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Learning via Virtual Reality Video: Investigating Students' Understanding in Organizational Behavior Classroom

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Abstract: ***The learning of Organizational Behavior (OB) course is abstract and perceived as difficult by students. This is because the students are unable to visualize the behavioral concepts and situations happening in an organization. Virtual Reality (VR) video can offer a personalized learning experience to all students, by virtually bringing them into the organization to experience the ambience themselves. For this purpose, this research attempts to investigate the effectiveness of virtual reality videos on improving students' understanding of the learning content in an OB classroom. The respondents for this research were 60 undergraduates who enrolled in an OB course in a public university in Malaysia. An experimental research design was employed by randomly assigning one group of 30 respondents to the intervention (VR videos) and the other group of 30 respondents acts as the control group with no intervention (traditional learning method). Four sets of case studies were used as data collecting instruments and were given to the respondents after each learning session. The data were then collected and analyzed using ANOVA statistical analysis. The findings revealed that the students who experienced the VR videos used showed higher understanding compared to those who used traditional method, therefore adducing a scope of implementing technology in a non-IT classroom such as Business to enhance the learning process.***

Keywords: Virtual reality video, Organizational Behavior, understanding, teaching, learning

I. INTRODUCTION

In the digital age, creative media is extended to create high-impact teaching and learning activities and to enhance the quality of teaching and learning. The technology-enabled innovations such as Virtual Reality (VR) videos are harnessed to offer more personalized learning experience to all students. It also attempts to promote effective, enjoyable and meaningful learning. The learning of Organizational Behavior (OB) course is a challenging task. The content is basically on how an employee behaves in the organization by engaging in motivation, communication process, leadership styles, teamwork, managing conflicts, emotion and personality in the organization so that they can help to achieve the efficiency and effectiveness of their organization. In many public universities in Malaysia, Organizational Behavior (OB) course is a core subject for undergraduate students who are taking Bachelor of Business Administration (Hons.) programme.

This course introduces students to organizational behavior as a whole. The course stresses on the concepts of individual, group and organizational system and the importance of the concepts towards organization. This course also covers about the roles of manager in understanding and applying the concepts in developing and retaining the competitiveness of the organization.

Currently, for this course, the teaching and learning is conducted in traditional method by which the students attend three hours lectures and the syllabus covers from the process of individual, group and interpersonal process, towards organization process. It is tiresome for the student to learn as it is a content based subject that has too much of information to digest. This is an intricate task that is perceived as hard and rigid by the undergraduates who have no idea of the real organizational background and environment. They also differ in their ability to understand material which is very abstract and difficult to visualize.

II. ISSUES WITH ORGANIZATIONAL BEHAVIOUR CLASSROOM

Organization Behavior (OB) subject delivers a clear picture of the "human side" of organizations together with general causal models that allow managers to determine action in order to improve the use of resources. The learning content is much more confined with accumulation of specialist content with less involvement of students to both practices and theories (Costea & Crump, 1999).

The main issues concerned with organizational behavior subject are: first, in many business schools, the students undertake the learning, in traditional model such as lectures, complemented discussion and online reading materials (Smith & Clark, 2010). The face-to-face model of a number of lectures plus a single tutorial each week has been a standard approach to course delivery (Butt, 2014) in business course such as OB for decades. Despite the revolution that the internet has been to education in providing flexible access to course material, tradition dictates that a number of hours each week be set aside for formal lectures and tutorials (Butt, 2014). Secondly, OB teaching requires systematic consideration of intellectual developments and discourses. It means OB relies on multitude of theoretical sources which is unmanageable to be teaching in the particular way such as lecture and online discussion (Costea & Crump, 1999).

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The maintenance of the formal lecture and tutorial structure is despite significant evidence that the traditional lecture format is not the most effective way for most students to learn (Butt, 2014). Consequently, the lack of approach for deep learning that incorporates students' higher order thinking skills to transfer and make connections, causes the students to convey disinterest and negative attitude to this subject.

