

A Case Study of Mission-type Education Programs with Smart Device Using LBS

Dong Uk Im, Jong Oh Lee

Hankuk University of Foreign Studies, 107 Imun-ro, Dongdaemun-gu,
130-791, Seoul, Korea
im.dong.uk@gmail.com, santon@hanmail.net

Abstract. The assessment of Korean students' academic achievement was in higher rank among OECD member countries. However, in terms of spontaneity, interest and confidence, they are in lower rank due to the oppressive schooling system. To raise the preference for study and develop creativity, the new kind of mission-type education programs using smart devices and ICT are drawing attention. For example, Ins-Edu Institute obtained a patent on learning programs using iPads and students on field trips were each given a mission with a QR code and instructed to take pictures, write reports and edit photos using the smart device and send them via SMS. At the 5th AEMM Meeting, the Institute of APEC Collaborative Education handed out iPads with task information and questions for a tour around the city. We analyzed the content and system of these apps, which perform a role to cultivate students' creativity and interest.

Keywords: museum, science museum, education, smart learning, field trip, mission-type, smart device, iPad, SNS, QR code, Korea, Gyeongju, APEC, AEMM

1 Introduction

1.1 The high academic achievement and low interest of Korean students

Korean students' academic achievement belongs in the highest ranks in the world. From 2000 until 2009, Korean students came 2.75nd in reading, 2.25nd in math and 4th in science on average, internationally, in an assessment conducted by PISA (Programme for International Student Assessment). PISA assesses 15-year-old students in 65 countries including OECD member countries every 3 years.

Table 1. PISA result of Korea students in every 3 years from 2000

Year	Reading	Mathematics	Science
2000	6	2	1
2003	2	3	4
2006	1	1	7
2009	2	3	4

From 1995 until 2007, Korean students ranked 2.25nd in math and 3.5rd in science on average, internationally, as assessed by the measures provided in TIMSS (Trends in International Mathematics & Science Study). TIMSS is conducted by IEA (International Association for the Evaluation of Educational Achievement), which assesses 9 and 13-year-olds in 50 countries every 4 years.

Table 2. TIMSS result of Korea students in every 4 years from 1995

Subject	1995	1999	2003	2007
Mathematics	3	2	2	2
Science	4	5	3	4

Despite their high academic achievement, Korean students do not show outstanding marks in terms of spontaneity, interest and confidence, and so a paradoxical phenomenon continues to exist. The assessment results collected by PISA in 2009 show that Korean students' learning interest in reading ranked 28th among 65 countries. They also ranked 58th in the assessment of control strategy (management ability in terms of self-learning).

1.2 A new learning method to enhance learning interest

The Ministry of Education, Science and Technology is introducing a new learning method in order to enhance students' interest and develop their creativity. This is in the form of STEAM, which has one more element (Arts) than the STEM program operated in the USA, which consists of Science, Technology, Engineering and Mathematics.

STEAM is a public education scheme comprised of three sequential steps: Situation Suggesting, Creative Design and Experience of Success. In order to solve a given problem, students are provided with a simulated situation and recognize it as a relevant matter. Then, they try to find their own solutions and are encouraged to embrace their success before taking on the next challenge.

Generally, it has never been in the public education sector where a new learning method is introduced but in the private education sector. The fact that the Government has started to take action on the matter indicates that the decrease in students' learning interest has become a serious social issue.



Fig. 1. The standard process of STEAM education in Korea

1.3 Integration of ICT and smart devices

There have been several attempts to improve the level of learning interest of Korean students in the private sector. Especially since South Korea is equipped with world-class ICT and the fact that smart devices such as smart phones and tablet PC's are prevailing among the public, new learning methods are taking advantage of the infrastructure. This is made easier by the ubiquitous online environment in Korea, where you can access the Internet wherever and whenever, enabling the public to utilize smart devices more often. A high-speed wireless communications network has been implemented in all the cities across the nation, including Wibro (Wireless Broadband) using a 2.3 GHz frequency, and LTE (Long Term Evolution), a 3.9-standard generation of wireless communication.

