

A Study on the Need for a Mobile Application Development Educational Program using an Authoring Tool

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저작도구를 이용한 모바일 애플리케이션 개발 교육프로그램의 필요성에 대한 연구

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Abstract To ensure excellence in logical software education for smart IT technologies in schools, the study was conducted to determine whether a course on mobile application (app) content creation using an app authoring tool can be introduced as a part of the regular curriculum. As an approach method, five sessions of related training for characterized high school teachers as well as three sessions for elementary, middle and general high school teachers nationwide and a satisfaction survey were conducted for a total of five surveys. The average of 91.4% for more than moderately satisfied' is judged to reflect the perception of a highly successful study. In conclusion, the introduction of an app development education program using an authoring tool in schools is considered essential, and furthermore, the need for establishing new national technical qualifications is still rising.

Key Words : Authoring Tool, Mobile App, Educational Program, High School, Middle School, Elementary School

요약 초중고교에서 스마트IT 기술에 대한 논리적 소프트웨어 교육의 수월성을 확보하기 위하여 저작도구를 사용하여 모바일 앱 콘텐츠 제작을 수행하는 과정에 대한 정규 교육과정의 도입여부를 판단하는 연구를 진행하였다. 연구 방법으로는 5차례에 걸쳐 전국에 분포된 특성화고등학교 교사를 대상으로, 3차례에 걸쳐 전국 초중등학교 교사와 일반고 교사를 대상으로 교육을 실시하고 만족도 조사를 하였다. 만족이상이 평균하여 91.4%로 조사된바, 본 연구조사가 매우 적절한 것으로 판단된다. 결론적으로 초중고교에서 저작도구를 이용한 앱 개발 교육프로그램 도입은 필연적이라 할 수 있는 것으로 판단되어지며 국가기술자격 종목 신설에 대한 요구도도 높아지고 있다.

주제어 : 저작도구, 모바일 앱, 교육프로그램, 고등학교, 중학교, 초등학교

** 이 논문은 2013년도 가천대학교 교내연구비 지원에 의한 결과임.(GCU-2013-R253)

Received 10 March 2014, Revised 20 April 2014

Accepted 12 April 2014

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1. Introduction

The Britannica Encyclopedia defines a smart phone used often as ‘a highly functional mobile telecommunication device for driving programs, data communication and interworking with PCs’. Smart phones with the aforementioned functions will change people, enterprises and the society through ‘3R’ of Real-time, indefinite Reach for information and communication and Reality to overcome spatial limitations[1]. If applications are developed to be fit for each OS of a specific smart phone although they are the same applications, they can be used only in the corresponding smart phones.

Hundreds and tens of thousands of smart phone apps are marketed in the app markets for each specification. We need to install a corresponding application to use the Internet banking service or to check subway or bus routes, and to use navigators in real time by means of the GPS receivers. We can book movies and read latest news released by each broadcasting stations or press on their websites. In addition, we just need download and install applications for films, music, photos and games which cannot be enabled with conventional mobile phones. Smart phones make our living easier with their smart functions. That is, smart phone applications are important software which decides convenience and the quality of our living depending on its level of development.

This paper studies the introduction of a pilot smart information technology (IT) and applications curriculum into schools in the Republic of Korea to meet ICT development policy and to recognize the importance of establishing it as a future national core strategy as implemented by the world’s developed countries. To ensure excellence in logical software education for smart IT technologies in schools, the study was conducted to determine whether a course on mobile application (app) content creation using an app authoring tool can be introduced as a part of the regular curriculum.

According to a survey by the World Economic Forum,

Estonia (with a population of 1.3 million) ranks second in e-banking, third in e-government, and first in online mobile voting worldwide, and had the most business establishments per capita in 2011. Rated as a global IT superpower in a short time, Estonia has already become a benchmark model country in the world’s IT sector. There is a more important reality to be recognized behind the scenes. Estonia’s moves related to IT education is even more drastic. A project named ‘Programming Tiger’ was implemented with children aged 5 and up to be taught the basics of computer coding with the cooperation of public and private sectors. Estonia’s public schools will introduce a curriculum of web and mobile app development in elementary schools.

