Research Note

Mobile Assisted Project-based Language Learning: Practical Considerations and Learning Outcomes

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この研究では、語学学習者がモバイル機器を使用して共同で行うデジタルストーリーテリングプロジェクトを完成させることの実用性について検討を行った。① ケーススタディアプローチによる調査を兼ねた教室観察、② 調査データの結果、③ 語学学習参加者のデジタルプロジェクトベースの意見や認識を分析するための面接、の3つを併せた複合的な方法を用いた。調査の結果、大多数の参加者は、単一のモバイルデバイスを使用してプロジェクトを完了することは可能であったが、他の方法を好む参加者も一部いたことが分かった。また、本論文では、デジタルストーリーテリングにモバイルデバイスを使用する技術的な限界についても言及した。

This study considers the practicality of having language learners complete a collaborative digital storytelling project exclusively using mobile devices. A mixed method, exploratory case study approach combined classroom observations, survey data results, and in-depth interviews to analyze participants' opinions and perceptions of digital project-based language learning. The findings indicate that the vast majority of students felt that the digital storytelling project provided a highly valuable learning experience. The study also revealed that while it was possible for the majority of participants to complete their projects using a single mobile device, some subjects preferred to use other methods. The technological limitations of using mobile devices for digital storytelling are also discussed.

1 Introduction

Although much of the current research around digital storytelling is based around new and emerging technology, digital storytelling as pedagogic practice has roots that date back to the early 1990s when Joe Lambert and Dana Atchley co-founded the Center for Digital Storytelling (Robin, 2008a). Not surprisingly, as the technology used to create digital stories has evolved since the 90s, so too has the definition of digital storytelling. At its core, digital storytelling in educational contexts is a learner centered activity that allows students to tell stories about personal subject matters or their daily lives (Kim, 2014). These personal stories are usually conveyed by combining multiple forms of digital media such as video clips, digital animations, photos, computer generated graphics and text, and audio tracks in the form of voiced narration or music (Hung, Hwang & Huang, 2012; Meadows, 2003; Robin, 2008a; Sadik, 2008). More concisely, Reinders (2011) describes digital storytelling as "simply the telling of stories in electronic form" (p. 2).

While digital storytelling was originally viewed as an effective way for people to tell their own personal stories about culture, customs or traditions, it is not limited to a single genre. Robin (2008a, 2008b) identifies three distinct categories of digital storytelling common across various educational contexts: stories that describe personal narratives, stories that examine historical events, and stories that inform or instruct.

Whereas teachers who were willing to integrate elements of digital storytelling into classroom activities once required access to video cameras, computer labs, and a certain level of technical expertise to effectively troubleshoot problems and edit video, the evolution of smartphones and tablets have relieved them of those troublesome requirements. With the proliferation of mobile devices with high quality cameras, affordable (often free) video editing software applications, and limitless cloud-based storage capabilities, digital storytelling now has the potential to enter into mainstream teaching practice. However, technological advances and improved access to the tools necessary for digital storytelling have not yet led to its widespread integration in the language classroom (Dumova, 2008; Robin, 2008a)

Recently, digital storytelling researchers have remarked about the increasing accessibility of video capturing devices and affordable nonlinear video editing software (Liu, Wang & Tai, 2016; Adams Becker et. al, 2017). Indeed, mobile devices with technologically advanced, high resolution cameras are now so ubiquitous that nearly any college student can capture studio quality images by simply using his or her smartphone. Moreover, the availability of completely free video recording and editing apps and software on a variety of operating systems and mobile devices has greatly increased in recent years. The essence of digital storytelling has also made headway into various popular social networking services (SNS) such as Facebook and Instagram with the 'Stories' apps. With these apps, users can upload pictures or short video clips with the option of adding text, animations, or sound that run in a sequence to create a kind of digital collage that can be viewed for a limited amount of time. This means that an ever increasing number of SNS users are coming into contact with elements of digital storytelling in their everyday online lives. As students are becoming more familiar with the concept of digital storytelling, adapting its use to educational contexts is becoming less burdensome for teachers. As well, many of the previously discussed issues surrounding digital storytelling in educational settings such as access to video cameras, computer labs, and editing software are no longer major concerns for many teachers.

2 Benefits of Digital Storytelling in Education

Because elements of digital storytelling can be adapted to fit a variety of instructional contexts, its effects on learning outcomes are numerous and wide-ranging. Yuksel, Robin, and McNeil (2010) conducted an in-depth survey of 154 students and educators from 26 countries around the world who had engaged in digital storytelling practices. Their results indicated that digital storytelling was viewed as having a positive and significant impact on social skills, language skills, higher order thinking skills, reflective practice skills, and artistic skills. They also found that digital storytelling could be used effectively in a wide variety of educational settings that included, but were not limited to, social sciences, second language learning, technology literacy, visual literacy, and even mental health services.

