An Evaluative Analysis of 'U-KNOU Campus' System and its Mobile Platform

Jinah Seol[1]

ABSTRACT

This paper is an overview of key elements of Korea National Open University's smart mobile learning system, and an attempt to evaluate its main services relative to the FRAME model and the Mobile Learning Development Model for distance learning in higher education. KNOU improved its system architecture to one based on xMOOC e-learning content delivery while also upgrading its PC-based online/mobile learning services to facilitate an easier and more convenient access to lectures and for better interactivity. From the users' viewpoint, the upgraded 'U-KNOU Campus' allows for a more integrated search capability coupled with better course recommendations and a customized notification service. Using the new system, the students can access not only the school- and peer-issued messages via online bulletin boards but also share information and pose questions to others including to the school faculty/officials and system administrators. Additionally, a new mobile payment method has been incorporated into the system so that the students can select and pay for additional courses from anywhere. In spite of these advances, the issue of device usability and content development remain; specifically U-KNOU Campus needs to improve its instructor-learner and learner-to-learner interactivity and mobile evaluation interface.

☞ keyword : Mobile Learning, KNOU, FRAME Model, U-KNOU Campus

1. Introduction

"Internet in the palm of your hand" is no longer just some catchy slogan. Advance in technology has literally made the concept a reality, its applicability and ubiquity extending to far reaches, including in the educational sphere where smart, mobile learning environment is now taken for granted. The concept of such smart learning technology encompasses the crucial role it plays in creation of efficient learning environments that can provide personalized content [1]. With stunning advances in device technology, mobile/portable smart device use is climbing rapidly across all sectorsof academia including higher education. Distance learning in particular has experienced an especially profound impact with the introduction of mobile technologies that affect teaching and learning methods. So it is no surprise that mobile learning, which exists within the framework of smart, blended, content

delivery system, has been adopted by distance education institutions worldwide.

Mobile learning by definition is educational content delivered and supported in a wireless setting via equipment such as smartphones, tablet computers or laptop PCs [2]. It also refers to a learning process using any portable computer as well as hybrids of these devices [3]. Key characteristics of mobile learning are access from nearly anywhere, robust search capability, rich interaction, powerful support for effective learning, and e-learning independent not only of location but also of time and space [4]. From the learner's perspective, mobile learning has distinct benefits such as ownership, informality, mobility, and context that is absent in conventional e-learning environment [2].

Beginning in 2009, some of Korea's cyber-based universities and distance education entities began providing mobile learning platform to its students. Korea National Open University (KNOU), the biggest and the oldest distance higher education university in Korea, also began offering mobile-learning service on March, 2009, called 'U-KNOU' which was then upgraded to 'U-KNOU Plus' in 2012.

However, its original e-learning platform (Massive Open Online Courses, xMOOC), despite being a system that allowed for an affordable and flexible way to learn new skills and which


---

delivered quality educational experience at scale, was not a system which could effectively support a learning management system(LMS)[5]. One of the problems was that the online and mobile web services did not function seamlessly this, when the majority of students were already utilizing PC and mobile devices (Android or iOS) interchangeably to interface with different course formats. A survey by Institute of Distance Education reported that as of 2018, 108,822 students were enrolled at KNOU, with 75.9% students utilizing smart devices in the course of their school work or related activity. About 55% of the mobile device users answered 'satisfied' or 'very satisfied' when asked about U-KNOU Plus'smobile learning usability. The reason cited by the students for most dissatisfaction with KNOU's then mobile learning platform was that seamless access to lectures via both PC and mobile was impossible [6].

KNOU subsequently launched a smart portal platform named 'U-KNOU Campus', adding features of advanced LMS to both PC and mobile web environment, thereby making it more suitable for an improved smart learning paradigm. Since KNOU'sadoption of smart mobile learning system and the development of e-learning content optimized for the ubiquitous learning in 2009, majority of its students have migrated to mobile-learning in lieu of web-learning. Students, rightly, prefer and perceive that content optimized for mobile learning system would be highly advantageous to accessing lectures anytime and anywhere.

