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Development and Use of the Nursing Management Application for Smartphones in Class

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Abstract

In this study, a nursing management application for fourth-year students majoring in nursing at university was developed and practically applied in lectures. The application consists of an introduction, learning contents, and quiz contents. Nursing students downloaded and used it on their smartphones, such as iPhones and Android phones. The learning contents of a nursing management application include theoretical contents related to courses on nursing management and quiz contents comprising basic, advanced, and mixed quizzes based on the learning contents. Nursing students had access to this application on their smartphones and studied the contents provided regardless of time and space. Moreover, they were allowed to check their scores as soon as they selected and answered the questions included in the quiz contents. Nursing students used a nursing management application during and after lectures. We confirmed their learning process and learning results anytime and provided relevant feedback.

Keywords: *Mobile, Nursing Management, Nursing Student, Smartphone*

1. Introduction

In modern education, the role of active learners is focused on more than that of the instructors providing education. Traditional and general education methods are based on face-to-face lectures. However, as mobile communication technologies and mobile devices have become indispensable in our daily lives [1, 2], an increasing number of teaching and learning methods using mobile devices have been developed because of their advantages such as portability and instant access to information [3].

Specifically, the frequency of use of applications on smartphones and the amount of time spent on them are constantly increasing because they provide various types of information and educational content regardless of time and space [4]. Moreover, the use of applications according to education and learning objectives increases learning effects [5]; thus, an increasing number of mobile applications for smartphones such as iPhones and Android phones are being developed.

Formal curricula for departments of nursing at universities support nursing students in acquiring the capabilities, knowledge, techniques, and attitudes they require through theoretical education and field

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training after they complete major and extra curricula and graduate. An examination of previous studies on applications developed for nursing students in Korea indicates that applications developed based on theoretical education include contents on drug dosage calculation [6], high-risk medication [7], information science [8], and women health nursing [9]. Applications developed based on field training include contents on mental health training [10], core nursing skills [11, 12], neonatal nursing [13], and clinical training orientation [14].

However, few empirical studies on the practical use of applications for nursing students in lectures have been conducted despite an increasing interest in the use thereof. In addition, there are few educational applications developed to support nursing management education. Thus, in this study, a nursing management application for nursing students was developed and used in teaching and learning activities for nursing management education majors.

2. System Design and Implementation

In this study, the functional and non-functional requirements of the nursing management application were distinguished based on previous studies to develop the application. The purpose of the application is to assist the instructor in confirming learners' learning process and provide them with relevant feedback in their major courses [15].

The functional requirements of the nursing management application are classified into items, inputs, and outputs, as shown in Table 1. Nursing students are asked to mark status for their emotions based on a star rating system (1–5 stars) on the main page of the application. On the following page, they input information regarding their ID and password for signing in. The main menu consists of seven parts: introduction to the application, PowerPoint files on nursing management, basic quizzes, advanced quizzes, mixed quizzes, statistics, and settings.

Table 1. Functional requirements of the nursing management application

Items	Inputs	Outputs
Sign in	An ID, a password, and status for emotions based on a star rating system	Information input by the user is displayed on the sign-in page, and the main page is subsequently displayed.
Main menu	Introduction to the application	Pages to introduce the application and information on the developers are displayed.
	Nursing management education	Data of PPT files on nursing management are displayed.
Basic quizzes	Basic quizzes	The page for the selection of educational contents (i.e., basic quizzes) is displayed.
Advanced quizzes	Advanced quizzes	The page for the selection of educational contents (i.e., advanced quizzes) is displayed.
Mixed quizzes	Mixed quizzes	The page for the selection of educational contents (i.e., mixed quizzes) is displayed.
Information	Statistics	Information on the number of tests taken, scores obtained according to test subjects, and time spent on tests is displayed.
	Setting	The page for a password change is displayed.
	Touch screen	The page for the contents of true or false quizzes is displayed.

Touch screen for contents	The page for the contents of five multiple-choice questions is displayed.
Touch screen for contents	The page for the contents of five multiple-choice questions is displayed.
Touch an icon	The page for explanations of all the menus of this application is displayed.

The non-functional requirements of the application are classified into quality factor items related to performance, immediacy, accessibility, expandability, security, and convenience, as indicated in Table 2.

Performance is evaluated based on the contents on nursing management, five multiple-choice questions, hints for answers, learning results, and quiz scores. Nursing students can download and use the nursing management application on their current smartphone devices. They can check their scores immediately after completing the basic, advanced, and mixed quizzes. In addition, access to the application is granted regardless of time and space as long as there is an Internet connection. The instructor confirms the quiz scores obtained by students, provides them with relevant feedback, and protects personal information.

Table 2. Non-functional requirements of the nursing management application

Quality factors	Requirements
Performance 1	Contents on nursing management should be provided.
Performance 2	Users are asked to answer true or false questions or five multiple-choice questions according to the content categories and check their scores.
Performance 3	Hints are provided after users try to answer a question at least twice.
Performance 4	The administrator should be allowed to check all user results.
Immediacy	Users should be allowed to check the results immediately after answering the questions.
Accessibility	Access to this application should be allowed regardless of time and space as long as there is an Internet connection.
Expandability	This application should be installed and operated on a smartphone (iOS and Android phones).
Security	Information on users' scores should be protected.
Convenience	Users should be allowed to download the application from the relevant app store for their current mobile devices.

