Work in Progress – Collaborative Learning for Packaging Design Using KM and VR

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Abstract - The purposes of this research were to develop online collaborative learning with the application of Knowledge Management and Virtual Reality technology for the course in Packaging Design in order to find solutions to the issues of insufficient time spent for instruction in classroom, resulting in lack of proper practice, and paper waste for the design, resulting in high cost. The sampling group for this study was composed of 30 third year undergraduate students studying at the Department of Printing and Packaging Technology, Faculty of Industrial Education and Technology, King Mongkut’s University of Technology Thonburi. The students were divided into groups of 2-3 persons. Each member in the same group, when logged in, would enter their own working space and could see their pieces of work, which they were doing, at the same time in 3 dimension format. Each member in the same group could help one another to design the assigned packaging. They could control their packaging design by using mouse and keyboard. They could also discuss via chatting system or microphone. Their records for activity participation would be made automatically, for example, their date and time of logging in, and transcripts of their conversation. The test at the moment reveals that learners who participated in online collaborative learning showed more interest and enthusiasm in learning. Moreover, learners had more time to practice outside classroom and reduced a large waste of paper.

Index Terms - Collaborative Learning, Packaging Design, Knowledge Management, Virtual Reality

INTRODUCTION

Packaging Design is a course related to the design and the application of the designed package to make the product. Therefore, the course must focus on the design and the package production in team. However, the practice cannot be achieved due to the limitations in budget for non-renewable materials, especially paper, resulting in the students lacking enough materials for practice. Moreover, because of insufficient time in class, the students have to continue their work at home. Other problems also arise such as some students do not work at all whereas other students must work very hard to finish the assignments on time. This is partly because the students live in different locations far away from one another and their free time is not the same due to their selection of different courses. These problems are crucial for the students’ learning skills. Therefore, innovation should be used in the instruction so that every learner could work together at the time they are ready such as after dinner time. In other cases like somebody is not free, the system is still ready for other people in the group to use it. According to research results in the past, it was found that collaborative learning which requires all members to work together to find solutions to the assigned problems is an approach suitable for the globalization era when everybody needs to participate in creating something in the modern world. Moreover, the focus is now on the relationship between the persons of different skills to work together in different issues [1]. If 3D virtual reality technology is applied to facilitate the presentation, the lesson may be interesting due to it is interactive. This is because virtual reality systems have the potential to allow learners to discover and experience objects and phenomena in ways that they cannot do in real life [2].

We have studied and applied the theory of knowledge management for collaborative learning in the way that the learners could use their previous knowledge, group’s opinions and searching from the database/Internet in order to build up new bodies of knowledge in a systematic way. Therefore, in this paper, collaborative learning with virtual reality technology and knowledge management will be presented in order to develop a new instructional approach to make it successful and effective for students to work in groups. The steps in the development will be explained next.

THE APPROACH

The collaboration between students through the Internet was used as a learning approach. In this approach, a small group of 2-3 students are working together to complete the task. In this approach, the learners must log in with their password given by the instructor. The proposed system can
evaluate the learners’ behavior and the group’s behavior and can show each learner’s participation graphically. It does not only measure the frequency of participation and sharing opinion, but also evaluate whether the opinions given by the learners are useful or not. The opinion the members in the group are voted most will be stored by the KM system. According to the initial experiment, the students showed great interest due to the new approach. The students could spend their free time and interact with their peers in the group. In addition, the instructor could randomly visit and see learners’ activities. The learners also know that the instructor could see and observe every learner’s behavior all the time; therefore, In this way, the grading system can be based on the true participation of each member. This approach could be considered effective in controlling the group activities. The application of Virtual Reality Technology in learning is a new thing and gains a lot of attention from learners. For example, students could virtually pick up an object in 3 dimensions which can be controlled by mouse or keyboard buttons, making collaborative learning more effective.

Our system [Fig. 1] is composed of VR library, VR Museum, Packaging Design and Folding Practice [3] sections, which are in Virtual reality representation. The Packaging design and folding packaging use collaborative learning technique for practices, and the knowledge from this process will be sent to the KM unit and the model of the package from students’ designed will be sent to VR Museum. In this paper we focus on packaging design practices only.

The system developed contains a packaging design in which assignments given can be changed randomly according to the product features. The problem is unknown to learners, in other words, it is a problem which the learners have never experienced before. Therefore, the learners must think, analyze and solve the problem collaboratively in order that they could get the final packaging suitable for the product in terms of material, structure and graphics, and the final packaging will be stored and retrieved based on Knowledge Management theory for later uses and references. That is to say, for each learner that has different background and experiences, they can share their knowledge to complete the task. For example, those who are good at packaging material could give their experience to other members. The learners must think and analyze together to find out the most suitable material by using their previous knowledge and seeking further information from the database which is developed in the format of online library (VR library) as well as searching from related websites. The information and knowledge would be posted on the system’s web board which classifies various ideas into similar group. They are stored and become ready for use as useful information in the database for future uses. When other students or other groups would like to access this information, they could use related keywords to expand their knowledge in the fields. The information which is read and referred a lot would be given scores by the developed system. In this way, the learners are eager to study and learn. Besides knowledge, they also gain score for their attention. This system encourages the students to search for new knowledge all the time, thus it looks like a competition all the time. The learners could act as both learners and knowledge givers. Moreover if the students would like to practice for other such as package folding, VR library and VR museum this system is supported. The main user interfaces are shown in figure 2.

![Figure 1](attachment:Figure_1.png)

The system of collaborative learning

![Figure 2](attachment:Figure_2.png)

The user interface of the purposed

**FUTURE WORK**

For the future work, we plan to tryout the proposed system with 30 undergraduate students, divided into ten groups and find the efficiency of this system.

**REFERENCES**