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Innovation in learning anesthesia nursing care based on the android application "SIASENA"

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Abstract

Background: The implementation of ASKAN requires nurse anesthetists as one of the health workers involved in providing health services to continue to improve their knowledge and skills. With mobile learning, students have access to learning materials and information from various places and at any time. They are not limited to a certain time or location to learn. The purpose of this study was to produce a prototype and learning model for mobile learning, namely the "SIASENA" application.
Method: This study uses the research and development (R&D) method, which is a research approach intended to create a particular product and test the effectiveness of the product. This research will follow 4 steps as a modification of the entire R&D process, The first step, Developing the concept and platform, includes the preparation of the concept and platform. A literature review was conducted to gather information on the study of ASKAN peri anesthesia cases, research and development (R&D) to build the platform, and the importance of the platform product in the education system of nurse anesthesia students. Focus group discussions with experts in anesthesia care will also be conducted. The second step, Developing content and platform, includes the creation of a preliminary form of the SIASENA Application product through offline field testing. The research team will identify shortcomings in this platform before developing an online version. The development of the SIASENA Application will involve mobile learning experts/IT experts, as well as collaboration with a team of anesthesia experts to develop relevant cases. The third step, Checking content and Platform, involves a review of the application-based platform by IT experts, Anesthesiology Nursing Lecturers, Anesthesiology Nurses/Anesthesia Administrators in the IBS Unit, and Surgical Area Expert Nurses. The prototype will be tested by a group of students, and the results will be used to revise the platform if necessary. The platform will then be tested on the main sample, namely students of the D4 Anesthesiology Nursing study program, Faculty of Health Sciences (FIKES) UM Purwokerto who have completed the Anesthesia Instrumentation and Anesthesia Nursing Methodology courses. The final step, Content and platform evaluation, involves analyzing data from testing on the main sample using a playtesting approach. Playtesting includes observations of team members, surveys to users, and interviews with IT experts.
Results: This study produced a prototype and a Mobile Learning learning model, namely the "SIASENA" Application, the purpose of utilizing/using the "SIASENA" application is expected to increase the appeal and variety of student learning media and improve the competence of anesthesia nursing students in learning Anesthesia Nursing Care (ASKAN) Peri Anesthesia. The Integrated Development Environment (IDE) used is Android Studio. The Database Management System (DBMS) used in building the database is MySQL. To integrate the Android-based SIASENA application with the MySQL database using web service technology written in the PHP programming language using the Visual Studio Code editor.
Conclusion: The creation of an android-based learning application "SIASENA" as an innovation in learning anesthesia nursing care, especially documentation, has been successful. With this application, it is expected to support learning anesthesia nursing care in anesthesia nursing education institutions.