A need analysis was done with the OB course students in a public university in Malaysia, indicated that students were struggling with the concepts, theories and models of the organizational behavior execution which are very abstract and difficult to visualize. An analysis of the questions asked to students revealed areas of misunderstanding that students were encountering at the beginning of the course that appeared to carry forward for the remainder of the course. Therefore, the students find the course frustrating and demotivating. Eventually, these accelerate their lack of engagement, motivation and interest. As a result, the students performed poorly in the subject.

The millennial students are less concern about the authority of the knowledge and focus more on finding easiest way to understand the things and processes. In other words, the students feel content when the practicality of a learning aid especially technology based would enable them to understand the content-based subject (Albert & Beatty, 2014; Smith & Clark, 2010). In order to develop their capacity in learning, they should be encouraged by articulating their processes and arguments on both theoretical ideas and social practices. The adequate practices definitely boost their learning experiences towards variety learning styles.

The evolution of teaching and learning method in academic fields are moving from traditional approach (teacher-centered) towards modern approach (student-centered). In this circumstance, organizational behavior (OB) is not an exceptional. The new teaching method is applied in organizational behavior through two-way communications, adaptation of games, role play, case method and others. In other words, teaching and learning organizational behavior subject shifted from tacit knowledge towards applied knowledge. An academic study was conducted by Ferreri and O'Connor (2013) emphasize on the redesign of a large self-care business course previously delivered in a traditional lecture format to a innovative way. These learning environments should be "student-centered" in that it is through student activity with the guidance of the teacher that learning occurs. Prince (2004) describes for active learning, students are required to do meaningful learning activities and think about what they are doing. Baeten et al. (2010) find that student-centered learning approaches are more likely (among other factors) to lead to a deep approach to learning. As a transition to a student-centered approach, educators can more effectively apply technology to improve learning outcomes (Froyd & Simpson, 2008). Therefore, it is crucial that there is some technological-based pedagogical innovation in order to maintain students' motivation and engagement (Smith & Clark, 2010) in the OB classroom.

III. DIGITALIZING ORGANIZATIONAL BEHAVIOR CLASSROOM

This research attempted an approach to incorporate virtual reality video as a learning aid in an OB classroom as to improve students' understanding of the learning content. The motivation of this research originates from the advantages of virtual reality reviewed in past literatures. There are increasing volumes of computer simulation such as virtual reality videos that are utilized in higher education for teaching and learning process (Merchant, Goetzb, Cifuentesc, Kennicudd, & Davis, 2014).

Virtual Reality (VR) video has been used in classrooms to involve students in the learning process and it caters students with all learning modalities. It actually bridges the real world into the classroom, rather than learning it in a lecture room. It enables students to interact with the real scenario rather than listening to the lecturer and trying to imagine an abstract scenario. Figure 1 illustrates a screen example of a virtual reality video used to teach OB content.

In this research, a few VR videos related to the students' learning outcome in OB course will be employed. The students will interact with the VR videos through the usage of VR Cardboard (Figure 2) and smart phones. The content which will delivered using redundancy of multimedia elements will emphasize on teaching the OB content to the students. Zhang, Jiang, de Pablos, Lytras, & Sun (2017) in their research stated that the application of VR in improving users' learning outcomes, especially in perceived learning effectiveness, is a new area. VR provides visualization and interaction within a virtual world that closely resembles a real world, bringing an immersive study experience (Merchant et al., 2014). It is stated that students feel more motivated and confident when they effectively practice outside of class, and VR videos can facilitate the motivation and engagement that they may lack in the traditional classroom (Dalgarno & Lee, 2010).

