A STUDY OF LEARNING EFFITIVENESS OF MOBILE TRAVEL APP IN
TOURISM GEOGRAPHIC COURSE

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ABSTRACT

Mobile technologies are adopted into education more and more popular especially after launching new hard-ward, such as smart phones, tablets, and the fourth generation, such as long tern evolution (LTE), wireless technology. There are also many applications created for education and tourism fields. Therefore, this research will choose a travel application (app) of Taiwan applying into Taiwan tourism geographic course at Taiwan Hospitality and Tourism College to exam the learning effectiveness. The quasi-experiment study will be suitable for this study. Two classes/groups will participate the study. One class will be the treatment group which will use travel App into teaching scenario. The other group will be control group. Both of them will give pre-test of knowledge of Taiwan tourism geographic and post-test after one semester teaching activates. Thus, the result of ANOVA showed that there was no statistically significant learning effectiveness between treatment and contrast groups. However, the paired-sample t-test analysis showed that after eight weeks teaching scenarios learning the knowledge of DFP were statistically significant increased both in treatment group and contrast groups.

KEYWORDS: Action research; M-learning; Smartphone; Travel app

INTRODUCE

There are four waves in the evolution of educational technologies (Crescente & Lee, 2011). In the 1970s, the computer was launched, and many people had to share one single machine. This was the first wave. The second wave began with the developing technologies of personal computer and desktop publishing in the 1980s. Internet and telecommunications technologies were developed in the 1990s, comprising the third wave of educational evolution. Pownell and Bailey (2000) stated that mobile learning (m-learning) would be the fourth wave for educational technologies. Shih and Mill (2007) also stated that mobile technologies could be a new evolution for learning and teaching.

Educators are adopting mobile technologies such as smart phones, tablets, wireless technology, and long-term evolution (LTE) technology. Brink (2011) illustrated
that mobile technology can provide lots of benefits for learning such as supplying current information for learners, enhancing training courses and strategies, motivating people who may not be as eager to participate in coursework, increasing learning likelihood anytime-anywhere, and saving time for increasing productivity.

It is essential that tourism educators understand the trend of wireless technological features so that they can utilize the features in instructional design. Moreover, the tourist market has rapidly developed and divided into numerous sub-markets that include personal or business travel. World-wide tourism is both an enjoyable and pleasurable activity for most people and of enormous significance to the global economy. According to the United Nations World Tourism Organization (UNWTO, 2013), international tourists’ visits reached 1.035 billion in 2012, and the rate is expected to increase by around three to four percent in 2013. The tourist market demands more experienced and skilled people to provide quality services. Therefore, students of the tourism department are expected to maximize information technological capacities so that they can deal with mass information and provide the best suggestions and services for tourists.

A goal of the tourism field’s programs in higher education is to assure that students graduate with the kinds of skills, knowledge, and wisdom needed to succeed. Thus, one area of research is the investigation of m-learning outcomes after using a mobile travel application (app) with a location-based services (LBS) feature in a mandatory course. This is done in the Taiwan Tourism Geographic class provided at the Taiwan Hospitality and Tourism College (THTC).

At the Taiwan Hospitality and Tourism College (THTC), tourism geography is an important mandatory core course for the Department of Tourism and Travel Management (DTTM). Also, information technology skills are a major issue for the students in the DTTM. Currently, there are many travel applications created for the tourism fields in Taiwan including “Tour Taiwan,” “Taiwan Go,” “Show Taiwan,” and “Danogdafa Forest Park.” Therefore, research on the effect of adopting new technologies into course scenarios will be an interesting and significant matter for instructors, the department, and the college. Thus, this proposal is attempting to utilize a travel app for Taiwan in the Taiwan Tourism Geographic course at the THTC to examine the learning effectiveness and students’ attitudes towards using the smart phone app. This dissertation will use a quasi-experimental design employing two classes of tourism geography students at the THTC.

LITERATURE REVIEW
According to Brink (2011), m-learning has benefits and limitations. The benefits of m-learning include providing easy methods to obtain current and updated information, accelerating the reinforcement of training courses, accessing a population, enhancing outcome of learning, and providing increased productivity and revenue. However, mobile devices in learning also have limitations: tiny screen size, low computational power, small battery capacity, limited input interface, and narrow network bandwidth (Kukuls-Hulme, 2009). Currently many scholars and educators are contributing to the development of learning theories and instructional designs that use m-learning. This literature review explores some of the advantages and disadvantages of m-learning, and analyzes instructional design models and strategies that are being developed.