In this context, this study was an attempt to assess KNOU's current mobile learning system, usingthe FRAME model and Mobile Learning Development Model as basis, and to examine how KNOU developed its mobile learning system to improve educational services in a distance higher education setting. The study also analyzed the key constructs of a mobile learning system for a mega-university like KNOU with more than 100,000 in enrollment. Two main questions were: What key elements constituted 'U-KNOU Campus' mobile learning system? and, How has its mobile learning system improved LMS in terms of learning method and mobile learning environment?

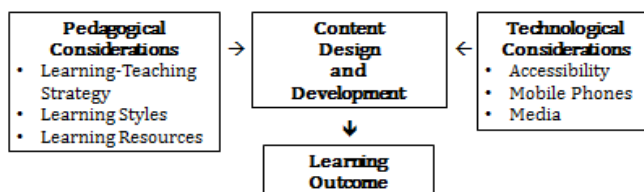## 2. The Frame Model and Mobile Learning Development Model

According to the Framework for the Rational Analysis of Mobile Education (FRAME) model, mobile learning can be defined as a process that culminates from technological and social convergenceinvolving mobile technologies, human learning capacities, and social interaction. Such a FRAME model incorporates not only the technical specifications of the relevant mobile devices but also personal and social aspects of the learning process [7]. In the FRAME model, mobile learning experiences are considered as existing within the collective as well as individual contexts of information creation. As such, mobile learners can and do consume and create information for him/herself and for the group, all the while the interaction with information being mediated through technology [8]. The FRAME model, then, can be represented as an intersecting set of three circles representing device usability, learner, and social aspects of learning (see figure1) [9].
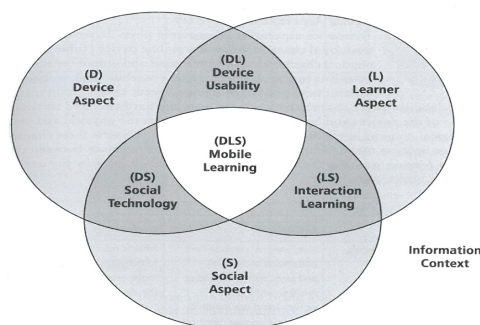
（Figure 1） The FRAME Model

The three circles represent device(D), learner(L), and social aspect(S). By assessing the degree to which the various areas of the FRAME model are utilized within a mobile learning situation, educators and practitioners may be able to design more effective mobile learning experiences.

First is the Device Aspect(D) which refers to the physical and technical aspects of various mobile devices. In short, it represents the medium with which mobile learners and general users interact. Second is the Learner Aspect(L) which refers

（Figure 2） Mobile Learning Development Model

to the individual learner's cognitive abilities, memory, and prior knowledge as well as situations and tasks in which a learner attains his goal. Lastly, Social Aspect(S) refers to the process of social interaction and cooperation among mobile learners, with the basic theme of social constructivist philosophy as its anchor [9]. According to Bruner(1996), the constructivist learning theory encompasses the socio-cultural aspects of learning which underline learning processes and it also can be incorporated inthe mobile learning format [10]

This FRAME model can be useful in assessing various types of mobile learning/teaching process whether or not they actually facilitate smart-learning in terms of device usability, interaction learning and social aspect.

Meanwhile, Peng et. al. suggested a Mobile Learning Development Model in 2011 that could be implemented in conjunction with the mobile learning model of the Open University Malaysia. The model(figure2) shows the three pedagogical considerations that formed the basis for plan and design of the mobile learning content. According to Quinn(2011), mobile learning capabilities could be characterized in terms of 4C's: content, compute, capture, and communicate[11]. Documents, audio and video contents deal with the ability to store, or access, content on a device. Capture, on the other hand, has to do with the individual producing content rather than accessing it. Mobile learners can capture images of texts and videos and take notes while in the field. Mobile learning also provides learners with computing ability so that learners could input observed parameters such as quantity and area then calculate its density. Lastly, mobile learning lets us fulfill our natural tendency to communicate, and it supports synchronous and/or asynchronous interaction. Communications can occur with fellow learners, instructors, teaching or research assistants, experts or anyone else within or external to the institution. The researchers also considered

several important criteria in considering appropriate technology for mobile learning; accessibility, mobile device, and platform [12].