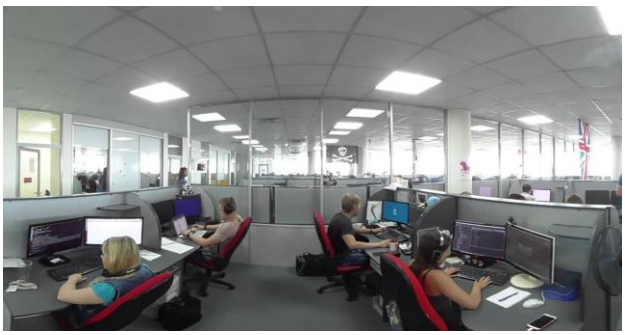

Fig. 1 Example of an Organizational Virtual reality Video

(Source: https://www.youtube.com/watch?v=GYPCjznfvu0)

Virtual reality video will provide a multi-genre virtual learning environment that engages and draws students into a different interaction with course learning content. Students are able to learn while creating and integrating 'schema' to understand better as they can be involved in a particular situation happening in the organization.

This will offer the students a welcome change from routine lectures in the classroom and also arouse their interest in being in a condition that resembles an organization environment.

Fig. 2 VR Cardboard

IV. LITERATURE REVIEW

Research literature has demonstrated number of advantages of using virtual reality in learning environment. Virtual reality (VR) is a technology that has become extremely popular in recent years. It is a newly emerging computer interface characterized by high degrees of immersion, believability, and interaction, with the goal of making the users believe, as much as possible, that they are actually within the computer generated environment (Handa, Aul & Bajaj, 2012). VR is a collection of hardware such as PC or mobile, head mounted displays (HMDs) and tracking sensors, as well as software to deliver an immersive experience. The differences between modern VR compared to the concept of VR presented two decades ago is that the technology is finally at the stage where it can be adapted to any mobile phone (Hussein & Natterdal, 2015). The introduction of HMD called Google Cardboard showed the public for the first time that any smart phone of this generation can be turned into a Virtual Reality machine. At this point any student with a smart phone and a Google Cardboard can enjoy the immersive experience of VR applications, share their ideas and imagination through a whole new medium (Russell, 2015). By simulating the experience it encourages them to acquire their learning content in a safe environment (Merchant et al., 2014).

VR technology has been successfully employed in educational applications (Chittaro & Ranon, 2007; Monahan, McArdle, & Bertolotto, 2008; Huang, Rauch & Liaw, 2010). A VR offers the opportunity to simulate a realistic and safe environment for learners to perform specific tasks (Merchant et al., 2014). In addition, the option of offering VR video learning in a classroom setting is now feasible, given that it is now run on low-cost VR cardboard and smart phones. VR has the ability to change the environment quickly and cheaply through available technologies (Russell, 2015), and thus students could be easily immersed in other environment without leaving their place. It offers the students a unique opportunity of experiencing and exploring a broad range of environments, objects, and phenomena within the walls of the classroom. Students can observe and manipulate normally inaccessible objects, variables, and processes in real-time. The ability of these technologies to make what is abstract and intangible concrete and manipulates them to the study of natural phenomena and abstract concepts (Zaretsky, 2009).

Thus far, the VR learning applications for math and science subjects are the most frequent to be found in the research literature. However, virtual reality simulations also offer benefits that could potentially extend across the entire curriculum as it is highly engaging (Hussein & Natterdal, 2015). For example, the ability to situate students in environments and contexts unavailable within the classroom could be beneficial in business and social studies (Hussein & Natterdal, 2015). The multisensory ability of virtual reality to scaffold student learning (Hussein & Natterdal, 2015), potentially in an individualized way, is another characteristic that enables them to be integrated across a range of curriculum areas. This also helps to put the students in control of their learning (Hussein & Natterdal, 2015).

VR offers many unique benefits when used in education. It offers a new tool for educators and provides a new way of reaching out to more students (Bell & Fogler, 2004). The goal of VR is to enhance, motivate and stimulate students of certain events and at the same time also allows for students to experience hands on learning (Shim et al., 2003).But what is more appealing in regards to VR in education is the fact that it can be used to simulate and allow learners to improve the practical knowledge and their ability to solve problems independently (Abulrub, Attridge & Williams, 2011). VR technology can help the students apply their theoretical knowledge into a real industrial problem (Hussein & Natterdal, 2015).