According to Piskurich (2000), the goal of instructional design is to assist instructors in teaching their content and to assist trainees in learning what they need to know. Instructional design not only can make decisions more systematic and accurate but also more effective in cost, time, learning, and evaluation. In 2006, Winters indicated that there were generally four broad perspectives of m-learning:

A. Techno centric: M-learning devices will include PDAs, mobile phones, iPods, PlayStation Portables etc.
B. Relationship to e-learning: M-learning is an extension of e-learning. These definitions are often all-inclusive and do not help in characterizing the unique nature of m-learning.
C. Augmenting formal education: M-learning includes all forms of formal learning not only learning in the physical classroom.
D. Learner-centered: The concept of m-learning is strongly linked to the mobility of learners so that a theory concerning m-learning is also an Activity Theory. This relationship results in m-learning being considered from the learner’s perspective, and perpetuates the definition of m-learning as: “Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies” (Sharples, Ed., 2006).

According to a report of the New Media Consortium in 2008, two-thirds faculty believed that ‘technological innovation will have a major influence on teaching methodologies over the next five years’ (New Media Consortium, 2008). Zur and Zur (2011) indicated that developing new methods of engaging students with technology and increasing technological literacy among faculty is of utmost importance because of increasingly “digitally native” students. In the study result of Mayberry, Hargis, Boles, Dugas, O’Neill, Rivera, & Meler, (2012), students found that the use of iTouch devices was a helpful supplement to standard for teaching methods.
They concluded four powerful student testimonials for using the iTouch:

A. ‘I have never had a professor post problem solutions on YouTube, and I hope more pick up the practice. It is extremely valuable.’

B. ‘My questions were answered and confusion on some problems were resolved due to the YouTube videos. I could see future classes also benefiting from the videos as well.’

C. ‘How many professors do you know who take polls with their iTouchs in class and send their students crazy YouTube videos to help explain international relations?’

D. ‘Filming video help me learn the material well enough so I could then explain it to others.’

A research of Huang, Jang, Machtmes, and Deggs, (2012) also showed that students accepted that the concept of mobility in learning was applicable to the learning process and had improved students’ achievement. They were willing to increase their learning exposure using mobile device and it has become a significant matter to develop methodologies and tools to help the students on m-learning environment.

There are plenty of papers focusing on adopting mobile technologies in education for m-learning development, the attitudes of students and faculty concerning m-learning, the features of m-learning and m-learning design and procession. For instance, Shih & Mill (2007) and Koole (2009) built instructional design models of m-learning; Cao, Tin, McGreal, Ally, & Coffey (2006) provided convenient m-learning methods and paths for a mobile library system for students; Crescents & Lee (2011) set a contextual-awareness strategy to develop a useful user interface for learners. In addition, there are articles illustrating m-learning outcome and learners’ attitudes toward using the smartphone app on m-learning. More limited but still available are studies on m-learning using a smartphone with a travel app in higher education tourism studies. Park, Nam, & Cha (2012) and Marwan, Madar, & Fuad(2013) indicate that students have positive attitudes towards using smartphones in learning activities. This view is contended when Molina, Redondo, Lacave, & Ortega, (2013) indicate that learners prefer to use desktops or tablets for learning rather than using smartphones because of the limitation of visualization.

Thus, the outcome of this pilot study in higher education of tourism will provide needed information on the efficacy of using mobile apps for training students for positions in the travel industry. This study will be an important resource for developing m-learning strategies, travel apps, and mobile service training for the DTTM of THTC,
and therefore, will also be a contribution for m-learning outcome in future tourism studies.

RESEARCH FRAMEWORK

The research is based on action research and creates a framework for this study using a quasi-experimental design theory. Among the different types of experimental design, there are two categories including true experimental design and quasi-experimental design. Gribbons and Herman (1997) illustrated that true experiment design has some criteria such as assigning sample groups and testing subjects randomly. In this study, only two classes will be involved in the research; one class is a treatment group, and the other is contract group. Hence, the quasi-experimental design is chosen to design the study, which is to compare the learning outcome between two classes.

The quasi-experimental design also has several categories such as nonequivalent group-posttest only, nonequivalent group-pretest-posttest, and time series design (Gribbons and Herman, 1997). Because the research intends to compare the m-learning with face-to-face learning outcome, the nonequivalent group-pretest-posttest design model can fulfill the study requirement. Thus, the action research design is adopted to form the study framework. The framework of research of this investigation is shown below as figure 1-1.

