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Development of Comprehensive web based learning Nursing Process Program on Linked NANDA, NOC and NIC

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Abstract. The purpose of this study was to develop and evaluate comprehensive web based program for improving learning ability in the nursing process of nursing students. We evaluated the contents based on the sufficient teaching materials and developed the process for implementation of the educational system. The participants were 62 nursing students. After implementation during 8 weeks, data was analyzed with the SPSS WIN 21.0. There were significant differences of achievement of learning objectives, application to work, according to the frequency of program use. Therefore, developed web based program will help to strengthen learning calculation ability of nursing students in nursing process. And also, the results suggest that more powerful web based program for improving academic confidence and increasing participation should be developed.

Key Words: Nursing Process, Guideline, Classification, Education

1 Introduction

As a result of the continued development of medical technology and improvements in the level of knowledge regarding medical subjects, continuous quality improvement in nursing is essential in the rapidly changing competitive medical environment. Also, accurate and prompt delivery of information and the appropriate use of information are necessary, given the ever-increasing amount of information. Improved productivity with regard to medical records and other areas of nursing management are also important in improving the quality of nursing [1].

Most information created and used by the nurse conventionally takes the form of natural language. As EMR systems have developed, a common question is how best to record information to accurately reflect the phenomena of nursing and the problems of patients. The use of natural language in an EMR system is optional, but if all clinical information used by nurses is stored in a natural language state alone, it is not readily accessible to computer-based applications, such as, for example, statistical research or automated decision-making systems [2], [3]. Nursing professionals have

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typically pursued specialized training and nursing education has undergone change in the last decade with the introduction of information technology [4]. Nursing diagnosis not only demonstrates that the essence of nursing is the underlying science, facilitating the development of theories and nursing studies [5]. But, undergraduate nursing students considered clinical practice to be the most stressful in nursing program education.

Therefore, the purpose of this study was to develop and evaluate the comprehensive web based program for improving learning ability in the nursing process of nursing students. Through this research, we can effectively not only apply the nursing process but also develop learning ability in clinical practice education.

2 Method

2.1 Design This study was used a descriptive study for the web based nursing program by nursing students during clinical nursing practice education.

2.2 Participants Study participants were eligible nursing students in C province of South Korea and 62 nursing students were willing to participate in this study.

3 Instruments

3.1 Web based nursing program

Linking NOC and NIC to NANDA

Johnson et al [6] described the linkage of NANDA, NOC, and NIC, and this nursing-terminology system (NNN) can be used as the language of nursing courses. However, each linkage was based on the determination of specialists, rather than the results of statistical analyses of the actual behavior of nurses.

3.2 Developmental environment

The development and operational environment of system is as follows.

- Program language: Java (development kits 1.8.0)
- User Interface: Java Swing
- Database: MySQL Server 5.6
- Database Interface: JDBC (MySQL connector 5.1.27)

- Operating System: Windows 2003 server

The basic development language of system was Java language. Therefore, in order to access DBMS (Database Management System), JDBC (Java Database Connectivity) offered by Microsoft was used. Also, the saving, search, modification, and deletion of data were performed using DAO (Database Access Object). Data in system was generated and delivered in the pattern of a Java class, and this was nominated simply as 'Bean'. Also, this system was performed based on the service-oriented architecture (SOA), which assembles the defined service according to business requirements and realizes desired functions, unlike existing development methods [7].

3.3 Reactivity of program and achievement of learning objectivity

To evaluate reactions to the program, utilizing frequency and correction answer rates were calculated based on the average times daily who participated, number of times recorded programs were accessed on the administrator screen for 8 weeks. In order to evaluate satisfaction with the program, we used five items from Nguyen's Satisfaction Questionnaire-8 (CSQ-8) [8]. The CSQ-8 measures perceptions of actual use and satisfaction with utilization and includes the following items: "How would you rate the quality of the education you used? Did you receive the program you expected? How much does this program satisfy the nursing process using you expected? Would you recommend this program to your friends? How would you rate your overall satisfaction with the program you used? Do you think web based nursing process education program is necessary?" Each item was measured on a 5-point Likert scale, with high scores indicating high satisfaction.

