Evaluation of Educational Material using 360-degree Video for Hazard Prediction Training in Nursing

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ABSTRACT

This study proposes educational material using 360-degree video for hazard prediction training in the field of nursing care. An experiment was conducted to investigate the effectiveness of the educational material using 360-degree video with reference to consciousness in learning and acquisition of knowledge. The role-playing of a scenario in which a nurse cares for four patients simultaneously was recorded as a 360-degree video and an ordinary 2D video. Participants observed either the 360-degree video or the 2D video. Therefore, the participants answered a questionnaire on learning motivation and responded to a paper test on behaviors of nurses and their reasons. The questionnaire results revealed that the group that observed the 360-degree video scored significantly higher on terms related subjectivity of training, etc. Furthermore, the measurement of the head movements during video watching revealed that the group that observed the 360-degree video was more attentive to the behavior of the nurse. The paper test scores were higher in the 360-degree video group than they were in the 2D video group. These results suggest that the educational material using 360-degree video was effective for facilitating active learning.

Keywords: Hazard prediction training, 360-degree video, Educational material, Active learning

1. Introduction

Hazard prediction training that called “Kiken-Yochi Training” (KYT) in Japanese is imparted to workers engaged in medical care, nursing, etc., to help them predict the dangers hidden in the work and to plan countermeasures to prevent accidents (Murai, 2009). This training is generally role-play based, in which the hazardous situation is reproduced, and educational material, such as illustrations and videos, are used to identify the problem by discussion.

However, since such educational materials present the hazardous situations as easy-to-find, it is difficult to learn an actively searching for dangerous places. Therefore, in the present study, we proposed a 360-degree video for hazard prediction training. In order to observe a 360-degree video, the observer needs to rotate his/her head, which aids active observation to identify the hidden danger. This active observation is expected to be effective for hazard prediction training.

2. Method

We conducted experiment to investigate the effectiveness of the educational material using 360-degree video with reference to consciousness in learning and acquisition of knowledge. The 360-degree video as an experimental stimulus was recorded using Gear 360 (Samsung), and 2D video was also recorded using ordinary video camera as a comparison condition (Figure 1, Figure 2). The role-playing of a scenario in which a nurse cares for four patients simultaneously was recorded. Both videos included texts that explain the nurse’s behavior and its reasons.

The 360-degree video was observed by HMD with a smartphone (Galaxy S6, Gear VR, Samsung). The 2D video was observed by ordinary note PC monitor.

All thirty participants were recruited from students of engineering science, because to control for the effect of the participants’ prior knowledge of nursing on the results.
Participants observed either the 360-degree video or the 2D video. After observation, participants answered a questionnaire on learning motivation. Next, the participants a video without explanatory texts and their eye or head movement was measured to estimate what the observer paid attention to. Finally, participants responded to a paper test on behaviors of nurses and their reasons.

3. Results

The questionnaire results revealed that the group that observed the 360-degree video scored significantly higher on “Reality of nursing” ($t(74.5) = 3.06, p < 0.01$), “subjectivity of training” ($t(86.9) = 2.49, p = 0.015$), “internalization of training content” ($t(87.8) = 1.96, p = 0.053$), and “immersion into the media” ($t(87.6) = 3.77, p < 0.01$) (Figure 3).

Furthermore, the measurement of the head movements revealed that the group that observed the 360-degree video was more attentive to the behavior of the nurse. The differences of number of the gaze count were marginally significant ($t(27.1) = 1.91, p = 0.07$) (Figure 4).

The differences of paper test scores were also marginally significant ($t(27.952) = 1.80, p = 0.08$). The score was higher in the 360-degree video group than they were in the 2D video group (Figure 5).

4. Conclusion

We proposed an educational material using 360-degree video for hazard prediction training and conducted an experimental evaluation of effectiveness for learning. The results of experiment suggested that the educational material using 360-degree video was effective for facilitating active learning and is recommended for use in hazard prediction training.

References

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