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![Diagram](image)

**Figure 1. The Research Framework**
RESEARCH QUESTION AND HYPOTHESES

The research question of this research was focused on the strategies of the m-learning outcomes for operating smartphones with the travel app in the TTG course. Using quasi-experimental research design theory, two freshman classes were selected at the Taiwan Hospitality and Tourism (THTC) of the Department of Tourism and Travel Management (DTTM) were the participants. To determine m-learning differences between the contrast and treatment groups, the achievement scores of the treatment and contrast groups were compared. Therefore, it was determined if there was a significant difference in m-learning outcomes between the treatment and contract group after providing the treatment of smartphones with the travel app activities.

A related aspect were examine if there was a significant increase in learning outcomes after eight weeks teaching scenarios for both the treatment group and the contract group. Since the researcher was the instructor of the TTG course, it was anticipated that students master the curriculum and expected that students learnt what they needed from this mandatory course. The instructor created 50 multiple choice questions for pretest and posttest so that the learning outcomes of two groups were examined by the paired-samples t-test.

There were three research hypotheses in this action research were listed below.

H1: There will be a statistically significant difference in learning outcomes in learning objectives between the treatment and contract group after eight weeks of teaching activities

H2: There will be a statistically significant learning increase in the mastery of learning objectives between the pretest and posttest of the treatment group after eight weeks of m-learning teaching activities.

H3: There will be a statistically significant learning increase in learning objects between the pretest and posttest of the contract group after eight weeks of participating in learning activities within the Taiwan Tourism Geographic course.

METHODOLOGY

The purpose of this study was to investigate whether or not there was a significant learning outcome between students who used a mobile travel application in a geography course when compared to students who did not use the mobile technology application. This study took place in the Department of Tourism and Travel Management (DTTM) at the Taiwan Hospitality and Tourism College (THTC).
Research Design

The research design was utilizing the action research technique. According to Lewin (1946), the action research is “a comparative research on the conditions and effects of various forms of social action and research leading to social action.” Reason and Bradbury (2001) defined the action research as an involved process with developing practical understanding of people’s intends and purposes. “A knowledge is gained through action and for action,” so how to create a certainly action science is to seek the answers about the validity of social knowledge. The performing action research is likely doing an empirical research (Torbert, 2004).

Based on the point of views for action research, the methodology for this study was adopting the quasi-experiment design dividing the population in two groups, one treatment and one contrast group. The treatment group utilized the m-learning scenarios, smartphone with Danongdafu Forest Park (DFP) travel app, while the contrast group was applied a handout material in the class activities. Before treatment, the pretest was given for two groups to knowing if there is difference between two groups. After eight weeks treatment, the learning outcomes which were posttests of two groups were held and compared to examine the research questions. The questionnaires of investigating students’ attitudes and interviews of five students randomly chosen from each group did also be operated to know more about the ideas, thinking, and thoughts about the m-learning and handout learning.

The methodology for this study question was that “do students who use the mobile application have a different achievement level in class when compared to students who do not use the mobile application?”

The question adopted a quasi-experimental design and used quantitative method to investigate the outcome. Two classes of freshman students at DTTM were randomly assigned to either the mobile technology or contrast group. Quasi-experimental designs had several categories such as nonequivalent group-posttest only, nonequivalent group-pretest-posttest, and time series design (Gribbons & Herman, 1997). For the proposed study, a nonequivalent group-pretest-posttest design the study was utilized (Gribbons et al., 1997). The pretest-posttest quasi-experimental design can eliminate the major limitations associated with a posttest only design of nonequivalent group. The pre-test served as a control for differences between the two groups.

This quasi-experimental design presented a static group comparison, a design in which a group that had experience in m-learning was compared with a group that did not.
After completion of the m-learning unit by the treatment group, both groups completed the post-test.

Course Design

The Taiwan Tourism Geographic (TTG) course at THTC was designed in three credit hours, which means three hours classes per week and totally eighteen weeks for one semester. The course design of this research was one hour scenarios for eight weeks plan to teach the learning objects of Danongdafu Forest Park (DFP). The schedule of DFP course design is listed as table 3-1. The DFP schedule was designed as the part of TTG course syllabus for first eight weeks.