3.4 Benefits to work

To evaluate benefits to the program, confidence and anxiety level were measured for applying in nursing process. Confidence and anxiety levels were measured using a NRS (numeric rating scale).

4. Data analysis

Data were analyzed using the SPSS WIN (22.0). Descriptive statistics, appropriate the level of measurement, were used to describe the study variables. Paired-t tests and one way ANOVA were used to assess the mean differences among groups.

5 Results

5.1 System design

Two NNN experts analyzed the structure and requirements of the program to develop useful program in the learning of nursing process. As a result of analysis, the structure of the program consists of the client program through the query processing and the NNN database web server. The client program consists of four functions, patient information, nursing plan, nursing practice, of nursing record (Figure 1). In particular, the NNN database server built up the relational database by analyzing the data in an object-oriented perspective.

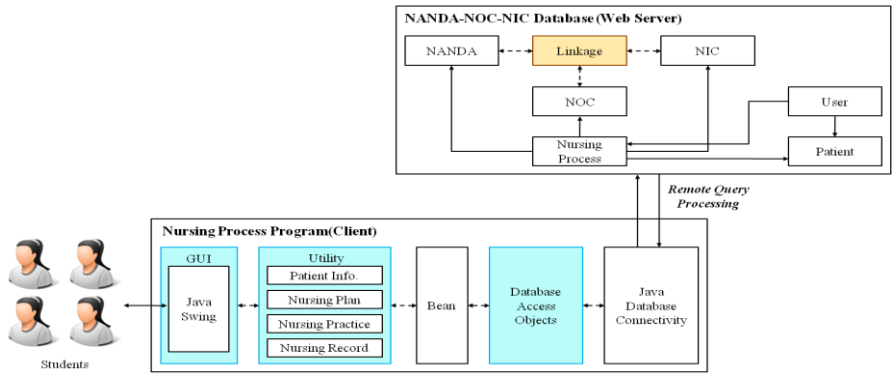


Fig. 1. Architecture of web based Nursing Process Program

5.2 System development

This study developed Nursing Process Program to meet the analyzed requirements by using the Java programming language. This program used NNN JDBC MySQL connector to connect to the database server built into MySQL Server 5.6. And the program is implemented the user interface by using Java Swing. The user can join the member registration in screen, when approved by the administrator may execute the program. The program is composed of the registered patient information, nursing plan, nursing practice, nursing record tab. Registered patient is updated the left panel at the same time (Figure 2).