Smart devices accessed to the Internet are suitable for a mission-type education program, where the student is assigned with a mission and encouraged to find their own solutions. The devices can also connect the student and the instructor over a long distance without any communication problems. Through GPS functions and other applications available in such smart devices, instant messaging and social network services can be utilized to assign a mission to students, which can trigger their learning interest and stimulate their problem-solving desire. Widely popular TV shows airing on weekends have demonstrated mission assignments using smart devices for entertainment purposes. This wide popularity would certainly help students feel more familiar with the method.

2 Case study of a mission-type education program

2.1 A Case of Ins-Edu Institute

KOFAC (Korea Foundation for the Advancement of Science and Creativity) under the Ministry of Education, Science and Technology aims to expand public understanding of science and foster creative human resources and development activities. During the Science Month in April 2012, KOFAC introduced a 'Science and Creativity Family Camp', inviting 300 people from 80 different families. Being a mission-type program, the 300 people were divided into 4 groups and were sent to different locations across the country to solve their missions.

Each group was assigned with a mission that reflected the target region and given tips for solving it. The group for the Greater Seoul area was assigned with 'The Great Sejong Code', where they had to investigate the creation of Hangeul in the palaces of Seoul. The group for the Eastern region was assigned with 'The Chronicle of Advanced Science', in which they had to study science and technology from both the past and present in the ancient capital Kyungju and the nearby industrial areas. The group for the Southern region was assigned with 'Mars Attacks', which required them to study the manufacturing process and fundamentals of aircrafts and spaceships while visiting an air force airfield and the Korea Aerospace Research Institute. The group for the Western region was assigned with 'Han Style', an experience of Hallyu in Jeonju, widely known for its traditional Korean houses and cuisine.

For 'The Great Sejong Code', the participants' smart devices were loaded with an operation program so they could transfer their solutions for the assigned missions. The operation program is based on a system called PBL (Project-based learning) and was developed and patented by Ins-Edu Institute. PBL demonstrates an experience-based learning program that utilizes different functions available on smart devices such as information retrieval, SNS based on Web 2.0 and LBS (Location-based Services).

Sixty-two participants were made up of 18 families. Each family was given 1 or 2 iPads and a portable Wibro device. Wibro only transmits wireless LAN signals within a 10-meter radius, which helped the family members stay close to one another.

As soon as the program started, each family was given an envelope containing a mission. The mission was written in QR code and so it was only decipherable when scanned through the 'EggMon' application on the iPad. QR stands for Quick Response, which leads you to the designated World Wide Web address when scanned.

On the first day of the 2-day-and-1-night camp, the program was conducted at Gwacheon National Science Museum. For instance, if a person was given a mission that said 'Take pictures of various species of dinosaur in the National History room and write down relevant information on more than three categories such as classification, extinction and evolution. Then, complete a dinosaur report', they were to take pictures of the exhibits with their iPad and write a report using 'Pages', an editing application with pictures.

They then uploaded their reports on blogs made for the occasion. The management team at Ins-Edu promptly checked the results and gave them feedback and announcements through a social networking site.

On the second day, families visited the palaces of the Joseon Dynasty and King Sejong's Memorial Museum. Their missions were completed in the same fashion as the first day. Their second mission was to take a video of the place that tells the story of the creation of Hangeul and its introduction process, to make a story that reflected the video and then to make a short, animated video blog. The participants learned about the exhibits, shot different scenes where family members acted out their original stories and made an animated version by using an application called 'Puppet Pals'. The results were posted on their blogs, and they received real-time feedback through SNS.