This approach supports Kolb's Experiential Learning theory (1984), which represented by a four stage as illustrated in Figure 3. Kolb states that learning involves the acquisition of abstract concepts that can be applied flexibly in a range of situations. In Kolb's theory, effective learning is seen when a person progresses through a cycle of four stages:

- Concrete Experience - (a new experience of situation is encountered, or a reinterpretation of existing experience).
- Reflective Observation of the New Experience - (of particular importance are any inconsistencies between experience and understanding).
- Abstract Conceptualization - (reflection gives rise to a new idea, or a modification of an existing abstract concept).
- Active Experimentation - (the learner applies them to the world around them to see what results).

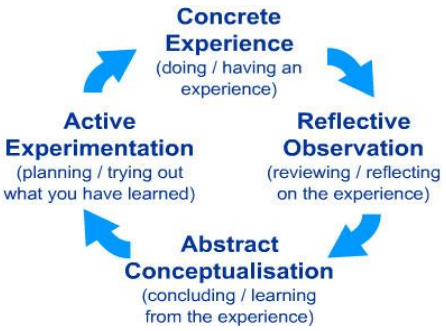

Fig. 3 Kolb's Experiential Learning Theory (1984)

Watching VR videos will give the students a concrete experience of the organizational behavior scenarios. This allows them to reflect their observations, and further conceptualization of modified and new ideas. This will later encourage the students to gather information and use imagination to solve problems in their organization behavior classroom (active experimentation) as stated by Kolb (1984). Studies done by many scholars stated that the use of VR was a successful complement to conventional teaching. This approach evidently enhances the learning process of the students besides lectures and textbook learning. At the same time, it also nurtures enthusiasm and motivation of the student to learn. It is concluded that use of VR in the learning environment contributes more information, deeper comprehension, better perception and more efficient memorizing.

V. METHODOLOGY

This research was conducted at a public university in Malaysia. The sample for this research is 60 undergraduate students who enrolled in an OB course. It employed a experimental research design whereby one group of selected participating sample are randomly assigned to the intervention which is the VR videos and the other group act as the control group with no intervention (traditional learning method). In this research, 30 respondents who were assigned randomly to the use the intervention become the experimental group and another 30 respondents become the control group. All of them are homogeneous in term of the prior knowledge of the learning content.

This experimental research was carried out for the duration of 4 weeks, using four VR videos (one for each week), with a purpose of improving students' understanding of the OB content and engages them in learning. A virtual learning environment (VLE) approach was adopted and in this approach, the students were given the VR videos as learning aids. 30 respondents (experimental group) viewed the VR videos using VR Cardboards and Smartphone. The students were expected to experience the virtual reality videos which will help them to explore and interact with the scenario by themselves. The control group was given no intervention and used lectures and tutorials for their learning.

The effectiveness of the VR videos on improving students' understanding was assessed. The instruments that were used include four sets of OB case studies to measure students' understanding. Pre-tests were administered before the execution of the interventions. After each intervention, the respondents were given an OB case study as their post-test. The students took 45 minutes to answer the case study. As the pre-test and post-test questions were similar, test-wise effect may occur to a degree that the students may show an improvement on the post-test simply as a result of their experience with the pre-test. To minimize this effect, the orders of the pre-test and post-test questions were randomized. The data were then collected and was treated statistically using T-test and ANOVA parametric statistics and the results are described in the following section.

VI. FINDINGS

The purpose of this research is to improve the content understanding of the Organizational Behavior course. In achieving the main research aim, an innovative pedagogical approach by utilizing virtual reality videos was adapted as a learning tool. Among the aspects that are evaluated is students' understanding of the learning content.