Table 1. The schedule of the DFP course design

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Treatment Group</th>
<th>Contrast Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week1</td>
<td>Pretest/ Introduce the object and the travel app of park</td>
<td>Pretest/ Introduce the objects with a handout</td>
</tr>
<tr>
<td>Week2</td>
<td>The project and blueprint of the park through the app</td>
<td>The project and blueprint of the park through a handout</td>
</tr>
<tr>
<td>Week3</td>
<td>The history of the land and local culture through the app</td>
<td>The history of the land and local culture through a handout</td>
</tr>
<tr>
<td>Week4</td>
<td>Attractions of the park through the app</td>
<td>Attractions of the park through a handout</td>
</tr>
<tr>
<td>Week5</td>
<td>Ecosystem of the park through the app</td>
<td>Ecosystem of the park through a handout</td>
</tr>
<tr>
<td>Week6</td>
<td>DFP field Trip with M-learning by using the travel app</td>
<td>DFP field trip with tour guides</td>
</tr>
<tr>
<td>Week7</td>
<td>Travel resources nearby through the app</td>
<td>Travel resources nearby through a handout</td>
</tr>
<tr>
<td>Week8</td>
<td>Posttest</td>
<td>Posttest</td>
</tr>
</tbody>
</table>

The course design was divided to treatment group and contrast group. Both groups were arranged pretest and posttest, and teaching the same learning objects each
week so that the research examined the m-learning outcome. The difference was that the treatment group introduced the DFP travel app and asked students using the app in class activities to learn the objects, did assignments, and interacted with classmate within small group. In the other hand, the contrast group was taught as the same progress rate but using handout and assignment sheets instead of using m-learning.

Population

The sample for the study was two freshman classes at the DTTM at the THTC. There were about 96 students at the freshman level that made-up the two predetermined groups. Group A, contrast group, was 54 students using handout for learning, and group B, treatment group, was 42 students utilizing smartphone with travel app to study.

Instrumentation Design

The instrumentation was designed according to the research design and learning objects. The amount of 50 multiple choice questions were created to do the pretests and posttests for both groups. The content of questions was related to the history, features, attractions, and tourism activities of Danongdafu Forest Park, which connect to the content of teaching material and course scenarios. There were two different examination sheets organized from 50 questions for pretests and posttests of two groups.

Research Limitations

Several research limitations might affect this study, such as a lack of smartphones, unfamiliarity with the mobile travel app, and the social network between the treatment and contract group. This section clarifies those research limitations.

A. The students’ attitudes towards using new technologies in class activities were a potential research limitation. If most learners had positive attitudes, they would participate in more learning scenarios so that the learning outcomes would be higher than if they have negative attitudes.

B. The learners’ capacities to deal with mobile devices and the smartphone travel app were the second research limitation. When students had difficulty dealing with devices or apps, they had to spend more time learning those features and functions. These factors would force students to spend time learning the functions of devices and apps while perhaps decreasing the amount of time spent in learning the course material.
C. The functions and features of the mobile travel app were a third factor that might affect the research. The smartphone travel app of the Danongdafu Forest Park was created for tourists that have knowledge of the use of smartphones, not for students. Thus, the materials from the app were created for tourists to understand and gain knowledge concerning the attractions of the park rather than for learning how to use smartphones. The app did not include all the materials necessary to teach new users how the app works, which might affect the learning outcomes.

D. The social interaction between the treatment group and the contract group was a fourth factor that might affect the study. Since the members of two groups were all freshman students in the DTTM of THTC, the students’ college activities such as in the extracurricular activities, coursework communications, and in-group interactions within this or other courses all might impact this action research. For instance, the contract group’s students might hear about the travel app of Danongdafu Forest Park from the treatment group students, downloaded the app fulfilling their curiosity, and shared the app with other classmates. This situation might influence the research.

E. The capacities of wireless broadband from carriers’ services were challenges to external validity. The travel app with LBS features would need a wide broadband to download the video and audio materials and locate the users’ position. If the download process took a long time due to carriers’ services, it would impact the learning procession and affect m-learning outcomes.

F. The characteristics and functions of mobile devices that were owned by treatment group students was a second threat to external validity. The mobile devices, mostly smartphones, were provided by the students. The functions, data processing speed, and screen size were all variable. This factor might impact each individual learner’s m-learning ability to access the app, thus becoming a threat to external validity.

G. Among the students who own smartphones or tablets there was a third external factor that might impact research results. Although smartphones were more and more common for college students, some students still could not afford the monthly bills and high price of mobile devices. This situation might be another factor impacting external validity.

DATA ANALYSIS AND RESULT
According to the research design and research questions, the collected data are presented as pretest examination, comparison of M-learning effectiveness between contrast group and treatment group, and comparisons of each group in pretest and posttest analysis.

Pretest Examination

Since the pretests of Dongnadafu Forest Park (DFP) examination sheets were held, the students’ understanding of the park before teaching scenarios could be inspected. In order to determine whether differences existed between two groups before treatment, one way analysis of variance (ANOVA) was used to examine the pretest scores. The analysis result showed that there was no statistical significance (F (1) = .556, P < .458) between the contrast group (M=47.19, S.D. =11.29) and the treatment group (M=48.86, S.D. =10.37) within two groups.

