360 degree immersive videos: A way to improve organizational learning practices

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1. Introduction

Situated learning approaches with the adoption of virtual reality (VR) are believed to improve organizational learning through dramatic progress in distributed learning and training environment, and a growing market of various innovative learning systems. As documented in relevant studies (eg. Lau, 2012), enhancing the experience and learning achievements of employees is always in the spotlight. Inspired by such phenomenon and studies, this empirical study has involved employees in an advanced situated-training program on Omni-Channel retailing. Using the use of designed 360-degree videos (with Oculus system), the program aimed to develop their professional knowledge and problem-solving skills.

Situated learning with panorama and an interactive mode is the main focus in this training program. A set of six tailored 360-degree videos (360Vs), a video recording technique allowing employees to experience real-world view in every direction, was developed. The aim was to enhance their learning achievements on Omni-Channel retailing method and knowledge, including inventory management, customer experience and loyalty, productive technology investments and customer retention. Each designed 360V lasted for 10 minutes, and could be watched through 360 gears and stereoscope-style headsets, immersing employees in real store practices and situated-training activities. In addition, a quasi-experimental research method was used to investigate employees' learning achievements.

2. Experiment design

Forty participants (employees experienced with retailing practices) were involved, chosen by criterion-based selection and purposeful sampling, and divided equally into an experimental group and a control group (See figure 1). The immersive learning mode with 360Vs (using Oculus VR) was used with the experimental group, while the control group applied traditional apprenticeship in-house training. Both the training content and assignment remained the same in the two groups.

After 12 teaching hours in four weeks, a criterion-referenced assessment scale was chosen to examine their learning progress from four perspectives:

(1) Professional Knowledge (PK),
(2) Problem Solving (PS),
(3) Independent Learning (IL), and
(4) Critical Reflection (CR).

The assessment was divided into two parts: a professional test and a 500-word reflective journal on self-evaluation and study insight, which were fairly assessed by three independent markers. The professional test examined the participants' achievement on the first two key indicators, they are PK and PS, and the IL and CR were assessed by the reflective journals

Figure 1. Experiment Design
The professional test contained two sets of questions; firstly, 30 multiple-choice questions designed to assess learners' professional knowledge on understanding theories and terminology. Secondly, 3 short questions on real-world practices, to assess learners' problem solving skills on applying theories to situations. To ensure the reliability of the short questions marking, three independent markers were appointed to mark all participants' tests in both the experiment and control groups.

The reflective journal aimed to assess the learners' independent learning rocess and their critical reflection on their achievements. Learners (in both groups) were asked to write 500-words based on two key open questions:
(1) What is the most important idea that was generated in this study? And
(2) How to apply the theories and practices on improving your routine?

A rigorous assessment was graded by a 5-level scale, form (a) Not satisfactory (0%-20%); (b) Fairly satisfactory (21%-40%); (c) Satisfactory (41%-60%); (d) Good (61%-80%); and (e) Very good (81%-100%). A rubric of describers was delivered to the three independent markers in order to maintain the reliability and validity of marking.

3. The analysis and results

Based on the quantitative data collection, ANOVA analysis was taken to further investigate the learning performances of both groups. The overall learning performance of employees in the experimental group (m= 73.63, *s.d.*=4. 37) was better than the result in the control group (m= 65.14, *s.d.*= 4.33), around 9% higher. This shows that the experimental group had a higher learning effectiveness, and implies that the adoption of 360Vs may improve organizational learning experiences and outcomes. 360Vs could become an advanced substitution of traditional apprenticeship pedagogical practices, especially on technological-focused subjects such as Omni-Channel retailing methods and practices.

The comparison from different perspectives (See figure 2) shows the immersive learning mode had a significant impact on PK and PS whereas there was not an obvious enhancement of IL and CR. This latter result calls for a further study particularly on these two important perspectives.

Figure 2. Employees' learning achievement by CRA

4. Conclusion and implications

The study explored the potential of immersive situated learning with the adoption of 360-degree videos to improve organizational learning. The results show there is significant enhancement in employee learning outcomes when using VR, compared with traditional apprenticeship practices. Yet, the result only weakly supports that the new learning program with 360Vs can inspire a rapid progress in independent learning and critical self-reflection. Thus, a possible future research direction is to take different characteristics of employees into consideration when designing a situated learning program.