Fig. 2. The actual practice of mission-type education program proceeded at the ancient palace in Seoul

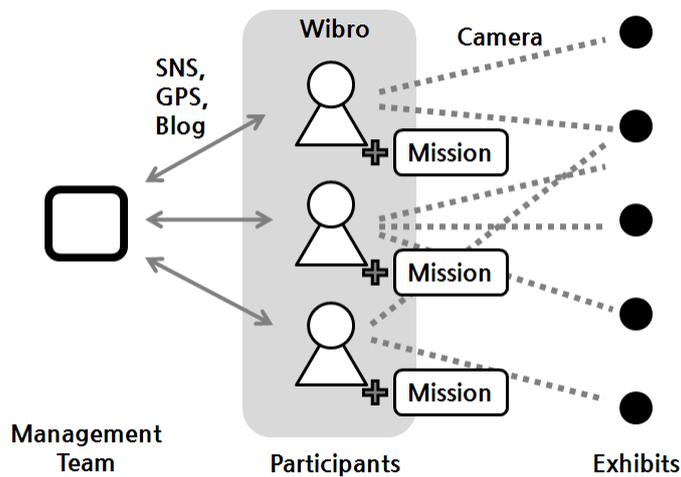


Fig. 3. The system structure of Ins-Edu's mission-type education program

2.2 A Case of iACE

There is also a case where information and communications technology was integrated with a tourism program such as LBS and PBL. On May 21, 2012 in the city of Kyungju, the 5th AEMM (APEC Education Ministerial Meeting) was held. It was a 3-day-and-2-night meeting, and 500 participants included secretaries of education from 21 APEC member countries, delegations, members of international organizations, interested parties from the business sector, education experts and journalists.

APEC Future Education Festival was also held alongside, from May 18 to May 23. About 300 participants from 21 member countries attended, included teachers,

students, university students and entrepreneurs, collectively called ALCob (APEC Learning Community Builders). They conducted different projects in groups regarding the environment and tourism. Teachers and students who participated in AEEP (APEC Edutainment Exchange Program) completed mission-type projects while visiting different tourist spots in groups under the theme of 'Tourism and Regional Economic Integration'.

The participants were handed out iPads with GPS functions and portable Wibro devices so they could access the Internet anywhere. Missions for each team were announced through Internet messages. For instance, if a person was given a mission that said 'Explain the purpose and the date of the establishment of Cheomseongdae Observatory in downtown Kyungju', they had to locate the address on the Internet and find the shortest way to get there. They could also take pictures with the camera on the iPad and transfer them to the right answer. The management team would then consider the answer and reply as to whether the mission had been successfully completed, through messaging. The current locations of the participants were observed by the management team, which enabled them to assess how much of the mission had been completed and manage the entire program in a more convenient way.



Fig. 4. The real-time location information of participants in APEC Edutainment Exchange Program

3 Conclusion

South Korea's Smart Learning is being conducted using different devices and systems. E-books that contain school curriculums are being used widely across the globe. However, it is mission-type education and experience-oriented programs that have brought about significant results, thanks to Korea's ICT infrastructure.

These mission-type programs using smart devices improve students' learning interest and spontaneity so they can find creative solutions by themselves. Using GPS and SNS makes it easier for managers and instructors to overlook the entire program.

If these elements are integrated and different education programs are to be developed, not only should schools benefit but also informal education in museums and tourist areas.

References

1. PISA 2009 Results, [http:// www.oecd.org/edu/pisa/2009](http://www.oecd.org/edu/pisa/2009)
2. TIMSS 2007 Results, http://www.iea.nl/timss_2007.html
3. Dong Uk Im, STEAM in Hand, Korea Foundation for the Advancement of Science and Creativity & Ministry of Education, Science and Technology (2012)
4. Jeanne Hopkins & Jamie Turner, Go Mobile: Location-Based Marketing, Apps, Mobile Optimized Ad Campaigns, 2D Codes and Other Mobile Strategies to Grow Your Business, Wiley (2012)
5. Allan Brimicombe & Chao Li, Location-Based Services and Geo-Information Engineering, Wiley (2010)