The sample for this research is 60 undergraduate students who enrolled in an OB course. 30 respondents were assigned randomly to the use the intervention and another 30 respondents become the control group. Table 1 depicts the respondents' demographic profile.

The analysis of the respondents' gender revealed that more than half (60.0%) of the respondents are females and 40.0% are males. Most of the respondents were predominantly Malaysian, who accounted for 76.7%, and the international respondents are 23.3%. 57 of them are in the age range of 20 to 29 years old and 3 of them are below 20 years old.

Table. 1 Respondents' demographic profile

Demographic Characteristics		C	E	T
Gender	Male	9	15	24
	Female	21	15	36
Nationality	Malaysian	18	28	46
	International	12	2	14
Age (years old)	Below 20	2	1	3
	20-29	28	29	57
	30-39	0	0	0

*C= Control; E= Experimental; T=Total

The respondents' were randomly divided into two groups; experimental and control. The experimental group experienced the VR videos while the control group used traditional method of learning. Table 2 describes the descriptive statistics for four pre-test and post test mean scores.

The statistical analysis in Table 2 reveals that both groups scored almost the same in the pre-tests ($\overline{X}_{Pre1E} = 4.03$, $\overline{X}_{Pre1C} = 4.23$; $\overline{X}_{Pre2E} = 3.73$, $\overline{X}_{Pre2C} = 4.56$; $\overline{X}_{Pre3E} = 3.80$, $\overline{X}_{Pre3C} = 3.23$; $\overline{X}_{Pre4E} = 4.50$, $\overline{X}_{Pre4C} = 3.83$), however they differ in the post-test scores ($\overline{X}_{Post1E} = 15.93$, $\overline{X}_{Post1C} = 11.63$; $\overline{X}_{Post2E} = 14.60$, $\overline{X}_{Post2C} = 11.63$; $\overline{X}_{Post3E} = 14.26$, $\overline{X}_{Post3C} = 11.86$; $\overline{X}_{Post4E} = 14.33$, $\overline{X}_{Post4C} = 11.86$). The analysis showed that the experimental group scored a higher mean scores during the post-test compared to the control group. In addition, the average mean of the experimental group pre-test scores is 4.02 while for the post-test scores is 14.78 and ss for the control group, the average mean of pre-test scores is 3.97 and for the post-test scores is 11.75. The averages of the mean scores indicate that the students who used the VR videos ($\overline{X}_{Post-Pre} = 10.76$) scored higher on their understanding of the learning contents compared to students who used the traditional method ($\overline{X}_{Post-Pre} = 7.78$). This means that the students were more successful in understanding the learning content when they used the VR videos.

Table. 2 Descriptive statistics for Pre-test and Post-test Scores

Item	Group	n	Mean	sd
Pretest1	Experimental	30	4.03	1.920
	Control	30	4.23	2.299
Pretest2	Experimental	30	3.73	2.033
	Control	30	4.56	2.661
Pretest3	Experimental	30	3.80	1.901
	Control	30	3.23	2.028
Pretest4	Experimental	30	4.50	2.345
	Control	30	3.83	2.150
Posttest1	Experimental	30	15.93	2.303
	Control	30	11.63	2.671
Posttest2	Experimental	30	14.60	3.069
	Control	30	11.63	2.042
Posttest3	Experimental	30	14.26	3.226
	Control	30	11.86	2.738
Posttest4	Experimental	30	14.33	3.198
	Control	30	11.86	2.161

*n= number of students, sd= standard deviation

To further investigate the research question, an ANOVA was conducted to see if there is a significant difference in the students' understanding between those who experienced the VR videos and those who used the traditional method. The data were distributed normally, the Levene's test for homogeneity of variances results for all the pretests revealed that the *p*-value is greater than 0.05 (*pre1= 0.33, pre2=0.09, pre3=0.84, pre4=0.76)*, indicating that the variances in the post-test scores between both groups are approximately equal indicating that they were homogenous with their prior knowledge.