Korea, on the other hand, has nothing to boast about in the software sector, although Korea leads the world for hardware in the smart IT sector. Smart networks and applications are present in the corporate world as well as in national competition for future fusion technology [2]. In smart networks, the combination of hardware and software has a synergic effect, creating smart business power, which continues to be in the spotlight. Hence, a future global IT leader must have integrated technology and marketing power in a two-tiered IT business market [3][4]. It is anticipated that a smart phone-based diversified convergence environment will play a central role in each sector of our society for at least the next decade or two. It is therefore essential to create an educational environment for smart phone-related technology as an indispensable factor for future national competitiveness and development.

Accordingly, in this thesis, we carried out research five times to explore the feasibility of teaching the production of mobile app content using an app authoring tool and an education course for it based on smart app development education provided to teachers in elementary schools, middle schools, high schools, and specialized high schools, including one special school [5]. Further studies would be desirable developing the national technical qualification based on mobile application development

educational program using an authoring tool which proposed in this paper.

2. Related Works

Smart phones have gained immense popularity, initiated by the release of Apple's iPhone all over the world. A new industrial revolution has already started from applying IT technology to the smart phone and wireless Internet in all industries and fields [6].

As part of a core technology education policy to prepare for the rapidly changing mobile education environment, the Ministry of Education, Science and Technology designates excellent offices of education and supports them with one billion won per office. The development strategy is to establish a leading global education model to lead smart technology - related education content and methods in innovative ways and to diffuse the model nationwide [7][8].

In this regard, the Jeonbuk Office of Education selected 80 teachers for smart IT education and is actively building up infrastructure for online smart IT lessons, while the Gyeongnam Office of Education announced 7 tasks and 50 detailed implementation plans to implement "Class innovation based on smart education." The Seoul Metropolitan Office of Education planned to provide smart IT - based education to 25% of its teachers in 2012 on a mandatory basis.

3. Features and Performance Analysis of App Authoring Tool

3.1 Satisfaction Survey of App Authoring Tool

In order to develop smart application by use of smart app authoring tool, a training session was given over 8 hours by default at workshop and seminar. By questionnaires, a survey was made to examine how many respondents are satisfied with smart app authoring tool set

forth herein, for the purposes described below.

First, to share information on the programs to educate app contents. Second, to know the functions of smart phone app authoring tool Third, to identify the applicability of app authoring tool

With relation to a survey of smart app authoring tool, questionnaires were handed out without prior notice.

Each of questionnaires consisted of 6~10 items, which fall into 3 categories of convenience, applicability and functionality that measure the goals and performances in developing smart applications.

The purposes of the App Contents Development Education Seminar conducted for teachers of computer and commerce subjects in elementary schools, middle schools, high schools, Meister high schools, specialized high schools and special schools were to share information on the development of an education program on app content for specialized high schools and to produce and realize app content. As an approach method, two sessions of related training for characterized high school teachers as well as three sessions for elementary, middle and general high school teachers nationwide and a satisfaction survey were conducted.

A total of five surveys were conducted. A survey of 136 teachers from 82 characterized high schools and a second survey of 160 teachers from 71 specialized high schools were completed initially. The subsequent third, fourth and fifth surveys were conducted with teachers from 59 elementary schools, 9 middle schools, and 7 high schools, including 1 special school.

A day with 8 hours of training was provided prior to the first and second surveys, while five days with 40 hours of pre-training was provided for the third, fourth and fifth surveys in order to maximize the effectiveness of the results. Rankings for each survey were divided into five tiers, and the training consisted of mobile app content creation using an app authoring tool.