The model emphasizes that a variety of mobile-enabled courses should be executable in different mobile devices used by students, and that the course materials should be designed to automatically change to the format when they download them onto their personal computers or mobile devices [13]. Similarly, U-KNOU Campus was designed and developed to improve the e-learning mobile services and to make its LMS more efficient. In order to achieve this purpose, building a new portal platform was a must.

3. Evaluation of U-KNOU Campus' Mobile System and Services

KNOU, the largest distance education university in Korea, initially adopted xMOOC system of learning which is based on a more traditional teacher-student knowledge transfer model. Massive Open Online Courses (MOOCs) provided an affordable and for that time, a flexible way to learn new skills, advance one's career and receive quality educational experience at scale [10].

The xMOOC(the "x" stand for "eXtended") was a system geared toward providing traditional university courses to the broadest number of university-level students possible. Its major shortcoming was that student-teacher interaction as well as student-to-student interactions were very limited[14]. It was a unidirectional online system that broadcasted to massive audiences through internet course content [15].

Despite its limitations, mobile based xMOOC e-learning did afford enhanced collaboration capability among learners, ready

access to subject information and related resources, and a deeper contextualization of learning [9]. Given that the LMS(Learning Management System) was a common component of the campus infrastructure even before 2010, mobile learning platforms provided by Blackboard, Desire2Learn and Moodle have developed apps for iPhone and iPad, Android, and Blackberry. These companies have provided, thus far, the best open-source higher education Mobile LMS [16].

In the past, KNOU's undergraduate e-learning program was not supported by learning management systems(LMS). KNOU's e-learning system was based on xMOOC (xMassive Open Online Courseware) from the early 2000s, but it has failed to offer compatibility between online and mobile web services each other. Even though a majority of KNOU students utilized both PC and mobile devices for taking different courses, KNOU has been offering its content via different types of media (TV, multimedia, web, and audio) which were designed and developed according to the pedagogical considerations shown on Fig.2. Thus, in order to assess 'U-KNOU Campus' system and its improved mobile services, the overall system connection diagram of U-KNOU Plus and its push system flowchart should first be examined (Figure3, Figure 4).

'U-KNOU Plus' was an upgraded smart mobile platform which enabled only KNOU students to view and download courses and receive push data services as Fig.3 illustrates. However, the problem was that the mobile e-learning format was different from that of the PC version, and therefore
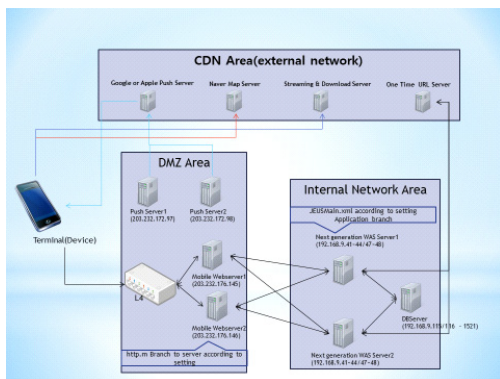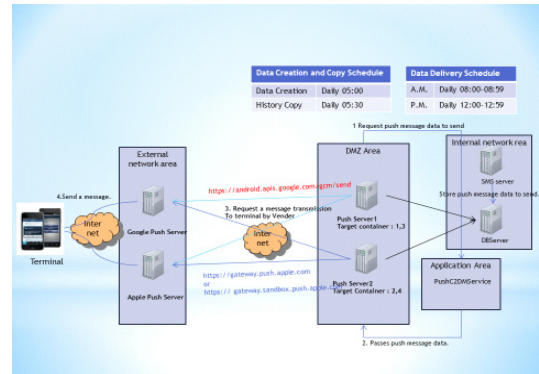
(Figure 4) Push Service System Diagram of U-KNOU+

students were not able seemlessly to view lectures from the PC environment to the mobile environment, and vice versa. Another problematic aspect was that it was a complex and inefficient system, the system operator having to run and manage a dual e-learning system for PC and mobile. Not only very costly to maintain, the dual system also meant much instability in mobile-learning content transmission/ reception, which resulted in the students complaining about the system's bias against mobile learning.