Table 3 describes whether the groups; experimental and control, are significantly different in terms of the post-test scores. The *p*-value for each all the means scores of the post-tests are lesser than 0.05 (p_1*=0.00*, p_2*=0.00*, p_3*=0.03*, p_4*=0.01*), therefore indicating that there is a significant difference between respondents who experienced the VR videos and the students who were in the control group.

Table. 3 ANOVA Test of Between-Group for Students' Understanding

Item	t-test for Equality of Means		
	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pretest1	.716	-.2000	.5470
Pretest2	.178	-.8333	.6114
Pretest3	.269	.5667	.5076
Pretest4	.256	.6667	.5810
Posttest1	.000	4.3000	.6440
Posttest2	.000	2.9667	.6731
Posttest3	.003	2.4000	.7726
Posttest4	.001	2.4667	.7048

A Post-hoc analysis was then conducted to see which group has the higher impact. The findings of the Post-hoc analysis are described in Table 4.

Table. 4 Post-hoc Analysis

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)
Posttest1	E	C	4.300*
	C	E	-4.300*
Posttest2	E	C	2.967*
	C	E	-2.967*
Posttest3	E	C	2.400*
	C	E	-2.400*
Posttest4	E	C	2.467*
	C	E	-2.467*

*. The mean difference is significant at the .05 level.

The findings showed that the experimental group performed much better in each of the post-test compared to the control group for. The mean difference between the experimental group and the control group are 4.300 for *Post-test1*, 2.967 for *Post-test2*, 2.400 for *Post-test3*, and 2.467 for *Post-test4* respectively. Hence, this suggests that students who used the VR video obtained higher understanding compared to students did not used the VR videos.

VII. DISCUSSION

The use of virtual reality (VR) videos in education can be considered as one of the natural evolutions of computer-assisted instruction (CAI) or computer-based training (CBT). It can stimulate learning and comprehension, because it provides a tight coupling between symbolic and experiential information. Research stated that it provides an alternate method for presentation of material as it can more accurately illustrate some features, processes, allowing extreme close-up examination of an object, observation from a great distance, observation and examination of areas and events unavailable by other means. Virtual reality video motivates students, grabs attention and encourages active participation rather than passivity. This method allows the student to take on the role of a person in different cultures or environment.

Research done in the OB classroom indicated that students were struggling with the concepts, theories and models of the organizational behavior execution which are very abstract and difficult to visualize. This is because the students have to understand situations happening in an organization, without experiencing it. This causes misunderstanding of the concepts and leads to the deceleration of their engagement, motivation and interest.

The findings of this research indicated that utilizing the VR videos in OB classrooms gives the students a concrete experience of the organizational behavior scenarios. This allows them to reflect their observations, and further conceptualization of modified and new ideas. This will later encourage the students to gather information and use imagination to solve problems in their organization behavior classroom. In this research,

the use of VR videos was a successful complement to conventional teaching.

This approach evidently enhances the learning process of the students besides lectures and textbook learning. The students were able to understand and visualize situations related to organizations. At the same time, it also nurtures enthusiasm and motivation of the student to learn. It is concluded that use of VR videos in the learning environment contributes more information, deeper comprehension, better perception and more efficient memorizing.

VIII. CONCLUSION

The findings from the research are expected to open up new means for non-technology courses such as Business to improve students' understanding and enhance classroom engagement. Virtual reality (VR) videos are an aid to engage students and also to overcome the limitations of traditional teaching strategies. The students are able to involve a real scenario of an organizational behaviour rather than reading it from textbook or PowerPoint notes.

Hence, the outcome of this research could also be successfully adapted into different classroom setting or disciplines. By highlighting the potential of virtual reality as a strategy to enhance non-IT classrooms' learning experience, it may answer to several pedagogical principles and learner modality. Therefore, it will be a useful instructional aide to teach abstract and raise standards of teaching achievement more effectively.

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