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Colloquium

Using augmented-reality-based mobile learning material in EFL English composition: An exploratory case study

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Introduction

Using a second language for written communication is difficult. Production of written language requires both linguistic knowledge and content knowledge. English as a Foreign Language (EFL) learners with limited linguistic and background knowledge tend to have difficulty in the production of meaning (Saville-Troike, 2006). In Taiwan, since English is a foreign language, many learners spend a significant amount of time learning English composition, and some lose interest or confidence in the learning process. This is because when these learners practice their writing skills, they often face a number of problems (eg, insufficient vocabulary, lack of experience regarding the composition subject, difficulty describing their ideas) (Shih, 2006). Addressing this issue, mounting research has contributed to computer-assisted language learning to enhance EFL learners' content and linguistic knowledge needed for writing tasks using multimedia documents (eg, photos and videos).

Recently, with the rapid growth of information technology, mobile learning (defined as achieving numerous learning processes through mobile devices [Holzinger, Nischelwitzer & Meisenberger, 2005]) has become popular. Since mobile devices are small, smart, portable and comfortable to use, EFL learners can access almost anything (eg, sound, voice, images, videos, papers and books) anytime and anywhere (Prensky, 2004). In the meantime, mobile learning offers EFL learners several advantages, such as facilitating complexly structured learning content, improving independent learning and increasing flexibility in learning activity (Chen, Kao & Sheu, 2003). When a learning activity is supported by mobile learning, learners have many opportunities to actively construct their knowledge instead of passively receiving information from a teacher or guide. In other words, mobile learning not only provides EFL learners easy-to-access multimedia information, but also engages them in a spontaneous learning environment in which learners can decide where, what and when to learn.

While many researchers have investigated the practice of English composition through mobile learning (Rüdel, 2006), use of the augmented reality (AR) technique has rarely been examined. AR-based mobile learning material helps engage learners in numerous learning activities. For example, Dunleavy, Dede and Mitchell (2009) designed an AR-based simulation (called Alien Contact!) on handheld computers to teach math, language arts and scientific literacy skills to middle and high school students in the USA. The results showed that Alien Contact! enhanced collaboration among students, raising their understanding and increasing their learning motivation.

Therefore, this study was intended to develop AR-based mobile learning material. Specifically, this learning material installed in mobile phones enables users to access information about scenic spots nearby so that they can learn about buildings/places/views of interest in English. This

AR-based mobile learning material could be useful for EFL learners in writing descriptive essays since they are provided with detailed information as well as writing samples. This study attempted to further the understanding of whether AR-based mobile learning material assists EFL college students in the process of writing English compositions. This study could be a helpful reference for English writing administrators and teachers who want to design mobile-phone-assisted English language curricula or courses whose goal is to encourage students to perform language learning in a variety of settings.

Methodology

Learning material

For the anticipated learning material, this study applied global positioning and AR techniques. The global positioning technique determined the current learner location, and the AR technique enhanced the information representation. The integration of the two techniques offered learners a mobile learning environment. In this learning environment, the AR technique combined the real scene viewed by the learner and a virtual scene generated by mobile devices to form semi-realistic information services. Through these services, learners can discover important information that they would otherwise not receive, and these learners are thus provided with schemata needed for composition (Dunleavy *et al*, 2009).

Figure 1 contains an example of an EFL learner executing the AR-based mobile learning material on campus. If this learner uses the mobile phone to point in a specific direction, the learner's location is rapidly identified, and the embedded camera automatically captures the peripheral images. In the meantime, the AR-based mobile learning material generates related information (eg, names and descriptions of the buildings). The captured images and generated information are shown in the screen of the mobile phone. If the learner wants to know more about a certain building or scenic spot, the learner can click a piece of specific information on the screen, and the details will be displayed. Clearly, the developed AR-based mobile learning material enhances information expression, provides visual descriptions and increases information accessibility.

Research design

Research participants included five (one male and four female) 20-year-old undergraduate students majoring in English who were registered in a college English composition course in 2011. These participants had no experience with mobile learning.