The first and second surveys were conducted in 2011 and 2012 at six months apart. The second survey saw an increase of 8% in the "satisfied" tier compared to

the first survey, and 18 months later (in 2013) the third, fourth and fifth surveys were simultaneously conducted throughout schools nationwide. In conclusion, the introduction of an app development education program using an authoring tool in schools is considered essential, and furthermore, the need for establishing new national technical qualifications is still rising. In particular, the need for an advanced curriculum for teachers is deemed the highest importance. In order to make a decision on the introduction of an education program for the first semester of 2014 in response to current requests in society, we conducted a training session of 8 to 40 hours, and conducted a one-hour questionnaire with teachers nationwide twice (at the end of the first semester and second semester of 2011 and 2013, respectively).

3.2 Results of Questionnaire for App Authoring Tool

The results of the first survey in Table1 revealed that 87% of respondents marked categories indicating they were more than moderately satisfied, which are the upper two tiers of 5 points and 4 points on a 5-point scale, which means there is definite need for smart app content development education. The categories below moderately satisfied, which are the lower two tiers of 2 points and 1 point, were insignificant at only 3% in the first survey.

<Table 1> Analysis of First Survey (Overall)

Summary of Analysis	①The result of 87% for 'more than moderately satisfied' is judged to reflect the perception of a highly successful seminar. ②The result of 3% for 'below moderately satisfied' is judged to be from the question item on app authoring education hours.
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The results of the second survey in Table2 revealed that 95% of respondents marked categories indicating they were more than moderately satisfied, which are the upper two tiers of 5 points and 4 points on a 5-point scale, which means there is definite need for

smart app content development education.

<Table 2> Analysis of Second Survey (Overall)

Summary of Analysis	①The result of 95% for 'more than moderately satisfied' is judged to reflect the perception of a highly successful seminar. ②The result of 1% for 'below moderately satisfied' is judged to be from the question item on app authoring education hours.
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The results of the third survey in Table3 revealed that 85% of respondents marked categories indicating they were more than moderately satisfied, which are the upper two tiers of 5 points and 4 points on a 5-point scale, which means there is definite need for smart app content development education.

<Table 3> Analysis of Third Survey (Overall)

Summary of Analysis	①The result of 85% for 'more than moderately satisfied' is judged to reflect the perception of a highly successful seminar. ②The result of 3% for 'below moderately satisfied' is judged to be from the question item on app authoring education hours.
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The results of the fourth survey in Table4 revealed that 92% of respondents marked categories indicating they were more than moderately satisfied, which are the upper two tiers of 5 points and 4 points on a 5-point scale, which means there is definite need for smart app content development education.

<Table 4> Analysis of Fourth Survey (Overall)

Summary of Analysis	①The result of 92% for 'more than moderately satisfied' is judged to reflect the perception of a highly successful seminar. ②The result of 2% for 'below moderately satisfied' is judged to be from the question item on app authoring education hours.
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The results of the fifth survey in Table5 revealed that 98% of respondents marked categories indicating they were more than moderately satisfied, which are

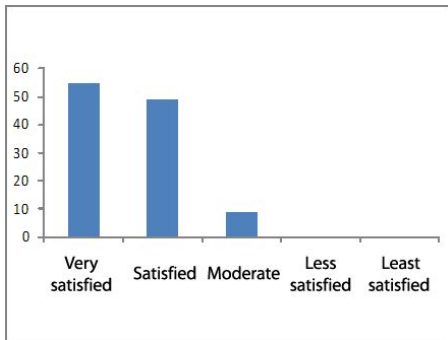
the upper two tiers of 5 points and 4 points on a 5-point scale, which means there is definite need for smart app content development education.

(Table 5) Analysis of Fifth Survey (Overall)

Summary of Analysis	①The result of 98% for 'more than moderately satisfied' is judged to reflect the perception of a highly successful seminar. ②The result of 0% for 'below moderately satisfied' is judged to be from the question item on app authoring education hours.
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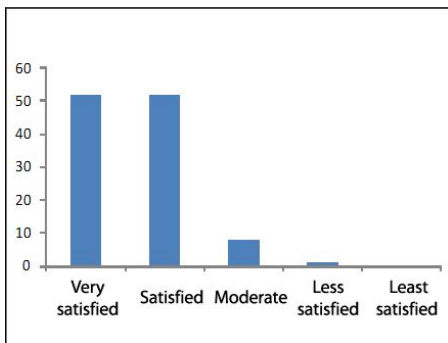
The Fig. 1 and Fig. 2 graph for the results of the first survey question1 and question2 are as follows; results of the second, third, fourth and fifth surveys are deliberately omitted because the results are similar.