Learner motivation and task engagement have also been found to greatly improve through the use of digital storytelling activities (Smeda, Dakich & Sharda, 2014). The act of creating a digital artefact and the sense of ownership it promotes allows students to make a deeper connection with the learning tasks (Lord, 2008; Dumova, 2008). Hung, Hwang, and Huang (2012) found that not only did project based digital storytelling encourage student engagement, it was also, "key to promoting

learning achievement" (p. 369). They also found that digital storytelling enhanced subject matter recall and promoted collaboration. A separate study by Liu, Wang, and Tai (2016) identified a dynamic pattern of motivation, disengagement, and re-engagement when using Web 2.0 technologies on mobile devices with elementary school students. Their analysis showed that although young language learners need different types of learning support, motivation and engagement ultimately increased. They also noted that by the end of the study vocabulary and oral fluency also significantly improved.

Enhanced critical thinking skills are another benefit of creating digital stories. Yang and Wu (2012) conducted a one year study on the impact of digital storytelling on the academic achievement, critical thinking skills, and motivation of high school English language learners in China. They found that students who engaged in digital storytelling activities had significantly improved their critical thinking skills compared to a group of students who had engaged in a traditional lecture style learning environment. Their results showed that higher order thinking skills were enhanced because creating digital stories was a learner centered activity that involved a multi-step process. Other researchers have also pointed to the improvement of critical thinking skills as a significant benefit because of the multi-step process of collecting research, analyzing and organizing ideas, and creating a finished product that digital storytelling necessitates (Hung, Hwang, & Huang, 2012; Burmark, 2004; Green, 2013; Robin, 2008a).

3 Method

3.1 Objectives of Study

Although digital storytelling is no longer a new educational approach, its adoption, integration, and implementation in second and foreign language learning classes are still not widespread. Furthermore, this researcher is unaware of any studies that have been conducted investigating the exclusive use of mobile devices to complete each stage of the digital storytelling process. To address this gap in the literature, the present study was designed so that students could use their smartphones to complete the entirety of the digital storytelling project. The research presented in this study will also serve as a model for teachers interested in integrating elements of mobile device digital storytelling in their language classes. To elucidate the objectives above, the following research questions were investigated:

1. Can digital storytelling projects be completed effectively using a single mobile device?
2. Do students perceive digital storytelling activities using a mobile device as a valuable language learning experience?
3. What problems or shortcomings can be identified when using a mobile device to complete a digital storytelling project?

3.2 Participants

A total of 83 undergraduate students enrolled in a compulsory first year English course at a Japanese university participated in the study. The students' English proficiency level was accessed as between A2 and B1 on the CEFR scale using the ACE Placement Test at the beginning of the school year in April. Of the 83 students, 79 completed an optional, anonymous online survey at the end of the school term to gather information about their thoughts and experiences regarding the

implementation and completion of the digital storytelling projects during the class. Of the remaining 4 students who did not participate in the survey, 3 were absent on the day of the survey and 1 declined to participate.

3.3 Data Collection

A mixed method, exploratory case study approach was used to collect quantitative and qualitative data to address the research questions. This method was adopted as data from student opinions, perceptions, and classroom practice were sought. For quantitative data, an online questionnaire created with Google Forms was distributed at the conclusion of the digital storytelling project. Students were informed that the survey was optional and that all answers would remain anonymous. There was a total of 15 questions, 10 of which were Likert scale items with the remaining 5 being open-ended questions. To avoid any misunderstanding with the survey, all questions and scale items were translated into Japanese by the researcher and checked for accuracy by a professional English to Japanese translator. Students were also permitted to submit answers to the open-ended questions using either English or Japanese. Of the 79 students who completed the survey, only 5 chose to submit responses to the open-ended questions in Japanese, the remaining 74 answered in English. As for qualitative data, participant observation was recorded during the in-class portions of the project and in-depth exit interviews were conducted on the last day of classes.

3.4 Instructional Context

The 83 students who participated in the digital storytelling project were from three separate classes taught by the same teacher. The teacher used a blended learning approach and conducted lessons in a computer lab. Because each class was conducted in the same computer lab, all students had access to the same computer technology and all accompanying software programs.

Although the classes were conducted in a computer lab, students were informed that because they needed to do field work outside of the classroom they should complete the digital storytelling project using their personal smartphones.

3.5 The Digital Storytelling Project

To complete the digital storytelling project, students were asked to work in small, collaborative groups (3-4 students) to produce films that informed viewers about locations in their university town that visitors or tourists might be interested in traveling to.

Adopting a framework for planning and implementing an effective digital storytelling activity proposed by Reinders (2011), the teacher followed an identical procedure to introduce the project to each class. The project was divided into four separate phases: an explanation phase, a research phase, a drafting phase, and a filming phase. At the end of each action phase (research, drafting, and filming) the students were given formative teacher and peer feedback to help develop and focus ideas.