The present 'U-KNOU Campus' portal, however, provides students with identical content and information across both PC or mobile enviornment. In order to resolve the inefficiency and to enhance mobile-facing service, the new platform integrated the dual system into an open knowledge portal that can be used by those with the site access. In the new portal system, integrated login was required of students to attend lectures, utilize school resources, and to receive feedback and consultation. Those students accessing the system primarily via mobile could now search for various lectures by category and also get more recommended content as well as important academic notices during the school term. Enrolled students also benefit from customized 'push messages' generated by the new service such as the registration date, sit-down class schedules and information regarding exams.

Moreover, users can read school- and student- issued messages on the online bulletin board as well as sharing their thoughts/information with their peers and posing questions to the school faculty/officials and system administrators. They can also use the new interface to purchase and pay for additional courses using a mobile payment system. Table1 details how

(Figure 3) Overall System Connection Diagram of U-KNOU+

U-KNOU Campus improved its LMS and upgraded learning method and mobile learning environment.

(Table 1) U-KNOU+ System vs. U-KNOU Campus

Category	U-KNOU+	U-KNOU Campus
Content/User Operating System	Distrubuted Operation	Integrated Operation
LMS	None	Applicable
PC/Mobile Learning	Separate Operation (PC/Mobile)	Integrated Mobile & PC operation
Learning Method	Distributed Learning: Inconvenience Difficulty for accessing Life-long education content	Integrated Learning: Content integration for regular and continued courses Easy to install system and to access various life-long education content
Mobile Learning Environment	Separate App Installation Only Audiovisual content Inconvenient UI/UX	Seamless Learning via PC/Mobile Multi devices/ N-Screen support User-friendly UI/UX structure
Online Learning Support Service	None	Self-directed learning function,Recommended courses Efficient learning support

What is unclear, however, especially in relation to the FRAME Model, is whether or not the latest U-KNOU Campus portal system has helped to increase the dialogue between the students and the school, and whether or not there was a noticeable increase in the learners' autonomous desire for mobile learning. Although the new portal system integrated the PC and mobile operating systems to increase information availability and to improve and enhance the device usability and system connectivity, it failed to meet the criteria posed by the interaction learning intersection (LS) regarding learner to learner interaction, learner to instructor interaction, and learning communities based on the FRAME Model.

More specifically, KNOU's mobile applications still lacksynchronous interaction services for both instructor and learner. This is problematic as mobile tools should facilitate interaction while supporting not only convenient access but also coordination and communication regardless of location[7].

Viewed from a learner's perspective, U-KNOU Campus system could improve in being more aware of and senstive to the student's cognitive abilities, experiential capabilities, and even motivation. According to the Learner's Aspect(L), such intrinsic and inherent elements residing within the learner might have a crucial effect upon the learning process as they relate to encoding, retaining, and transferring information [8].

However, as Knowledge-Construction menu illustrates in Fig. 5, U-KNOU Campus for the learners(portal users) was not fully able to promote self-directed interaction among learners, not to mention between the instructor and learner. To motivate self-directed learning and adaptive e-learning, more synchronous activity options need to be recommended per subject and learner.
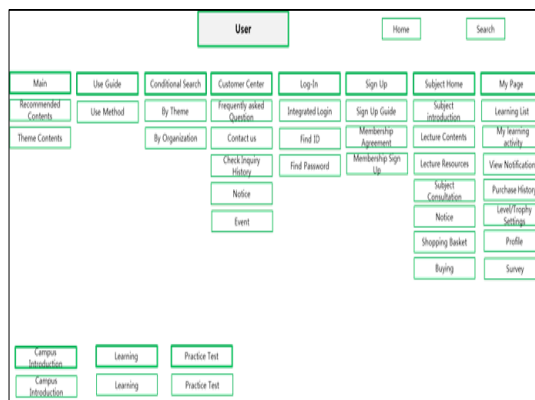
(Figure 5) Future Knowledge Portal System Construction Menu (U-KNOU Campus)

Lastly, U-KNOU Campus also needs to improve social technology(DS) and interactive learning(LS). To do so, it needs to allow for more system flexibility for learners trying to interact with instructors the system also needs to be able to better promote social learning, as social learning can empower learners to collaborate on assignments with other mobile-using peers stretched across the internet, for real power in social learning comes from learner-learner interactions[9].

