Consideration of the Use of 360-degree Videos Recorded During Student Fieldwork

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Abstract: This study aims to examine the effective use of 360-degree videos recorded during student fieldwork. Typical fieldwork procedures comprised three steps: pre-learning, on-site fieldwork, and post-learning, and this study aims to support mainly pre- and post-learning steps. Three fieldwork experiences were targeted in which the students recorded 360-degree videos, reflected on their experience, and presented their experiences to younger students by showing their 360-degree videos using a virtual reality headset. By observing these actions, we were able to determine some of the effects of using 360-degree videos as a learning aid, including helping the students detect what they missed while on site, keeping the students' excitement and motivation high after returning, and promoting pre-learning for younger students. Further practical efforts are needed to confirm such effects and pursue appropriate use of 360-degree video for fieldwork.

Keywords: Higher education, Fieldwork, Virtual reality, 360-degree camera

INTRODUCTION

Experiential learning is an effective teaching method, and beneficial outcomes for students include a positive attitude, independent thinking, ethics, and so on. Many universities now offer fieldwork programs in an effort to provide this kind of learning experience.

Nihon Fukushi University provides mainly two kinds of fieldwork opportunities to students. One is faculty-driven fieldwork; the basic schedule is set by faculty members who also participate in the fieldwork. The other is student-driven fieldwork in which students are expected to plan learning activities for themselves. They can earn certain credits if their activity plan and its outcomes are approved by faculty.

This study considers the effective use of 360-degree videos in such fieldwork. During fieldwork, it is common for students to take pictures and videos and share them on social media. The authors believe that 360-degree images allow students to take richer pictures and videos and are potentially useful to deepen learning. As a first step to considering these possibilities, the authors have documented the experience of using 360-degree videos in student fieldwork and will discuss the possibilities of the use of 360-degree videos in fieldwork in this paper.

LITERATURE REVIEW

Fieldwork

In this paper, we use the word "fieldwork" in a broad sense to include various activities conducted by students outside a university setting. Many universities now provide fieldwork programs in an effort to make learning more student-centric. Teachers expect fieldwork to promote a positive attitude and independent thinking among students. Our university has been providing fieldwork opportunities through formal classes. Students are expected to plan some learning activities for themselves, and they can earn certain credits if their activity and its outcomes are approved by faculty.

The typical fieldwork procedures comprise three steps: pre-learning, on-site fieldwork experiences, and post-learning. Students generally work hard during their fieldwork experiences, and one of the challenges for faculty is to implement pre-learning and post-learning effectively. To deal with these challenges, faculty members involved in the fieldwork experiences have established a post-fieldwork program in which the students present their experiences to faculty and younger students who will be involved in the same or similar fieldwork in the near future. It is expected to have a positive impact on the younger students' pre-learning and is also an opportunity for the presenting students to reflect on their experience.

Information and communication technology (ICT) can be effectively used to prepare reports and pictures and share them among students and teachers. This can facilitate reflection on experiential learning. There have been some efforts to facilitate students' reflection in actual educational settings. For example, Sato and Kageto (2010) proposed methods to deepen students' reflection through project-based learning using social media and analyzed the results of those activities. They also used social media as a platform for students to share text, pictures, and videos and conducted practice activities to deepen the learning experience. Sharing recorded videos, images, and texts seems effective in deepening student reflection; however, some students had problems recalling their experience vividly, and that seemed to have led to disappointment with the activity.

Virtual reality in education

The capabilities of virtual reality (VR) have advanced significantly in recent years, and the cost to implement VR has greatly decreased. These changes have led to an increase in the use of VR technology in education (Freina & Ott 2015). VR is considered effective for training, learning about complicated concepts, experiencing what is impossible to experience in real-life settings, and so on (Liu, Dede, Huang, & Richards, 2017). These educational applications of VR mostly rely on the abilities of VR content developers. However, with 360-degree cameras having become easier to use, students and teachers can create VR content by themselves. We would like to illustrate through an example how students and teachers can create and use VR content autonomously.

The effectiveness of VR implementation can be assessed by the AIP cube (Zeltzer 1992): a model of a virtual reality system that plots three variables, autonomy, interaction, and presence. Autonomy means that users can react to events and external stimuli. Interaction means that users can interact with the environment. Presence means that users can feel immersed in the environment.

