The agent gives hints either on demand, when the student asks for them, or unsolicited, when it decides that the student needs help in learning from the game. Basically, the agent provides unsolicited hints when the probabilities in the student model indicate that the student is missing key pieces of knowledge to learn from her current move. The authors provide a detailed example of the model and describe how it works.

Methodology:
To evaluate the effectiveness of the agent and of the underlying logic, they ran a study with twenty 7th graders. The students were divided into an experimental and a control group. In the experimental group, ten students played with the version of the game with the pedagogical agent. The rest played the game without the agent (which was an older version of the game).

They ran the study in a series of ten sessions with one child from each of the groups playing simultaneously.

The study took place in the school and consisted of ten sessions, each running two subjects in parallel. Each subject played with an experimenter, rather than with a peer. to avoid the possible confounding effect due to the students’ different playing patterns and prior knowledge.

Before the study, students were given a pre-test involving seven multiple-choice questions on finding common factors between two numbers. Five of the questions were worth a maximum of 2 points, and two a maximum of 4 points, depending upon the number of common factors involved. Thus, the maximum total score for the pre-test was 18. Unfortunately, we did not have time to use the pre-test results to initialize each student’s long term model for this study, so we set the probability of all the nodes to 0.5 for every student. After receiving a brief introduction to the game, students played Prime Climb for 20 minutes.

Then, they took a post-test. Students in the experimental group also filled out a short questionnaire to gauge their opinion of the agent. Log files were collected, recording the relevant student interface actions, as well as all the agent’s hints.

What was learned:
That there was a slight increase in knowledge gain with kids who played the version with the agent as opposed to those w/o. The minimal increase is justified by the extremely short period of time kids got to play the game(20 min).
What was not learned:
The first thing that comes to my mind is that they have not learned that everyone hates those Microsoft agents (the paperclip)! They claim that most kids rated the agent highly and prefer that it was there but I think the fact that the kids did not use it more telling.