3. Educational Application

The nursing management application developed in this study was used as a supplementary teaching and learning tool. Nursing students downloaded and installed the application from the app store relevant to their smartphones, such as an iPhone and Android phone, for learning.

The instructor conducted an orientation on the purpose and methods of use of the application in the first lecture, and the developers helped nursing students use it during and after lectures. Figure 1 shows the flowchart of the application.

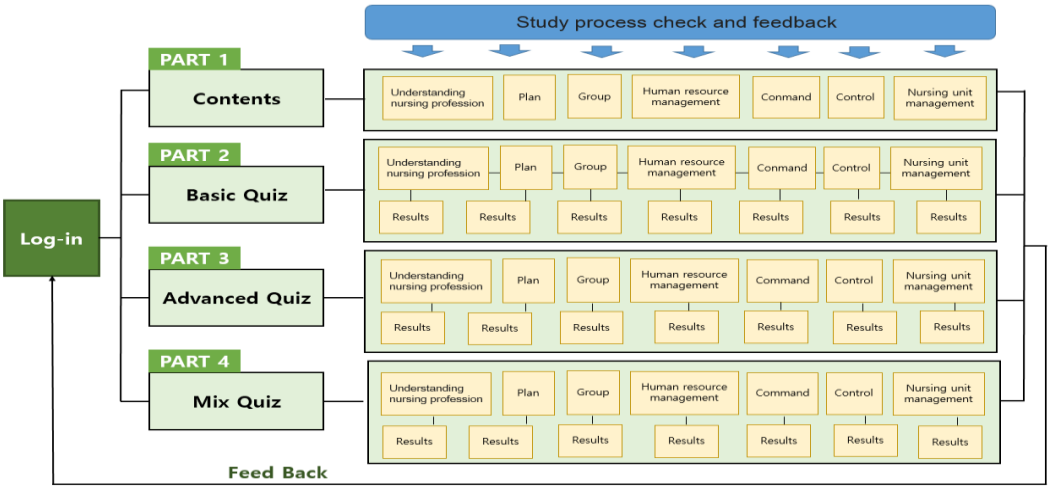

Figure 1. Flowchart of the teaching and learning method

Figure 2 illustrates the screens implemented for it. Nursing students downloaded the nursing management application and watched a usage guide and instruction video, which was included in the application. They used the application during and after lectures. During the lecture, they had access to the educational contents the application provides, which they studied through the learning process of reviewing and repeating. The educational contents comprise six chapters and are displayed in the form of PPT files. The nursing students were allowed to select educational contents on understanding the nursing profession, planning, group, human resource management, command, control, and nursing unit management and perform educational activities such as summarizing lectures and repetitive learning.

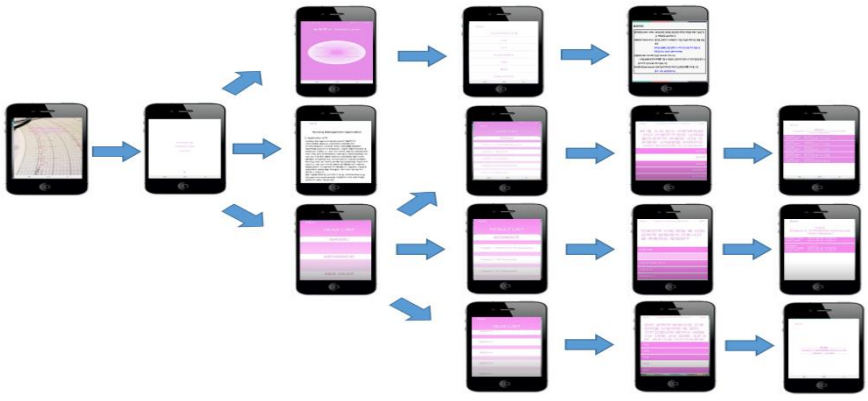

Figure 2. Screens displayed on the nursing management application

After the lecture, they used the educational contents in the application to review their lectures and had access to quiz contents to confirm their knowledge of the contents they had learned. They were also provided with basic and advanced quizzes generated in the form of four or five multiple-choice questions. The mixed quizzes covered the entire contents of the six chapters. After selecting and answering the basic, advanced, and mixed questions, they were allowed to check their scores immediately.

The instructor observed learners' learning status based on the time of access and scores obtained on the administrator website. Based on the status of learning, the instructor provided relevant feedback to the students and performed the required management tasks.

4. Conclusion

The nursing management application developed by the instructor in this study was practically applied in lectures. Learners downloaded the application on their smartphones and used it according to their learning speed regardless of time and space to check their learning results and perform repetitive learning. The instructor was allowed to observe learners' learning status, provide them with relevant feedback, and manage the lectures. This study is significant in that the instructor developed a nursing management application that can be used on learners' smartphones, such as an iPhone and Android phone. Furthermore, the application was practically applied in the formal curricula to supplement lectures. However, the practical effects of using this application during lectures have not yet been verified. Therefore, we suggested that follow-up studies should be performed to confirm the effects of using the application as a teaching and learning method based on the results of this study.

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