Since 360-degree videos are recorded data, autonomy and interaction are limited; however, the sense of immersion (presence) is expected to be high when users can watch 360-degree videos by using VR headset. This sense of immersion is considered helpful in education if it is provided with appropriate instructional designs (Dede 2009). Yee and Bailenson (2007) pointed out that the appearance and action of a person's self-representations affect his or her behaviors. Applying this to fieldwork, this means that an immersive environment has the potential for a person to feel similar sensation with what the person who recorded the 360-degree video felt at the fieldwork sites.

Purpose of the study

To learn appropriately from fieldwork experience, reflection after the experience is considered important. In this study, the authors aimed to help students reach deeper levels of reflection and posited that VR technology would encourage students to reflect on their experiences more deeply and internalize them for the future. Because fieldwork is a new experience for students, it can be overwhelming and impossible for them to absorb everything; hence, they may overlook important details. We expect that viewing and editing 360-degree videos will help the students recall their experience more vividly. We also anticipate that the students will be able to relive the experience in a relaxed manner, and, as a result, they are able to notice important details they missed while on site. It is also expected that having returned students explain about their experience to younger students will help them deepen their reflection on the fieldwork.

We also considered that younger students who conduct fieldwork the following year would benefit from 360-degree videos edited by older students. In pre-learning, students generally are unable to gain a sense of what they would actually experience in the field even after viewing normal pictures and videos. We expected that the sense of immersion provided by 360-degree videos would help in that regard.

METHOD

Recording of fieldwork

The target activities were three fieldwork programs. Explanations of these programs are shown in Table 1.

Table 1. Target fieldwork programs.

Fieldwork area	Programs
Philippines – Davao	Exposure to the way of life at a small private orphanage in a rural area and an exchange program at a sister school (student-organized program)
Philippines – Manila	Learning about social work and community development (university-organized program)
Cambodia	Learning about Asian history and volunteer-work experience for development and support (university-organized program)

As we described earlier, the students in our department are expected to design their learning activities by themselves, and teachers do not necessarily accompany the students on the trip. Hence, we decided that the students should record the activities by themselves. One student was assigned to take 360-degree videos for the Philippines-Manila and

Cambodia fieldwork programs. However, since one of the authors accompanied the Philippines-Davao fieldwork program, he recorded activities there by himself as a trial run. The authors instructed students to record videos that they considered effective in explaining the activities to others, such as teachers and especially younger students who will be involved in the same or similar fieldwork in the near future.

The cameras used to record videos were a Ricoh Theta S and Ricoh Theta V. The resolution of recorded data is 1920x1080 or 1280x720 for Theta S and 3840x1920 (4K) or 1920x960 for Theta V, and the maximum duration of recordings is 25 minutes.

Viewing of 360-degree videos

The authors prepared and tested several VR headsets that were considered appropriate for our use. One is the HTC Vive, which is a full VR system with position sensors. Simple headsets that could be used with a smartphone were also used. The author also used an Oculus Go. The Oculus Go is a standalone VR headset that can be used to view 360-degree videos without the need for a smartphone or PC. A remote control was also available to perform screen commands such as selecting videos, start playing, fast-forwarding, and rewinding videos.

The students watched videos with the above-mentioned headset, and the authors took notes while the students talked about their experience of watching the 360-degree videos. After viewing, semi-structured interviews were conducted.

The authors also instructed the students to edit videos and to explain their fieldwork experience to younger students with edited 360-degree videos. The authors also observed and took notes during these activities.

RESULTS

Recorded 360-degree videos

For many students, recording their fieldwork experience with 360-degree camera was their first time using this type of camera, and it was somewhat harder for them than taking normal videos. It took some time for students to become familiar with recording with this camera. Ultimately, the students succeeding in recording parts of their fieldwork experience, and one of the authors recorded many student activities on the Philippines-Davao program.

Reflection using 360-degree videos

The followings are examples of what was observed while or after the students viewed the 360-degree videos.