Mobile learning environment, in particular, accomodates the user's natural urge for active communication. What's more, it supports both synchronous and asynchronous interaction. Seen thusly, it would be desirable for collaborative forums or discussion tools to be added to the system's menu since it

could help to enhance more communication among the students while also leading to the growing well of collective intelligence.

Communication can also occur among fellow learners, instructors, teaching or research assistants, experts or anyone else within or external to the institution. Mobile devices further offers unique property of awareness of local context via capture of GPS and local signals [17]. Which is why the interactivity of the service is paramount to the success of a portal/platform such as U-KNOU Campus.

Despite its limitations and needed improvements, the fact is, the U-KNOU Campus is a system used widely by KNOU students. According to the Institute of Distance Education's 2018 survey, 95.3% of the students matriculated at KNOU during the survey period regularly logged onto U-KNOU Campus to access their school assignments and related activities. Of these, freshmen students were the most active users. Also, approximately 2/3 of the survey respondents said that they were either 'very satisfied' or 'satisfied' with the U-KNOU Campus, with only 7.4% of them saying 'unsatisfied' about the mobile service platform. With regards to needed improvements, the students said that U-KNOU Campus 'allow customization of school calendar,' 'increase learner support interface,' and 'actively promote the use of U-KNOU Campus' to the enrolled students [18].

4. Conclusions

This paper was a case study on KNOU's mobile learning system in distance higher education. U-KNOU Campus, the most recent internet portal system for Korea National Open University, integrated separate PC and mobile operating systems into one in order to produce an efficient learning management system and to meet the needs and expectations of the students who access the system by mobile connection.

Users of the new, smart, learning system began with the integrated login interface. From there, the mobile learners could take lectures, utilize lecture/site resources, and get subject consultation as well as academic notifications. U-KNOU Campus's mobile homepage also lists recommended content tailored to individual students and allows them to search any content by topic or organization.

Mobile learning has now become an integral part of e-learning. It allows an even more innovative use of the latest educational smart technologies in the realm of education. Mobile platform also offers the possibility of greater access, interaction and collaboration among all users including faculty, administrators and most importantly, the students. The success of mobile learning system, then, can be measured by the benefits which learners gain from using the mobile learning materials and resources [13]. Furthermore, smart device-enabled teaching and learning activities should be more geared toward enhancing problem solving possibility, as use of such devices has already been shown to be effective for learners [19]. An advanced mobile learning system would allow for a more personalized educational delivery, enabling the teachers to check students' queries in real-time and provide customized answers accordingly [20].

It's true that U-KNOU Campus was successful in integrating the previous, disparate information portals into a single system to help enhance student's learning experience. However, its menu construction was not fully optimized to take advantage of the smart mobile platform which can support robust interactive learning. The optimized mobile learning model suggests that mobile educational content and its access should be geared to allowing for more collaborative learning so that there is a bigger and more beneficial impact on learning. To become more effective at developing better mobile content and online services, KNOU's operating platform for mobile learning should be further developed with the help and feedback of those users who access the system primarily by mobile connection.

There are some limitations to the current case study. First, its scope was limited in elaborating the specific developmental steps of 'U-KNOU Campus' mobile learning. Second, although the FRAME model was useful in assessing KNOU's mobile learning system, the analysis of social aspect on mobile learning management system of KNOU was not executed. Lastly, it would have been desirable to delve more into pedagogical considerations of 'U-KNOU Campus' as well as into the content design and development process. Most importantly, related future studies should continue to focus on measurable achievements of integrated mobile learning system in light of its social and learning environment.