Keywords: Innovation; Learning Application; Anesthesiology Nursing Care; SIASENA

INTRODUCTION

In learning planning, a teacher is expected to be able to design learning using various types of media and appropriate learning resources, so that the learning process can run effectively and efficiently(1)(2). Learning is a process of interaction between students, educators, and learning resources in a learning environment that includes the exchange of information between teachers and students(3,4). In the context of education, the role of the teacher is to teach so that students can learn and master the subject matter to achieve the goals that have been set(5). This process involves cognitive aspects, where students are expected to understand the subject matter(6), as well as effective aspects that can influence changes in attitudes, and psychomotor aspects related to the development of student skills(7) and all of that can be achieved if they are able to design learning media properly(8,9). Learning media is a tool or intermediary used to communicate information or lessons with the aim of stimulating students to learn(2). Android application-based learning media is a new innovation in the field of education(10). This type of learning media has generally become an educational application or application that contains learning materials and materials(11). The application can be downloaded and installed on smartphones or gadgets that use the Android operating system, and is usually available on Google Play or the Play Store. Basically, Android application-based learning media is a learning media product in the form of an application that can be accessed or downloaded via an Android-based smartphone(12). The use of applications as learning media is a method that can be used by teachers to improve student achievement and interest in learning(13). The use of this learning media is expected to support students' understanding and acceptance of the learning process delivered by teachers in the digital era(1,14), especially to improve competency in the health sector, one of which is the field of anesthesia nursing. Competence in the field of anesthesia nursing involves a multidimensional concept consisting of seven skill areas, namely Anesthesia service ethics, Patient risk services, Patient involvement with technology, Collaboration in anesthesia services, Patient care with medication, Anesthesia nursing interventions, and Knowledge of anesthesia care (15). It is important to ensure that nurses, especially novice or student nurses, have adequate competence in caring for patient risks and have sufficient knowledge of anesthesia care through periodic competency assessments. One effort to improve the competence of nurse anesthesia nursing is to provide more opportunities for special education in the field of anesthesia nursing, especially when providing anesthesia nursing care. Anesthesia nursing care is a nursing specialty that focuses on caring for patients who are preparing for, undergoing, or recovering from anesthesia(15). Patients under anesthesia care typically undergo four phases of the anesthesia care process (pre-anesthesia, anesthesia induction, during anesthesia, and post-anesthesia) in two main forms: general anesthesia care and monitored anesthesia care (MAC), which combines sedation and analgesia in local/regional anesthesia(16).

The quality of learning depends on the learning method used and can facilitate the learning of nursing care as a whole, involving cognitive, affective, and psychomotor aspects. The use of quality media requires significant budget allocation(17). However, with changes in policy and rapid advances in information technology, the traditional learning paradigm is changing(18). With mobile learning, learners have access to learning materials and information from various places and at any time. They are not limited to a certain time or a specific location to learn(18). Mobile wireless technology allows them to learn in both formal and informal contexts without having to wait for time or go to a certain location(19).

The purpose of this research is to produce a prototype and learning model for mobile learning, namely the "SIASENA" application. This study utilizes the research and development (R&D) method, which is a research approach intended to create a specific product and test the extent of the product's effectiveness. The urgency of this research is that anesthesia nursing education needs to find innovative and accessible learning methods, creating students who are ready to become professionals.

METHOD

A. Dataset

The innovation/newness of this research is to create a prototype or application platform by utilizing the concept of local wisdom that describes the documentation of anesthesia nursing care starting from Assessment, Data Analysis, Anesthesia Nursing Problems, and Planning systematically to facilitate.

The first step, Drafting the concept and platform, involves the development of the concept and

platform. A literature review is conducted to gather information on the assessment of peri anesthesia ASKAN cases, research and development (R&D) to build the platform, and the importance of the platform product in the education system of nurse anesthetists. Focus group discussions with experts in anesthesia care will also be conducted.

The second step, Developing the content and platform, involves the creation of a preliminary form of the SIASENA Application product through offline field testing. The research team will identify shortcomings in this platform before developing an online version. The development of the SIASENA Application will involve mobile learning experts/IT experts, as well as collaboration with a team of anesthesia nursing experts to develop relevant cases.

The third step, Examining the content and Platform, involves a review of the application- based platform by IT experts, Anesthesiology Nursing Lecturers,

Nurse Anesthetists/ Anesthesia Administrators in the IBS Unit, and Surgical Area Nurse Experts. The prototype will be tested by a group of students, and the results will be used to revise the platform if necessary. The platform will then be tested on the main sample, namely students of the D4 Anesthesiology Nursing study program, Faculty of Health Sciences (FIKES) Universitas Muhammadiyah Purwokerto who have completed the Anesthesia Instrumentation and Anesthesia Nursing Methodology courses. The last step, Evaluating the content and platform, involves analyzing data from testing on the main sample using a playtesting approach. The playtest includes observations of team members, surveys to users, and interviews with IT experts.

B. Application requirements analysis

Collecting and analyzing all the needs and specifications of the application to be developed(20). Activities carried out in this stage include:

1. Stakeholder Identification

Determining who is involved in the development of the SIASENA Application. The parties involved in the development of this application are lecturers, students, developers, and anesthesia nursing material experts(21,22).