Philippine-Davao – at an orphanage:
- While watching some movies with children, one student mentioned, "the movie reminds me of the precious time we had with House of Joy (the name of the orphanage she visited). At first, I didn't know how to interact with the children and felt depressed. But, I soon came to think that it's okay to just be myself."
- The student made rice balls and children ate them at a beach. While watching this movie, she mentioned, "I'm glad to be able to see what I missed since I was preoccupied with other issues."

Philippine-Davao – at a sister school:
- While watching a video in which the student is introducing Japanese culture in English to local students, she mentioned, "I was not conscious of how I did on the presentation. I think I need to improve various point. But, most students seemed to listen to me more than I felt in a class, and I seem to have interacted better at the later part of my presentation. I seemed to be helped local students' kind and tolerant attitude for me."

Cambodia – at a local city
- While watching videos of roaming around the local city with fellow students, "It's so realistic, and I feel like I'm in Cambodia again. Watching the video now, I remember that while I was there, I committed to studying harder after coming back, but…"

Video-viewing by younger students

The students were instructed to explain their fieldwork experience to younger students; one student who participated in the Philippines – Davao fieldwork presented her experience to eight younger students. It was difficult for her to explain only using the 360-degree videos; therefore, the authors discussed her options with her and instructed her to prepare a poster to provide an overview of her fieldwork and some background information for younger students.

The followings are examples of what was observed while or after younger students viewed the 360-degree videos.

Philippine-Davao – at an orphanage:
- A student mentioned, "Oh, House of Joy looks like this. Where in House of Joy? I found Student A and the teacher (one of the authors). You were really there! I'd like to go to House of Joy, too."
- Another student mentioned, "I feel as if I'm in a remote place, and it's interesting that people beside me are also in that remote place."

Philippine-Davao – at a sister school:
- While watching a video of a Japanese culture introduction in English, a student mentioned, "Local students are watching Student A. I will be so nervous in such a situation.

Preparation before going abroad is really important, isn't it?"

- While watching a video of Student A talking with local friends, she mentioned, "Where am I? I'm at the same table with Student A, and who is he? (referring to a student who visited the university last year on an exchange program.) It's cool to communicate in English like this. I'm looking forward to making international friends in an exchange program this year."

After taking the VR headset off, some students mentioned "I'm back" or similar expressions.

DISCUSSION

Potential effects of 360-degree videos

This study is a preliminary survey on the effective use of 360-degree videos in university fieldwork, and conclusive findings have not been obtained yet. However, from the observation of the students who viewed the 360-degree videos of their fieldwork, the following can be considered potential benefits.

Students sometimes were able to watch what they had missed at the sites. For example, the student who visited an orphanage did not see how the children enjoyed eating the food she had cooked. She also had different impressions about her own presentation at a sister school. She was able to observe both negative and positive aspects that were impossible to experience until viewing the videos. Students are limited in what they can take in during fieldwork. This is even more restricted when students feel pressured and are visiting an unfamiliar place. Viewing their fieldwork on 360-degree videos helps the students obtain new aspects from and deepen their reflection on their important experience.

While students viewed the videos, they often talked about their own emotions; 360-degree movies are so immersive that students often feel as if they have returned to the video's setting. Some students seemed to recall their emotions on site when they viewed a casual scene in which they just roamed around the local city. After coming back to Japan, many students struggle to stay motivated in their daily lives because they get stuck in a routine, whereas during fieldwork in a foreign setting, everything is new and exciting. This immersive sensation may help students sustain the motivation they experienced during fieldwork.

Furthermore, younger students seemed interested in experiencing the older students' fieldwork. The sense of immersion seemed to motivate younger students to prepare more before embarking on the fieldwork program.

Future Challenges

Although 360-degree cameras and VR headsets are easily available now, they are still unfamiliar technology for most non-technical students. We found that the students were unable to record 360-degree videos as they had imagined. Certain knowledge, like how to set up the camera and what kind of scenes or experiences are appropriate to record, should be addressed beforehand.

Instructional design is also necessary if such media is to be used effectively. It is implied that 360-degree videos and VR headsets can provide a sense of immersion; however, defining which cases are appropriate for 360-degree videos and in which cases normal pictures and videos are good enough need to be defined. In some cases when students needed to present their experience to younger students, giving an overview by using a poster seemed to be effective. It is important to gather more data about how to use such emerging media and how to appropriately combine it with traditional media to enrich students' experiences.

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