References

[1] W.C. Jun and S.K. Hong, ″A Study on Development of Smart Literacy Standards of Teachers and Students in Smart Learning Environments″, Journal of Internet Computing and Services, Vol.14, No.6, pp.59-70, 2013. https://doi.org/10.7472/jksii.2013.14.6.59

[2] J. Traxler, ″Current State of Mobile Learning,″ International Review on Research in Open and Distance Learning Vol.8, No.2, pp.13-14, 2007. https://doi.org/10.4018/978-1-4666-0053-9.ch001

[3] P. Sloep, K. Stefanov, N, Alateva, I, Koytchev, and P, Boychev, ″Advanced Research in Mathematics and Computer Science: Doctoral Conference in Mathematics, Informatics, and Education [MIE2013] Proceedings, 2014.

[4] C. Quinn, ″mLearning: Mobile, Wireless, In-Your-Pocket Learing,″LineZine, Fall. 2000. http://www.linezine.com/2.1/features/ /cqmmwiyp.html

[5] https://www.igi-global.com/dictionary/massive-open-online-courses/40878

[6] S.H. Kim, ″Smart Learning based KNOU's Future Knowledge Portal Design for Fourth Industrial Revolution″, IDE Vol. 17, No.13, pp.58-59, 2017.

[7] M. Koole, ″Framework for the rational analysis of mobile education: A model for evaluating mobile learning devices″, Thesis, Centre for Distance Education Athabasca University, 2006.

[8] M.L. Koole, ″A Model for Framing Mobile Learning″, Mobile Learning: Transforming the Delivery of Education and Training, ed. By M. Alley, p.p.25-31, 2009.

[9] R. F. Kenny, C. Park, J.M.C. Van Neste- Kenny, P.A. Burton and J. Meiers, ″Using Mobile Learning to Enhance the Quality of Nursing Practice Education″, Mobile Learning: Transforming the Delivery of Education and Training, ed. By M. Alley, p.p.77-78, 2009.

[10] J. Bruner, ″The Culture of Education″, Cambridge, MA: Harvard University Press. 2009.

[11] Quinn, C.N. ″The Mobile Academy: mLearning for Higher Education″, Jossey-Bass: A Wiley Imprint, p.p.17-19, 60-78, 2012. https://doi.org/10.1111/teth.12075

[12] C. L. Peng, Abas, Z.W., Goolamally, N.T. Yusoff, Y. and Singh, H.K.D., ″Implementation of Mobile Learning at the Open University Malaysia″, In Ng, W. Mobile Technologies and Handheld Devices for Ubiquitous Learning, Hershey, New York, pp.171-180, 2011. https://doi.org/10.4018/978-1-61692-849-0.ch010

[13] S. Thirumeni, and Y. Yusoff, ″A Conceptual Framework for OUM M-learning portal″, In Proceedings of IADIS International Conference Mobile Learning, pp.250-254, 2009.

[14] http://mooc.org/

[15] http://blog.extensionengine.com/xmooc-vs-cmooc

[16] https://www.igi-global.com/dictionary/massive-open-online-courses/40878

[17] C. N. Quinn, ″Designing mLearning Tapping into the Mobile Revolution for Organizational Performance″, San Francisco : Pfeiffer., 2011.

[18] W. M. Kim, ″2018 Survey of KNOU Students″, Institute of Distance Education Annual Report, 18-03, pp.72-81, 2019.

[19] M. Y. Kim, ″A Study on Educational Application of Smart Devices for Enhancing the Effectiveness of Problem Solving Learning″, Journal of Internet Computing and Services, Vol15, No.1, pp.148-156, 2014. https://doi.org/10.7472/jksii.2014.15.1.143

[20] E. M. Kim and J. W. Choi, ″Development of e-learning support platform through real-time two-way communication″, Jourla of the Korea Aademia-Industrial Cooperation Society, Vol20, No7, pp.249-254, 2019.

◑ 저 자 소 개 ◑

설 진 아(Jin-Ah Seol)
1985년 고려대학교 신문방송학과(문학사)
1989년 조지아주립대학교 언론대학원 언론학석사
2000년 맥콰리대학교 언론학박사
2001년~현재 한국방송통신대학교 미디어영상학과 교수
관심분야 : 소셜미디어, 소셜네트워크 저널리즘, 글로벌미디어
E-mail : jas@knou.ac.kr