3.5.1 Explanation phase

During this phase of the project the teacher explained the task, outlined the learning objectives, and discussed the resources that students would require to complete the project. The teacher also outlined several requirements to complete the task. First, the teacher stipulated that the video length

had to be between approximately five to seven minutes in duration. Next, all members of the group were required to be present at the location when filming was conducted. To confirm this point, at least one scene of the video had to include a shot of the whole group together. Finally, the students had to record a voiced narration in English explaining the unique features of the location accompanied by matching subtitles. While not a requirement of the project, the teacher also encouraged the students to include other multimedia elements such as soundtrack music, animated text or graphics, and photos.

The students then watched an example video that the teacher had filmed and edited himself so they could better understand what the finished project looked like. The example video was recorded and edited using an app called *Clips* on an iPhone 7. The video was recorded at a well-known park and included photos, film clips, animated text, graphics, a soundtrack, and voice narration with accompanying subtitles. Of the numerous free video recording apps available for smartphones, *Clips* was chosen because of a feature that is unique among free apps of its kind. When voice narration is recorded, editable subtitles are automatically generated and embedded into the video clip.

To conclude the explanation phase, the teacher then gave an in-class demonstration of how the video was made by connecting his iPhone to an overhead projector, launching the *Clips* app, and modeling the process for the students. Finally, a rubric was distributed that broke down how the students would be evaluated on the project.

3.5.2 Research phase

As the teacher had already outlined the steps involved in completing the digital storytelling project, one of the first steps students had to consider was finding an equitable way to divide the tasks required to complete the project. After students had clearly defined their roles in their groups, the research phase began in earnest.

During the research phase, students were asked to establish a set of criteria that tourists might use when they select a travel destination. The criteria included such considerations as ease of travel to the location, cost of travel and admittance, historical or cultural significance, and unique features. Students then applied the criteria they established to select locations throughout their university town. To select locations, students searched online using travel and tourism websites such as Tripadvisor.com and Expedia.com, as well as the local tourist association website. The locations that students selected included such places as a nearby park, a well-known river, a shinto shrine, an eel restaurant, a museum, a suspension bridge, and even a 'michi no eki' (a roadside rest area). Students then had to research the background of the locations to prepare descriptive, 'promotional' scripts of what made that place worthwhile for someone to visit. Finally, students had to plan their method of travel to their selected locations in anticipation of creating the on-site film that highlighted its points of interest.

3.5.3 Drafting phase

During the drafting phase, students used the information they had researched online to prepare scripts that described the locations they would film. To do this effectively, students were encouraged to search for online images to visualize their locations. Some students took the extra step of making a kind of reconnaissance trip to their location to get a better image of what they could film.

　　It was also at this point that students drafted storyboards. To complete the storyboards, 2 of the 23 groups used a traditional paper and pencil method of drawing sketches while the remaining groups used free mobile device apps such as Adobe Illustrator Draw and MediBang Paint. Storyboarding was included to help students better visualize the task of filming before they travelled to their locations.

3.5.4 Filming phase

　　In this final phase of the project students travelled together to their selected locations and filmed their stories. Each member of the group was encouraged to use their own smartphone to film different perspectives of the story they wanted to tell. The clips they filmed could then have additional elements such as graphics, animations, and subtitles added to them. Once the filming was completed, clips from each of the group members were compiled on to one smartphone using bluetooth tethering. This device was then used to edit and publish the final project.

4 Results

　　In order to ascertain the extent to which students were able to complete the project in its entirety by using a single mobile device, classroom observation and a self-assessment survey were conducted.

　　While the majority of each of the project's phases were conducted on a single mobile device, there were certain areas of divergence. For example, during the drafting phase, two groups opted to use paper and pencil to sketch a storyboard. When asked about this decision, one of the groups indicated that it 'felt better' to use pencils, rather than one's finger, to sketch a picture. The other group based their decision to use paper and pencil on the fact that no group member had any experience using a sketching app and that they were unsure which app to download and use.

　　Film editing was another occasion when some groups opted not to use a mobile device. In total, 3 of the 23 groups decided that rather than editing their films on their smartphones, they would download their clips to a personal computer and use separate editing software. One group indicated that it was difficult to share the clips they had filmed with each other because of compatibility issues between iPhone iOS based apps and Android OS based apps. The remaining two groups each had members with extensive experience using iMovie, an Apple video editing program. These groups felt they could do a better job by using software they were familiar with.

　　Regarding the second research question, to better understand the students' perceptions about the language learning value of digital storytelling, a survey using a five item Likert scale was used. The results of this survey are shown in Table 1 below.