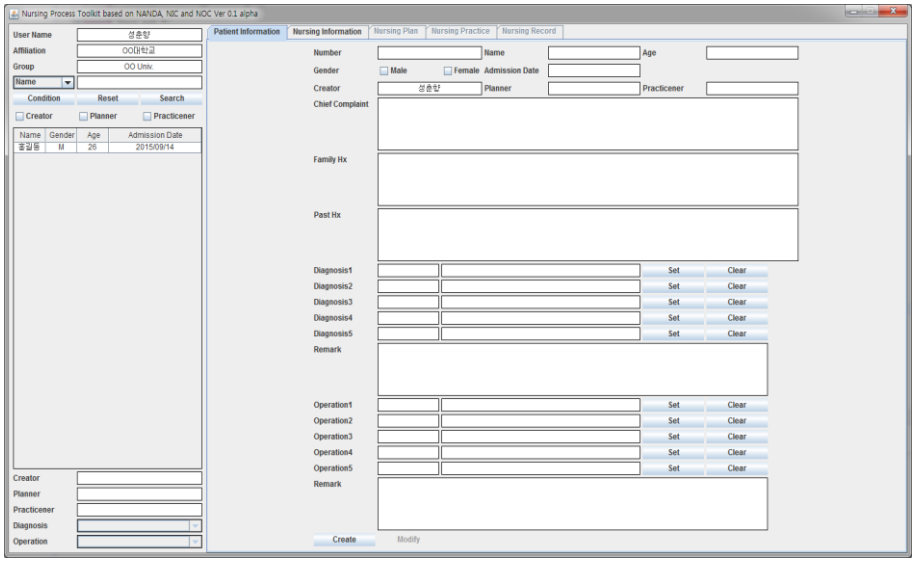


Fig. 2. Patient information

The nursing plan tab is activated when you select one of the registered patients, this can temporarily select and store nursing diagnosis (defining characteristics, related factors, risk factors), nursing results (indicators), intervention (Nursing activities) conjunction with 8 tables placed in the top (Figure 3).

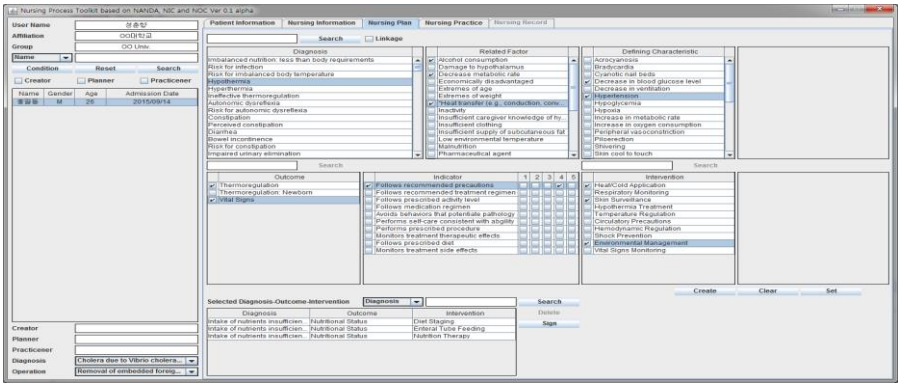
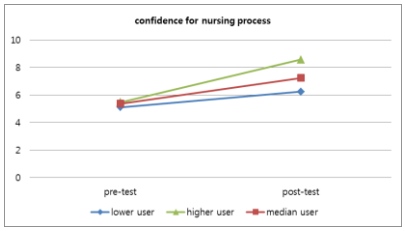


Fig. 3. N-N-N Linkage

5.3 Adoption Evaluating

Table 1. Reactivity of program and achievement of learning objectivity

		Low group (n=13)	Middle group (n=22)	High group (n=27)	F(*p*)
Reactivity	Number of participants	11.21 (21.21)	17.21 (15.90)	90.12 (31.21)	321.83 (<.001)
	Connect time(min)	30.01 (15.21)	48.21 (26.33)	230.33 (142.21)	94.77 (<.001)
	satisfaction	3.09 (.70)	3.81 (.59)	4.59 (.50)	29.312 (<.001)
achievement	Nursing process knowledge	5.18 (.98)	6.45 (1.43)	9.03 (.59)	67.114 (<.001)



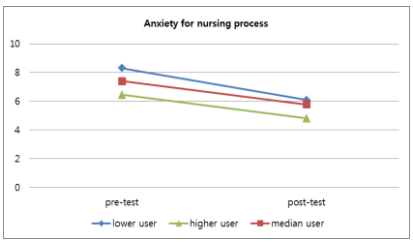


Fig. 4. Benefits to work (confidence, anxiety level) according to the degree of use of the program

6 Conclusions

This study was focused on integrating a nursing knowledge system using web based programs to enhance the applicability of the nursing process for nursing students. This was done by including actual data and nursing statements corresponding to the signs and symptoms of subjects to the nursing information system with the aim of helping the nurse to easily identify the patient's problem. In educational aspect, using the system described, standards can be developed for each type of nursing unit based on a

nursing information system that includes a nursing diagnosis / outcome / intervention linkage, and this can be used in nurse education.

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