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Changing Classroom into Exciting Learning Space by Entertainment Computing Approach

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Abstract: In this paper, we describe an attempt to increase students' learning motivation in a classroom lecture. Our idea is to change a classroom into an exciting learning space by entertainment computing approach. The prototype system called "UbiDoor" aims at increasing learning motivation by giving students irregular external cues such as image, audio, temperature, and light.

Keywords: Classroom, classroom lecture, learning motivation, entertainment computing

Introduction

Education should change along with not only technological progress but also social situations. Nowadays in Japan, it is said that students' learning motivation is declining. Learning motivation is considered to be quite important for successful learning [1]. Therefore, increase of learning motivation should be addressed as a matter of first priority. The purpose of this study is to increase students' learning motivation in a classroom lecture from the viewpoint of learning space. The Learning space can influence not only learning efficiency and efficacy but also students' learning activities, attitudes, and motivation [2]. A classroom is a principal learning space in a school/university setting and classroom design covers a wide variety of issues (e.g., desks, chairs, black/white boards, lights, electric/digital equipments, and learning support software). We think that the conventional classroom design is too serious and the future classroom design should focus more on exciting classrooms—classroom lectures where students can be immersive and infused in learning. Our idea is to change a classroom into an exciting learning space by entertainment computing approach, which focuses on "fantasy" identified by Manole and Lepper [3] as an important factor for an exciting classroom.

1. Learning Motivation Model

In this study, we propose a learning motivation model that is applied to classroom lectures and consists of three layers. Figure 1 shows the model overview.

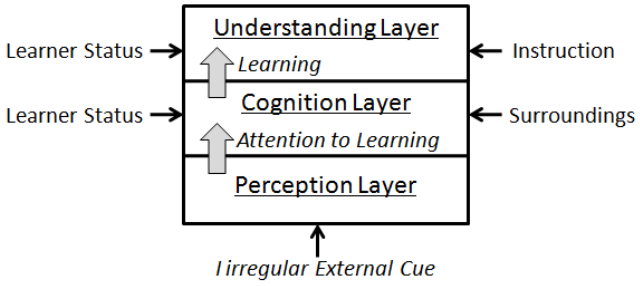

Figure 1: Learning motivation model

1.1 Perception Layer

This layer is positioned at the model's bottom and handles whether an irregular external cue makes a student pay attention to the current classroom lecture. Here, the attention is not necessarily paid to the content of learning (the lecture). For example, all of sudden a teacher begins to explain in a loud voice and at that moment students may pay attention to the teacher or the blackboard.

1.2 Cognition Layer

This layer is positioned at the model's middle and handles whether the student's attention transitions to learning actions. Here, the leaning actions mean listening to the teacher's explanation, looking at the content of the blackboard or learning material (e.g., textbooks and digital slide show on the classroom screen), note-taking, asking a question, etc.
In this layer, the student recognizes his/her internal states (e.g., understanding level, learning process, and curiosity) and surrounding situations (e.g., the teacher's words and facial expression, other students' learning attitude, and the classroom atmosphere) and then judges whether he/she takes a learning action. For example, if a teacher says "this part is on the test" and a student has not understood the part, the student will take a learning action.

1.3 Understanding Layer

This layer is positioned at the model's top and handles whether the student can understand the content of learning as a result of his/her learning actions. Here, his/her understanding depends on his/her internal states and the teacher's instruction. Once the student feels the satisfaction of understanding, he/she may pay attention to learning continually without an irregular external cue.

2. Prototype System

We developed a prototype system called "UbiDoor", focusing on the perception layer in the above model. This prototype system, which changes a classroom into an exciting learning space by entertainment computing, aims at increasing students' learning motivation in a classroom lecture from the perception layer. Currently, UbiDoor does not ensure increasing learning motivation on the cognition layer and the understanding layer.

2.1 Concept

UbiDoor makes students pay attention to learning by giving them irregular external cues. Irregular external cues are given on a predefined time schedule and/or at events in a classroom and stimulate their visual and auditory senses. For example, digital slide show of the lecture's trailer is projected onto the classroom screen a few minutes before the lecture. In another example, opening music is played at the moment when a teacher enters the classroom. In a different standpoint, UbiDoor helps teachers to give a classroom lecture different than usual, that is, helps to introduce fantasy into the classroom lecture.
In this study, we regard such introduction of fantasy as "entertainment". Whether students' learning motivation is increased from the perception layer depends on how a teacher can make effective use of UbiDoor— comprehensive instructional design including entertainment aspects.

2.2 System Composition

The prototype system has client-server architecture and is composed of the following subsystems: entertainment executor and entertainment manager. Figure 2 shows the system composition.

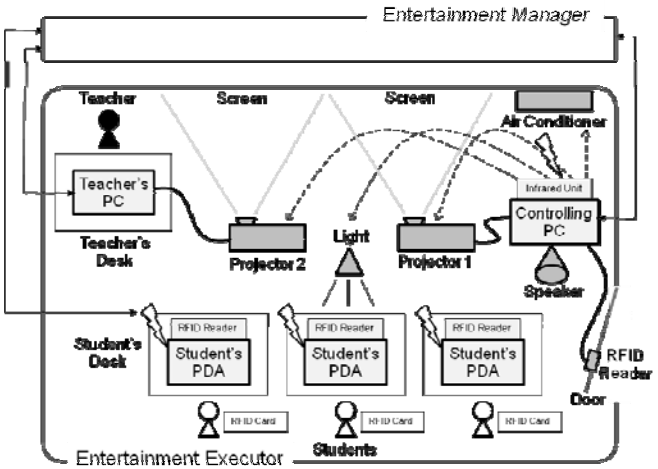

Figure 2: System composition

The classroom we assumed has digital projectors, screens (available as whiteboards), an air conditioner, and a spotlight. One of the projectors, speakers, an infrared unit, and an RFID reader are connected with the controlling PC via wired lines. The infrared unit is used for transmitting infrared commands (e.g., on/off) to the air conditioner and the spot light. The RFID reader is embedded in the classroom door (beside the doorknob) to detect a teacher's entry to the classroom. A wireless-network-enabled PDA equipped with an RFID reader is put on every student's desk to detect a student. A teacher's personal computer whose display output is transmitted to a projector is put on a teacher's desk. The prototype system controls image, audio, video, slide show, temperature, and light in a classroom.

2.3 Example of Entertainment

We think that UbiDoor can work well for learning topics (lectures) such as geography, history, and literature. To take the learning topic of "Malaysia" for example, the classroom temperature has been raised to around 30 degrees Celsius by an air conditioner before a student has a seat and a Malaysian traditional music is played when having the seat.

3. Summary and Future Work

This paper described an attempt to increase students' learning motivation in a classroom lecture by giving the students irregular external cues such as image, audio, etc. A future work is to examine whether UbiDoor increases learning motivation and learning effect.

Acknowledgements

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