Table 1. *Student perception of the educational value of digital storytelling using mobile devices* (n=79)

Items	Strongly Agree				Strongly Disagree	Mean (SD)
	5	4	3	2	1	
I found this project enjoyable	53	24	2	0	0	4.65 (0.532)
This project was useful for studying English	48	30	1	0	0	4.59 (0.519)

I could learn English by participating in this project	51	25	3	0	0	4.61 (0.564)
I could learn English by watching my classmates' videos.	35	38	6	0	0	4.37 (0.624)
I found this project educational (not only language learning)	52	26	1	0	0	4.65 (0.507)
This project was a valuable language learning experience.	59	19	1	0	0	4.73 (0.472)

While students' perceptions regarding the educational value of this type of project were overwhelmingly positive, it is interesting to note that their enthusiasm was slightly diminished when considering the language learning value of watching their classmates' videos.

Students were also interviewed about their experiences during the digital storytelling project and asked to share an opinion about the project overall. Below are some of the most relevant responses:

Student A: It was enjoyable not because we didn't have any writing test but because I could learn many things from this project which are much more important than the tests we normally take. (Relationship, communication, editing skill etc...) Everything was valuable. This project can improve a variety of skills that we need when we get older. It was a great experience.

Student B: This is a good way to get along with other students and to improve our English skill. I think it should be continued.

Student C: I think this project was very interesting because I have never done something like this. When I was a high school student, English classes were very boring for me. So this project could change my opinion about studying English.

Student D: I think group work is good because when we enter society, we must create things in group.

Student E: I think this project is very good, but I think there are disadvantages for students who are not good at PC or IT.

In order to identify any technological problems or shortcomings, students were asked an open-ended question to describe the most challenging technological aspects of completing the digital storytelling project using a mobile device. While answers varied widely with some students identifying multiple problems, by closely examining their responses, common topics emerged. First, about three-quarters (73%) of the students remarked that adding subtitles to their videos was complicated and troublesome. Indeed, while the *Clips* app that the teacher demonstrated has the ability to automatically embed subtitles into a video clip, when students' voices were unclear because of windy conditions, pronunciation problems, or Japanese words, such as place names were spoken, the embedded subtitles were often unintelligible. Moreover, there are currently very few video recording

apps for mobile devices that make allowances for subtitles. This means that separate software must be used. As well, approximately 30% of students commented that because they had little to no experience with making longer videos using a smartphone, they had trouble making the final edits of the clips they had created. A final topic that emerged had to do with using a single mobile device to record audio. In some cases, wind or background noises interfered with clear audio recordings. The smartphones' limited microphone range meant that the devices needed to be held relatively close to the speaker to record the voiced narration adequately. This proved troublesome for groups that had more than one member speaking at the same time.

5 Discussion and limitations

This study revealed that the vast majority of participants expressed overwhelming enthusiasm and positivity for having had the opportunity to engage in a mobile assisted project-based language learning activity. Several of the participants remarked that the project was not only a valuable language learning opportunity, but that they could also learn important skills that were transferable to other academic subjects. Aside from English language skills, participants identified several other '21st Century Skills' that they felt improved throughout the course of the project, which included: critical thinking and problem solving skills; collaboration, communication, and social skills; and digital literacy skills.

Another important finding of this study revealed that the majority of participants were able to complete each phase of this collaborative, digital storytelling activity using nothing more than free software applications and their smartphones. Importantly, they also largely succeeded at producing entertaining and engaging digital videos that satisfied the language task requirements. While there were some instances of divergence from this norm, such as sketching storyboards with paper and pencil or editing the videos using a desktop PC, these divergences were largely due to personal preference rather than technological limitations.

Unsurprisingly, there were some technological limitations. Although it was possible to complete the majority of the projects using a single device, there were instances when this limited the production value of the videos. This was especially true for the quality of the recorded voice narrations. In most cases, because the participants were filming in outdoor locations, it was not possible to control the sound environment with respect to wind or background noises. The degraded sound quality had two effects. First, because the students' voices were sometimes unclear, the subtitles that were automatically produced by the *Clips* app did not always match what was said. Even with the ability to edit the subtitles within the app, it was not always possible to completely correct them. The second outcome relating to poor sound quality had a detrimental effect on one of the desired language learning outcomes. As noted in the results section, participants felt that watching their cohorts' videos had less educational value related to learning English. Clearly, if the viewers could not distinctly hear what was being said, and the subtitles were inadequate, it would be very difficult for them to learn English. Providing the participants with unobtrusive lapel microphones they could connect to their smartphones would have been one method to possibly improve the sound quality in the videos.

Because the primary purpose of the vast majority of video recording apps developed for mobile

devices is entertainment, adapting them to educational contexts is not without challenges. That being said, as more and more Web 2.0 technologies are being developed into mobile device applications, the ability to create valuable language learning opportunities through collaborative project-based learning approaches on a single device are ever expanding.

6 References

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