Design of teachable agents and feedback in educational software
Focusing on low-performing students and students with low self-efficacy

Authors: Tärning, Betty (1)

(1) LUCS (Lund University Cognitive Studies), Lund University, Lund, Sweden.

- - -

Abstract

The use of educational software is expanding. The six papers included in this thesis deal with design of teachable agents and feedback in educational software with a focus on low performing students and students with low self-efficacy. Paper I examines differences between high- and low-performing students interacting with a teachable agent — that is the students' digital tutee — capable to have off-task conversation. Results point towards differences between the student groups in their engagement in the off-task conversation. Papers II to IV examine a characteristic in teachable agents that to my knowledge has not been studied before: that of having high or low self-efficacy. The teachable agent's self-efficacy (high or low) was displayed via a conversational chat in which the digital tutee provided the student feedback in form of her thoughts regarding the just completed game session. The results show how a teachable agent with low self-efficacy can positively affect low performing students and students with low self-efficacy with respect to performance and own self-efficacy beliefs.
The last two papers, V and VI, focus on feedback in the more common and broader sense, namely feedback from someone/something to a person regarding her performance. Paper V contributes by a more detailed understanding of where in the feedback chain from noticing feedback (or not) — attending to it (or not) — making sense of it (or not) — acting upon it (or not) and progressing (or not) most students fall off. In addition, it points at the possibility of using agents to increase students' inclination to pay attention to textual feedback. Paper VI studies the current situation and what types of feedback is provided in digital apps used in Swedish schools and addresses the mismatch between the design of feedback in the majority of apps and what, by scientists and educators alike, is known to be adequate. The majority of apps presented as supports for learning are nothing more than glorified digital tests.
Taken together, this thesis contributes to the educational society in the following manners. It pinpoints two characteristics of teachable agents that can be exploited to improve performance and

self-efficacy beliefs for low performing students and students with low self-efficacy. It fills in details on the process by which students make use of — or fail to make use of —software-delivered feedback. Finally, it points at an important aspect — feedback — where designers of educational software need to make a better job.