This study reinforces the opinion that situated learning approaches with 360-degree videos evoke employees to explore new learning behaviors and experience and make proactive adjustments on their own learning pace (Rutten, van Joolingen and van der Veen，2012), based on the view from prior study (Blascovich and Bailenson, 2006) that VR in situated learning can enrich the learning experience.

In conclusion, in addition to offering employees a simulated learning environment and a unique learning experience, 360Vs act positively in inspiring learning behavior changes for practices. The findings may contribute to both research and teaching practices in various educational sectors. And the generated knowledge on design and application of immersive learning program with 360Vs can also help to identify future research perspectives and improve situated learning pedagogy development.

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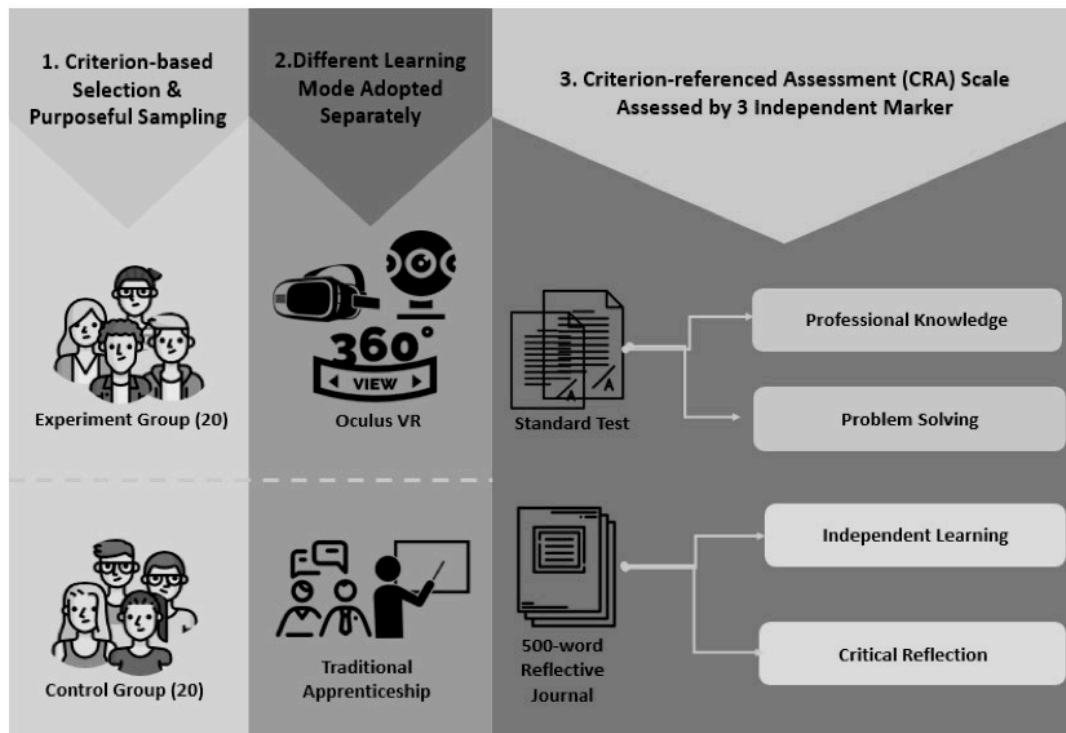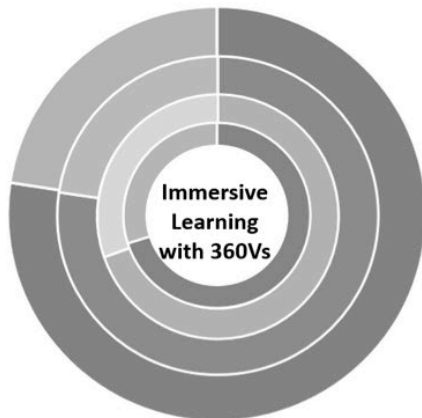
Figure 1. Experiment Design

Figure 2. Employees' learning achievement by CRA

Immersive Learning with 360Vs

- PK (M=77.42, s.d.=4.79)
- PS (M=77.34, s.d.=4.01)
- IL (M=69.64, s.d.=4.88)
- CF (M=70.12, s.d.=3.78)

Apprenticeship Pedagogical Practices

- PK (M=61.52, s.d.=4.12)
- PS (M=63.24, s.d.=4.44)
- IL (M=66.78, s.d.=4.56)
- CF (M=69.04, s.d.=4.20)

PK=Professional Knowledge   PS=Problem Solving   IL= Independent Learning   CF=Critical Reflection