2. Data Collection

Interview, survey, or discussion sessions to obtain information about the functional and non-functional needs of the application are carried out. Functional needs include learning material and simulation features, while non- functional needs include performance, security, and user interface.

3. Needs Documentation

The preparation of detailed documents related to all application needs and specifications is carried out in this activity, including system needs, functionality, and limitations.

C. System Design

Prepare a detailed application design based on the needs that have been collected. Activities:

1. Architectural Design

This activity will create a design for the application structure, including system architecture, platform selection (iOS, Android, or cross-platform), and selection of the technology used. The platform chosen is Android, where smartphone users with the Android platform reach 84.67% of all smartphones in Indonesia.

2. User Interface Design

This activity will create a prototype for the user interface, including layout, navigation, and interactive elements. The results of this interface design will be used as a reference in the development of the SIASENA application.

3. Database Design

The design of the database structure, tables, and relationships between data is carried out to support the running of the SIASENA application. The database is used to store user data and simulations of anesthesia nursing care.

4. Module Design

The design of application components or modules such as login systems, learning materials, and simulations are also made as materials in the development of the SIASENA application.

RESULTS

A. Developing applications

The implementation in question is the process of creating the SIASENA application in the form of a complete application. It includes the development of program code which is done bywriting the source code for the SIASENA application according to the specifications and designs that have been made. This activity includes the development of user interfaces, application logic, and integration with databases. The Integrated Development Environment (IDE) used is Android Studio. The Database Management System (DBMS) used in building the database is MySQL. In order to integrate the Android-based SIASENA application with the MySQL database using web service technology written in the PHP programming language using the Visual Studio Code editor. In this activity, all application modules and components are combined into one complete system unit.

At this stage, software design is realized as a series of programs or program units. Unit testing involves verifying that each unit has met its specifications. For unit testing, it is carried out by two validators, namely material experts and media experts, material expert validators by Ns. Marta Tania Gabriel Ching Cing, S. Kep., M.Kep and media expert validator by Mrs. Zahrasita Nur Indira, A.Md.RMIK., S.Tr., M.K.M. The results of the validation are used as a basis for revising the smartphone-based learning module (android) and as a reference for the validity of the instrument to be used in this study.

Picture 1.1 Login Page Picture 1.2 Home Page

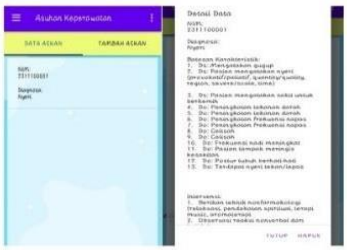
Picture 1.3 Home Page SIASENA

Picture 1.4 Logout View

Picture 1.5 Select Anesthesia Nursing Problem

Picture 1.6 Input Characteristic Limits

Picture 1.7 Input Intervention/Action Plan



Picture 1.8 ASKAN Data Result Page that was entered

Figure 1. Image of the SIASENA software design

5. Media validation

Media validation aims to see whether the module or media developed is valid or still needs to be revised. The data from the validation results of experts for each learning media format are analyzed by considering the assessment, input, comments, and suggestions from the validator. The validation results are divided into two parts, namely validation from media experts and material experts.

a. Media expert

Software testing was carried out using the Blackbox testing Boundary Value Analysis method and the Android Application Feature Test on the SIASENA application (Anesthesia Nursing Care System) with overall successful results in several test components, including Student Login Page Testing, Lecturer Login Page Testing, Home Page Testing, Anesthesia Nursing Care Page Testing, Monitoring and Evaluation Page Testing of Anesthesia Nursing Care Results. (I attach the complete results)

Table 1. List of functional requirements of the application

No	Menu
1.	*Login*
2.	*Home*
3.	Anesthesia Nursing Care System
4.	Monitoring and Evaluation of Anesthesia Nursing Care Results
5.	*Logout*

b. Material expert

Material suitability testing was carried out by someone who is proficient in anesthesia nursing care with components of suitability of material with the application, image illustrations with the application, completeness of the menu flow in the application, clarity of the purpose of the application and clarity of information from the application for users. In general, the results of the test were in accordance with what was expected by researchers and user partners.

