A Case Study of Online Project-based Mobile Learning- Beer King

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Abstract: The purpose of this study is to discover the elementary school students’ online project-based mobile learning results of “Beer King”. Nine sixth-grade pupils of an elementary school in Pingtung City were targeted, and they participated a whole semester’s online project-based mobile learning as teamwork. The content analysis adopted in this study revealed their learning performance, and the conclusions are as the following: 1. The highest percentage of the students’ chosen topics was online project discoveries and constructions followed by project marketing and investigation, and topic-based visits and feedback. 2. The websites designed and finished by the students contain the introduction of beer, key features, beer manufacturer visit, marketing, learning and sharing. 3. The construction of topic-based websites not only improves people’s IT knowledge but also generates more browsers to the website which enhances the effectiveness and advantages of online mobile learning.

Key-Words: Online Project-based Mobile Learning, Primary School

1 Introduction

The improvement of information technology and popularity of the internet have gradually changed the teaching environment from the traditional face to face method to digital learning. Thus, learners aren’t restricted to classroom learning anymore. Nevertheless, the fast development of wireless communications, cell phones with ADSL connections, Notebooks, PDAs, PMPs and other mobile electronic goods led to the concept of mobile learning make learners read materials via various mobile facilities anytime and anywhere. Therefore, it becomes necessary to implement the Internet effectively to the primary education. The compatible mutual relationship between the concepts of project-based learning (PBL) and the reformation of curriculum in recent years has gradually been attracting more attention. Daily life related topics are emphasized and lead learners to real situations. The design of driving questions, implementations of technologies as the recognition tools and scientific methods discover resolutions to help students reveal problems, to conclude key concepts and to build up knowledge. Meanwhile, students can also be guided to match the academic knowledge to their hand-on experience in terms of efficient learning[1][2][3]. Consequently, the online project-based mobile learning enables the cutting edge self-learning method possible regarding to various learning styles. Furthermore, students’ self-identifications contribute towards their understandings in profound knowledge. Online project-based mobile learning and school education can also establish effective, mutual and exclusive relationship for e-learning.

Further researches are needed on online project-based mobile learning for elementary school students.

The sixth grade students of an elementary school in Pingtung Taiwan were targeted as teamwork. This online project-based mobile learning was studied for a semester to discover students’ learning results.

2 Literature Review

Project-based learning is a form of expeditionary learning which focuses on guiding students through structural investigating activities to solve important conceptual problems. Students then have the courage to take up the challenge and make decisions in terms of the recognition aspect. Thus, knowledge becomes automatically obtained.
in active structural daily life situations. Figure 1 indicates that project-based learning can result in repetitive interactive behaviours between learners and outcomes via the effects of curriculum design, delivery, assessment and learning environments.

![Fig. 1: The outcome model of project-based learning [4]](image1)

Students are the aim in project-based learning which helps them learn in daily lives and solve real problems. Teachers play the role as curriculum designers and learners’ assistants. They are the judges during the learning process and also for participating learners [5]. Subsequently, project-based learning can be seen as a combination of curriculum, teaching and evaluation. The ultimate purpose tends to help learners eliminate post learning ossifications and enable students to become good at solving problems.

Online project-based mobile learning method developed from the project-based learning model which can be treated as the procedure of problem solution discoveries. Such project-based learning procedure can be divided into six steps, like messing about, asking and refining question, finding information, planning and designing, conducting the experimental work, making sense of data and sharing artefacts[6]. These steps are repeated like a loop until the problems are sorted. Such method matches the concept of browsing hyperlinks.

Followed by the popularity of Internet technologies, many scholars [7] [8] [9], treat technologies as a recognition tool. They suggest information technologies to play extremely crucial roles in project-based learning. Accordingly, Web-enhanced Project-based Learning has become the trend in online education.

In conclusion, online project-based mobile learning not only takes care of teaching procedures and the actual teaching, but it is also a diverse evaluation method. The contents of the evaluation cover a higher level of recognition, skills and attitudes. Both students and teachers can carry out evaluations. Students’ self-assessment can be seen as a continuous process of learning from correcting.

Case studies are the research method for this project, and further details will be discussed for “targeted study group,” “research tool,” “curriculum design and implementations,” and “data analysis.”

3 Research Method

3.1 Targeted Study Group

This research targeted on a group of computer advanced users in an elementary school in Pingtung City. The nine selected participants are volunteers including 4 boys and 5 girls.