Comparison of M-Learning Outcomes

To test the first research question H1, the means of the posttest scores of the contrast group (n=54) was compared to the treatment group (n=42) to determine whether the treatment group had a better learning outcome by using m-learning. The scores were analyzed by SPSS using one way ANOVA. The null hypothesis was listed below.

H0: there is no statistically significant difference in learning outcomes in learning objectives between the treatment and contract groups after eight weeks of teaching activities.

The ANOVA was used to determine whether the treatment group had better learning outcomes than the contrast group. The analysis showed that there was no statistically significant difference between the groups (F (1) = .032, P > .05) (see Table 2). The mean of contrast group was 61.74 (S.D. 12.548); the treatment group’s mean was 62.17 (S.D. 11.719). The H0 was accepted. Thus, the result of ANOVA showed that the learning outcome of the treatment group was not statistically significantly different from those of contrast group.

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4.778</td>
<td>1</td>
<td>4.778</td>
<td>.032</td>
</tr>
<tr>
<td>Within Groups</td>
<td>13974.847</td>
<td>94</td>
<td>148.669</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13979.625</td>
<td>95</td>
<td></td>
<td></td>
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</table>

Comparison of Each Group
To test Hypotheses H2 and H3, a paired-sample t-test was conducted to identify if there was a difference in pretest and posttest grades both on the contrast and treatment groups. The analysis results are illustrated below.

**Paired-sample t-test of Treatment Group**

H₀₂: There is no statistically significant learning increase in the mastery of learning objectives between the pretest and posttest of the treatment group after eight weeks of m-learning teaching activities.

<table>
<thead>
<tr>
<th>Table 3. Paired Samples t-test of Treatment Group</th>
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<tbody>
<tr>
<td>Paired Differences</td>
</tr>
<tr>
<td>Mean</td>
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<tr>
<td>Pair 1</td>
</tr>
</tbody>
</table>

A one-tailed paired samples t-test revealed that contrast group students had statistically significant learning outcomes between pretest (m=48.86, s=10.37) and posttest (m=62.19, s=11.719), t (41) = -7.287, p< .05 (see Table 3.). The t-test result showed that there was a statistically significant difference in one-tailed. Thus, the null hypothesis, H₀₂, was not accepted, and it could be inferred that after eight weeks’ teaching activities, the treatment group students had statistically significant increases in m-learning outcomes by using smartphones with the travel app, in the TTG course.

**Paired-sample t-test contrast group**

H₀₃: There is no statistically significant learning increase in learning objects between the pretest and posttest of the contract group after eight weeks of participating in learning activities within the Taiwan Tourism Geographic course.

<table>
<thead>
<tr>
<th>Table 4. Paired Samples t-test of Contrast Group</th>
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<tbody>
<tr>
<td>Paired Differences</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Pair 1</td>
</tr>
</tbody>
</table>

A one-tailed paired samples t-test revealed that contrast group students had statistically significant learning outcomes between pretest (m=47.19, s=11.297) and posttest (m=61.74, s= 12.548), t (53)= -10.649, p< .05 (see Table 4.). Thus, the null
hypothesis, H₃, was not accepted, and it also could be conjectured that after eight weeks’ teaching scenarios, the contrast group students had a statistically significant improvements in learning outcomes by using handouts in the TTG course.

SUMMARY

The primary purpose of this study was to investigate whether the m-learning with travel app provided better learning effectiveness than using handouts over eight weeks of teaching activities in the Taiwan Tourism Geographic course at THTC. Prior to the study, course’s design, and its learning objects had been organized. The freshmen students were divided into two groups: one was the treatment group and the other was the contrast group, and had a knowledge pretest of Danongdafu forest park. After eight weeks teaching scenarios and data collection, the ANOVA and t-test were used to inspect the learning outcomes. The result showed there was no statistically significant difference between using m-learning, smartphone with the travel app, and handout learning. However, the data analysis outcomes showed that after eight weeks’ teaching activities, both groups of students had statistically significant learning effectiveness no matter whether using handouts or smartphones with the app, in class activities.

The study focused on quantitative research so that the result showed just the statistical summary. However, what the students’ attitudes and thinking is about using mobile devices in the class will be another field and issue to study. Therefore, the teachers or instructors could know more about the teaching methods or scenarios that can help students in learning effectiveness.

REFERENCES


