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Design guidelines for Motivational Interface of Intelligent Tutoring System

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Introduction

ITS are useful tools which attempt teaching and learning together. Previous ITS mainly focused on cognitive increase such as knowledge acquisition and problem solving. Motivation is also important as much as cognition in ITS, because it makes learners be able to persist on learning and improve learning achievement. We suggest design guidelines for motivational interface of ITS in this paper.

Dimensions for motivational interface in ITS

Individualization

We categorize individualization into 3 factors. These are individual differences in cognition, motivation and, interestingness and comprehension.

In cognitive individual differences, we should consider prior knowledge and metacognitive skills. Because Learners decide their posterior learning experience based on their prior knowledge, ITS measure and reflect the level of prior knowledge. In addition, metacognition is critical skill for learning. Metacognition is essential skill for making a learning plan and keeping it thoroughly.

In motivational individual differences, we suggest ITS include competence and goal orientation. Because competence affects behavior, persistence and achievement in learning, ITS should be tools which make learners feel competent. Therefore it is necessary to differentiate the level of task complexity and the challenge level depending on competence level of learners. According to Dweck and Leggett (1988), learners can be divided into the two types of goal orientation: learning goal orientation and performance goal orientation. Because learners prefer different tasks depending on their goal orientation, ITS should provide proper tasks correspondent with goal orientation of learners.

In individual difference in interestingness and comprehensibility, ITS should reflect the current level of interests and comprehension of learners.

Situational Interests

We consider the situational interests as a second way to improve motivation in ITS. The specific design guidelines for motivational interface are proposed at three different factors: learning activity, learning material, and reward.

In learning activity, we suggest that ITS reflect self-determination and curiosity of learners. Learners are intrinsically motivated in their learning activities when they have a sense of self-determination. When learners meet the novel events that are incongruous with their prior knowledge, they feel surprising and curious about the cause or effect of the event. This discrepancy would induce the learner to make inferences to resolve the incongruity, which would in turn generate the cognitive situational interest.

In learning material, ITS should include self-relevance, narrative structure with fantasy and multimodality. The narrative structure with fantasy is related to learning subject, which is called endogenous fantasy motivation. In order to make learners be interested and intrinsically motivated, multiple sensory stimuli like pictures, sound effects, and dynamic graphics are more efficient than the traditional text-based interface in ITS.

In reward, the immediate reward is a way to increase motivation level of the learners. Especially, when learners get immediate feedbacks after each stage, they can confirm their goal and change their strategies depending on feedback during learning in ITS.

Conclusion

In this study, the specific design guidelines for motivational interface of ITS are proposed to promote motivation of learners during interaction with the ITS. First, ITS should reflect individual differences in cognition, motivation, and ongoing changes of interestingness and comprehensibility during learning. Second, it is essential to guarantee learners' controllability, diverse learning activities, curiosity, self-relevance, challenge, and rewards to enhance the level of motivation in ITS.

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