3.2 Research Tool

An online project-based mobile learning website “The homepage of Beer King Web” (Figure 2) was developed for this study. This website provided the team members an online learning environment to do researches, presentations and discussions during this project.

![Fig. 2: The homepage of Beer King Web[10]](image2)

3.3 Curriculum Design and Implementations

Regarding to the students’ interests and local resources, three teachers designed the curriculum for this research. “Taiwan Tsing-tao Beer” was the chosen topic, and students could use online learning environment to do researches anytime. The following steps are detail procedures for the academic activities:

**Step 1 Initial discovery:** After the students explored the Website, they decided on their own
topic, gathered related information and planned the learning activities.

**Step 2 Developing activities.** The teachers and students arranged three investigations and hand-on experiences together along the online topic-based learning. First visit: During the visit, they referenced previous similar researches and made enquiries. Then they learned equipments of the beer brewery, the functions of saccharification and fermentation sections, and the process of packaging. The staff also explained the ingredients of the beer, the types of beer and certain knowledge of the liquid inclusions. Hence, those problems got solved. After the visit, the students shared and discussed their experience online. Second visit: The main task is to learn the proportion of alcohol and water of beer, the calculation, the concepts and the percentage of the alcohol in several groups. The students also needed to make various alcoholic beverages including passion fruit, green tea, golden wheat tea, green tea with plums, etc. by mixing up different drinks in different proportions. Third visit: The ingredients of beer jelly include malta, Guì línggāo (a Chinese medicinal dessert), coffee and strawberry as a creative beer making activity. Moreover, the students designed and created their own inventions such as salted eggs with beer flavoured, containers and all other crafts made of beer cans for numerous purposes. All the works were photographed and uploaded to the learning Website for sharing and discussions.

**Step 3 Final Presentations and Feedback**
After the whole semester’s learning activities, the students made posters and animations to promote their produced works at home or school. Meanwhile, they were collecting all the results from the online learning process, constructed the Website and finally presented the project outcomes including the students’ learning experiences, topic-based visits and feedback, and their designed crafts.

**3.4 Data analysis**
On the Website, all the collected information including the construction of the web pages was presented. Then the gathered data were analysed.

**4. Results**

The results of online project-based learning are as the following:

**4.1 The analysis of the students’ online project-based learning work**
Each participant published their learning outcomes online during the project. Table 1 shows each topic’s percentage against the total number of the projects. The results showed the most popular topic is online project discoveries and constructions (110 times, 51%), then project marketing and investigation (54 times, 26%), topic-based visits and feedback (41 times, 19%), and project learning and feedback (9 times, 4%).

**4.1.1** Pointed out that the students were mostly interested in online project discoveries and constructions. The students gradually found out their interested topics after having done researches from newspapers, journals, magazines, online exhibitions and Websites. They finally adopted Beer King as their topic after the discussions with their three teachers. The grade six students’ curiosities and learning motives towards alcohol revealed from the decision making. This was also the most crucial part to start the whole project-based learning.

**4.1.2** The project marketing and investigation involve various animation design and production, and the students could share their creativities and productions via the medium of the Internet. Figure 3 and 4 are the chairs and the lamp done by the students with aluminium beer cans. Figure 5 and 6 are the animations done by the students to demonstrate the diversity.

**4.1.3** The results of the students’ topic-based visits and feedback can be concluded as the following:

a. The positive attitude towards beer: After having visited the beer brewery three times and made their own alcoholic drinks with various percentages of different types of beverages, the students have learned to look at beer positively and objectively. Through the designing process, they realized the possibilities to observe a problem or an event from different aspects which might lead to different outcomes. Consequently, the students then understood that scientific researches take certain thoroughly and practical discoveries to generate reliable data. The best judges and decisions then can be made according to what can be understood.
b. Improving the problem solving ability: The students solved the problems during the whole project via doing researches online and books, discussions on the Internet, making hypothesis, experiments and profound thoughts. Hence, they realized that the Internet provides an effective learning environment for discussions followed by observations and thoroughly thoughts, and then problem solving. Thus, independent thinking and problem solving ability can be trained.

c. Active and enthusiastic cooperative learning: The students were motivated by each other via the online learning. Accordingly, it developed active learning attitudes which caused the effectiveness and results of active learning. Furthermore, their vision could be extended and their weakness could be exposed. The Internet arose the students’ enthusiasm, attracted their attention, and improved their communication skills and personal abilities via interactive and collaborative learning.

d. Versatile implementations: The students developed and applied multi abilities including reading, writing, Internet development, animation making, data analysis, presentations and charts making. Their knowledge and self-confidence improved through the project.

e. Independent and responsible: The beer brewery presented the organisational cultures and importance of green issues. The students have become more responsible after a whole semester’s teamwork and also have learned knowledge and hand-on experiences. The project taught them how to be more independent and dare to try without their parents’ help.