* Do you think the app authoring tool functioned and performed well?



[Fig. 1] Item 1 graph

* Do you think an app authoring tool is necessary?



[Fig. 2] Item 2 graph

To date, there are no similar studies because application education itself is the initial level in elementary, middle and high schools. But programming education supported by the government is being driven in order to improve the future competitiveness of the country.

4. Conclusions

The important difference between the first and second questionnaires and the third, fourth, and fifth questionnaires is the introduction of the authoring tool for app development in elementary, middle and general high school as a regular curriculum. Microsoft's founder Bill Gates experienced computer programming at the age of 13, Twitter founder Jack Dorsey at the age of 8, and Facebook developer Mark Zuckerberg in Grade 6. Since they believe their success was based on early exposure to computer programming, these global IT leaders pronounce with a single voice the necessity for early education in computer programming. The seminars on app content development education for the teachers in charge of computer and commerce subjects from Meister high schools and specialized high schools were successful. Specialized education programs for authoring tool-based app content production was adopted by as many as 11 schools in the first semester of 2012, and the schools are utilizing the program.

It is anticipated that the education program will be adopted by approximately 600 Meister high schools and specialized high schools by 2015. The education program was adopted by approximately 10 junior colleges (2- to 3-school year systems), including universities. The program is mainly used in the engineering field, but it has been diffused even to business management.

Currently, education courses for the three stages of entry level, middle level and advanced level are being developed, while an education plan for 36 class hours was completed initially for Meister high schools and specialized high schools. Ultimately, working level courses

focusing on development tasks in enterprises are being prepared as additional courses, and we expect they will serve as a landmark for the smart education course in a true sense.

For suggestions on areas for improvement for the education of teachers, issues such as organizing training sessions for enrichment courses, organizing education courses for approximately 1 week, expansion of working level education focusing on cases, and expansion of iOS - based education were discussed. We know intuitively that introduction of a regular programming curriculum from preschool to high school (depending on level) is directly connected to the future of Korea.

Future research is to develop the national technical qualification based on mobile application development educational program using an authoring tool which proposed in this paper.

ACKNOWLEDGMENTS

This work was supported by the Gachon University research fund of 2013.”(GCU-2013-R253)

REFERENCES

[1] Samsung Economic Research Institute, Future with Smartphone, CEO Information No.741, February 3, 2010.

[2] Young-Hyun Chang, Dea-Woo Park, A Study on Smartphone APP Authoring Solution Design for Enhancing Developer Productivity, Communication in Computer and Information Science, Vol .206, pp. 160-166, 2011.

[3] Young-Hyun Chang, Jae-Min An, Dea-Woo Park, A Study on Effectiveness of the App Curriculum using Smartphone Authoring Solution, Journal of The Korea Institute of Maritime Information Communication Science, Vol. 16, pp. 192-195, 2011.

[4] Young-Bae Son, Dea-Woo Park, A Study on the

Development of Learning Programs using Smart Phone, Journal of The Korea Institute of Maritime Information Communication Science, Vol .15, pp. 429-431, 2011.

[5] Gil-Wong Kim, Mobile App Program Development Practice, WonderfulSoft, 2011.

[6] Gil-Wong Kim, Software Engineering and State-of-the-art methodology, Crown , 2005.

[7] Young-Hyun Chang, Dea-Woo Park, ANDROID 2.1 BASIC PROGRAMMING, Young min, 2010.

[8] Dea-Woo Park, Young-Hyun Chang, ANDROID Froyo PROGRAMMING 2.2, Global, 2011.

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