6. System Testing

Ensure that the application functions well overall and meets user needs. Initial trial or readability test is used to determine whether the developed module can run well. The number of research subjects was 10 students. The instruments used were a learning module on documenting anesthesia nursing care based on smartphones (android) and a respondent questionnaire.

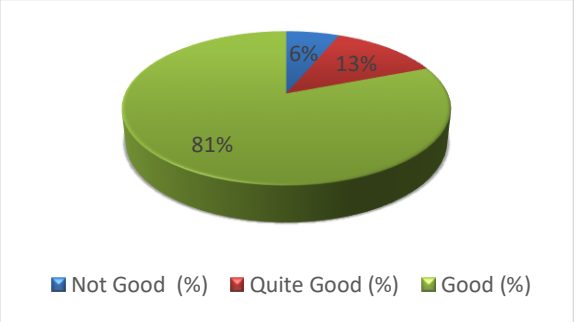


Figure 2. The average percentage of questionnaire response

The average percentage of questionnaire response results to the smartphone-based learning module (android) was 80.88% with an average of 3.19 (good criteria). Testing was carried out to ensure that each part of the application works well according to the design that has been made. Testing was carried out using the Blackbox testing Boundary Value Analysis and Feature Test Android Application methods, where testing only focuses on the functionality of the system/application. If there is a discrepancy between the application and the design, improvements or adjustments will be made.

DISCUSSION

The formulation of the problem in this study is how does the innovation of learning Askan Peri Anesthesia Based on the Application "SIASENA" affect the improvement of the Competence of Anesthesiology Nursing Students? The purpose of this study is to produce a prototype and learning model of Mobile Learning, namely the "SIASENA" Application, the purpose of utilizing/using the "SIASENA" application is expected to increase the attractiveness and variety of student learning media and improve the competence of anesthesia nursing students in learning Anesthesia Nursing Care

(ASKAN) Peri Anesthesia. These results are in line with Jeon's (2020) research which states that nursing education should provide greater opportunities to improve nurses' competence in knowledge of anesthesia theory(23).

The Integrated Development Environment (IDE) used is Android Studio. The Database Management System (DBMS) used in building the database is MySQL. In order to integrate the Android-based SIASENA application with the MySQL database using web service technology written in the PHP programming language using the Visual Studio Code editor.

All modules and application components are combined into one complete system unit. Software testing was carried out using the Blackbox testing Boundary Value Analysis method and the Android Application Feature Test on the SIASENA application (Anesthesia Nursing Care System) with overall successful results in several test components, including Student Login Page Testing, Lecturer Login Page Testing, Home Page Testing, Anesthesia Nursing Care Page Testing, Monitoring and Evaluation Page Testing of Anesthesia Nursing Care Results. Meanwhile, the results of the material expert test were in accordance with what the researchers and user partners expected(11).

The implementation of the initial trial or readability test was used to determine whether the module that had been developed could run well. The number of research subjects was 10 students. The instruments used were a learning module on documenting anesthesia nursing care based on smartphones (android) and a respondent questionnaire. The average percentage of questionnaire response results to the smartphone-based learning module (android) was 80.88% with an average of 3.19 (good criteria). Testing is done using the Blackbox testing method Boundary Value Analysis and Feature Test Android Application, where testing only focuses on the functionality side of the system/application. If there is a discrepancy between the application and the design, then improvements or adjustments will be made.

CONCLUSIONS

The "SIASENA" application is expected to increase the attractiveness and variety of student learning media and improve the competence of anesthesia nursing students in learning Anesthesia Nursing Care (ASKAN) Peri Anesthesia. The Integrated Development Environment (IDE) used is Android Studio.

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