### Table 1: Records of the students’ project topics

<table>
<thead>
<tr>
<th>Topic Type</th>
<th>Project Name</th>
<th>Number</th>
<th>Percentage</th>
<th>Number/Percentage subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Project Topic</td>
<td>Discovering exhibitions</td>
<td>23</td>
<td>10.75</td>
<td>110 times 51¢H</td>
</tr>
<tr>
<td></td>
<td>Studies of print media topics</td>
<td>35</td>
<td>16.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discovering and visiting online topic</td>
<td>24</td>
<td>11.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Studies of online exhibition topics</td>
<td>18</td>
<td>8.41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structure of research</td>
<td>10</td>
<td>4.67</td>
<td></td>
</tr>
<tr>
<td>topic-based visits and feedback</td>
<td>Questionnaires</td>
<td>10</td>
<td>4.67</td>
<td>41 times 19¢H</td>
</tr>
<tr>
<td></td>
<td>Introduction of beer making visit and facilities</td>
<td>21</td>
<td>9.81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experience sharing after the visit</td>
<td>10</td>
<td>4.67</td>
<td></td>
</tr>
<tr>
<td>Project marketing and investigation</td>
<td>Super hacker mission</td>
<td>9</td>
<td>4.21</td>
<td>54 times 26¢H</td>
</tr>
<tr>
<td></td>
<td>Logo &amp; poster</td>
<td>16</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Questionnaire design for Beer Making King</td>
<td>9</td>
<td>4.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design of the product</td>
<td>11</td>
<td>5.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statistics (3D bar chart)</td>
<td>4</td>
<td>1.87</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statistics (3D pie chart)</td>
<td>5</td>
<td>2.34</td>
<td></td>
</tr>
<tr>
<td>Project learning and feedback</td>
<td>Project research plan “influences &amp; impacts”</td>
<td>9</td>
<td>4.21</td>
<td>9 times 4¢H</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>214</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

4.2 The Construction of Beer King Websites:
After the students obtained some knowledge about beer making through this online project-based learning, they published all the related information and the produce on the web pages made by them as teamwork. Accordingly, the students could implement what they learned from the project and have hand-on experience in Website making. Figure 7 displays the sitemap including introduction of beer, special features, beer manufacturer visit, market, learning and sharing.
4.3 The construction of Beer King Project

Websites: The team made the Websites during their winter vacation to share the results of their learning. Without any boundary limits, other members could also interact with each other. The students didn’t only retain more knowledge in information technology through this project, but they also took advantage of online learning. They contributed a cost free web space. Figure 8 shows the homepage of beer making marketing with URLs to the cocktail making, Logo, posters, craft work, etc.

The presentation of this online project-based mobile learning involves the students’ handcrafts and Website construction. From the students’ work on the online learning medium, the most popular topic is the discoveries and constructions of online project with the highest chosen percentage, followed by project marketing and investigation, and topic-based visits and feedback. These activities enabled the students to be active in learning and researching while they also built up the ability to complete a project. Second, the students designed creatively and produced diverse handcrafts through the marketing and investigation activities. Regarding to the topic-based visits and feedback, the project learning was more effectively and maximized by the online medium where team members could interact frequently and share knowledge.

Finally, the students turned the results of this project into a topic-based learning Website. They succeeded a lot of improvement in researching, decision making, intergrading, implementation and evaluation via the web page design and Website construction. They enhanced their abilities in information technology and promoted the project by the boundary free Internet medium which enforced the project learning.

5.2 Suggestions

Two suggestions are listed for online project-based mobile learning in the future.

1. More information technology curriculum in primary education. Although the participants for this particular project were all highly interested in online project-based mobile learning, the whole learning procedure took a long time to construct the topic-based learning Website. Hence, students’ ability in practicing online project-based mobile learning will be more efficient after they receive more IT education and activities.

2. Constructing diverse children Websites. Great enthusiasm was revealed during this online project. Therefore, more diverse children Websites could well satisfy pupils’ interests and needs which lead to better online project-based mobile learning results and effectiveness.
References