This study adopted a mixed method (quantitative and qualitative) to collect and analyze data. Data collection included student essays and reflections on an open-ended questionnaire regarding their experience of mobile learning. The quantitative assessment focused on analyzing the words

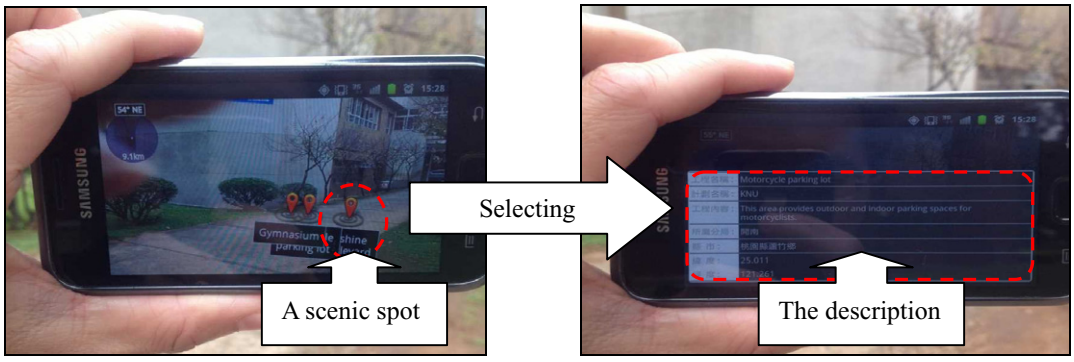

Figure 1: Using the augmented-reality-based mobile learning material

and sentences used in the participants' essays. The participants' written reflection was qualitatively analyzed.

The procedure of data collection consisted of three steps. First, in a designed writing activity, the student participants were asked to introduce their campus. In the activity, the participants performed a short trip on campus using the AR-based mobile learning material. The distance and path of the trip, the mobile phone used and the accessed AR-based mobile learning material were the same for all participants. After the trip, the participants were asked to describe the observed scenery in their essays. Finally, upon completion of the writing activity, the participants were presented an open-ended questionnaire asking them to reflect on their experience of mobile learning. The reflecting questions included: (1) How do you benefit from the AR-based learning material when writing the essay, and (2) what is your experience using the AR-based learning material?

Results

Regarding the research question, the findings indicated that the AR-based mobile learning material provides linguistic and content knowledge in English composition for the participants.

To begin with, the AR-based mobile learning material assisted the participants with English vocabulary and expressions needed for descriptive writing. The participants read the descriptions (eg, vocabulary and sentences) that were provided in the AR-based mobile learning material and made use of the information in English writing. Table 1 illustrates that the participants cited several specific words and expressions in their essays. These English vocabulary words and expressions, considered linguistic knowledge provided by the AR-based mobile learning material, expanded the participants' vocabulary repertoire.

In addition to linguistic knowledge, the AR-based mobile learning material supported the participants in gaining content knowledge related to the composition subjects. The participants were able to refer to information provided in the mobile phones in their essays. Some even elaborated on the information based on their own experiences. For example, Participant 2 clearly described a scenic spot on the campus and commented that the university was a comfortable learning environment. Therefore, the AR-based mobile learning material not only provided linguistic and content knowledge for the participants, but also helped them construct knowledge and produce meaningful essays.

Furthermore, based on the questionnaire designed to collect participant reflections, this study classified the obtained feedback into two categories involving:

Table 1: Results regarding the participants' essays (n = 5)

	Participants				
The introduced scenic spots	*1 (Female)*	*2 (Female)*	*3 (Female)*	*4 (Female)*	*5 (Male)*
1. Sunshine Boulevard	O	—	O	—	O
2. Tree-planting square	O	O	—	—	—
3. Temple of Village God	O	O	O	—	—
4. Motorcycle parking lot	O	O	O	—	—
5. Reservoir No. 12	—	O	—	—	—
6. Kainan University Library	O	O	—	—	O
7. Zhi Cheng Hall	O	—	—	—	—
The amount of cited words	6	5	3	—	2
Additional scenic spots	—	—	—	—	3

1. Assistance for English composition. The participants thought that using the AR-based mobile learning material to comprehend the visited scenic spots on the campus was useful in describing the observed scenery. Therefore, when the participants wrote their essays, they were able to use the obtained vocabulary and information. Also, some participants thought this learning material provided something new and fun for them.
2. Suggestions for the AR-based mobile learning material. Although most of the participants pointed out that this learning material offered some advantages (eg, easy operation, interesting interaction and useful assistance), they felt the displayed learning information regarding the scenic spots should be increased. Also, Participant 4 stated that the mobile device was not used at all during the activity, since this participant was not familiar with information technology. This example highlighted that sufficient familiarity with the AR-based mobile learning material was necessary.

Conclusion

This study described an exploratory case study regarding the use of AR-based mobile learning material in EFL English composition. This learning material provided EFL learners with enhanced information expressions, visual information descriptions and increased information accessibility. After a designed learning activity, the results showed that the participants were engaged in the learning scenario, constructed linguistic and content knowledge, and produced meaningful essays. For future research, numerous experiments are necessary to validate the obtained results and further explain the major issues discussed in the results. In sum, using AR-based mobile learning material associated with a number of learning scenarios may increase the effectiveness of language learning.

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