

# Using Interactive Multimedia Web Interface for Multicultural Healthcare Education

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**Abstract.** Interactive multimedia education using web technology is a beneficial area of education. Multicultural healthcare is one of the major issues in the healthcare industry which is facing the rapid globalizing of healthcare market. The purpose of this study was to describe a research which purpose is to develop an interactive multimedia education program using web interface to enhance cultural competency of the healthcare professionals. The system is being developed using the following five processes: 1) Analysis stage 2) Designing stage 3) Content framing and development stage 4) Program application stage 5) Evaluation stage. The completed program was applied to nurses in the community hospitals and interactive web based multimedia education was an effective e-learning media of healthcare professionals in the information age.

**Keywords:** e-learning, Healthcare, Culture

## 1 Introduction

### 1.1 Background

With the rapid change in working environments in healthcare, there is a significant need to train healthcare professionals. Web based interactive multimedia learning is an important method that can be used to supplement or replace the off-line education, facilitating easy and fast access to learning experience. This method allows the user to control the time and contents of education and provide a variety of entertaining multimedia formats including online lectures, video & audio materials, and interactive discussion with peers [1].

Korea is one of the fastest globalizing countries showing that the ratios of foreigners living in Korea and multicultural families are on the rise. Healthcare system needs to be changing and evolving with the cultural norms, beliefs and values, social structure and environmental conditions. Thus, multicultural education is needed urgently to improve the cultural competency of healthcare in Korea [2].

Education on healthcare professional is typically delivered group based with text based information [3]. Individualized web education and multimedia can save the healthcare professional's time and efforts. Interactive multimedia can be effective tool

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designed to be used in tailored education, where participants can learn about specific topics in efficient ways at their workplace or home [4].

## 1.2 Purpose of the Study

In this study, a web based interactive multimedia education program using user friendly interface for multicultural education program targeting the nurses in hospital settings was developed. The specific purposes of the study were follow as;

- 1) To analyze the target users' needs for education and develop the interactive multimedia education
- 2) To design the system architecture and database

## 2 Method

An adaptation of the model for developing interactive multimedia was used to guide program construction (Figure 1). During the analysis stage, learners' needs on interactive multimedia for multicultural education were investigated with a group of nurses in the community hospitals.

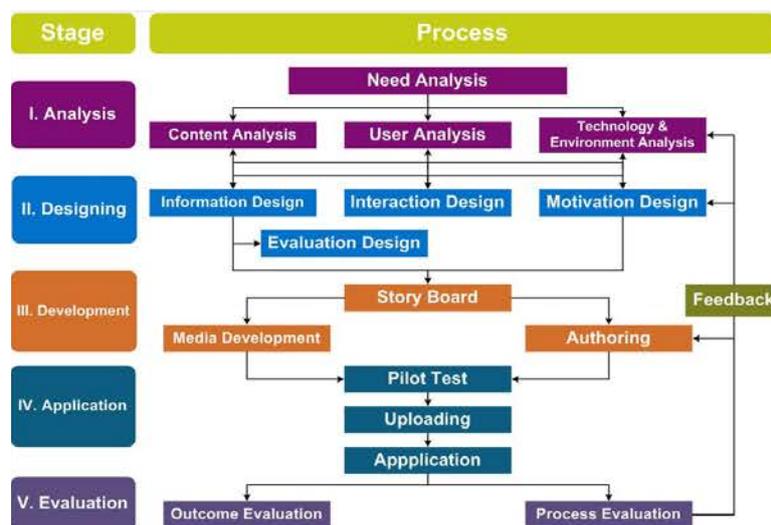


Fig.1. Process of System Development

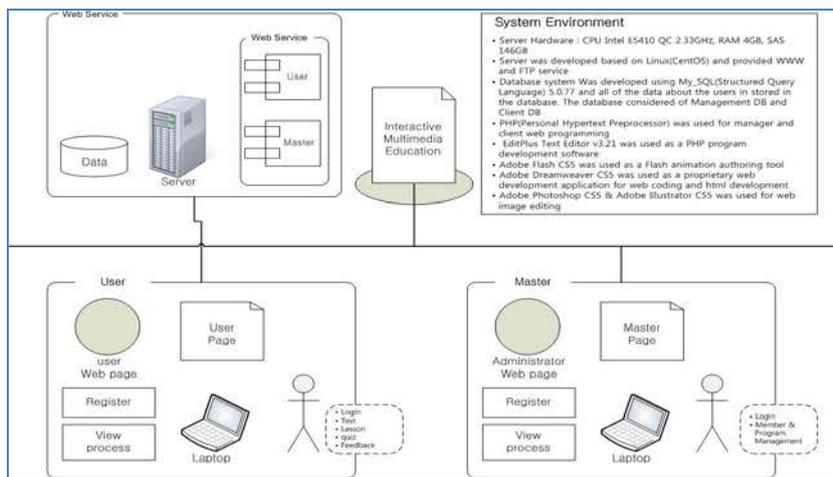
The design phase, content was classified into texts, images, and video & audio. Information of multicultural competency concepts were designed mainly using online lectures and interactive case scenarios. Post-learning discussion and Q & A were designed to solicit users' impressions of the learning experience and facilitate interface. The preview of each learning activity was provided in order to stimulate

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users' interests in learning activity. Functions to evaluate users' learning progress include quizzes, online test, assignment, discussion, and activity participation check.

In the production phase, the structure of the program was organized into a sequence of modules and user friendliness considering difficulties of content, and the technological possibility of implementation (Figure 2). The system environment of the web program was as follows;

- Server Hardware: CPU Intel E5410 QC 2.33GHz, RAM 4GB, SAS 146GB
- Server: Linux(CentOS) and provided WWW and FTP service
- Database system: MySQL(Structured Query Language) 5.0.77, Management DB and Client DB
- Master and user web programming: PHP(Personal Hypertext Preprocessor)
- PHP program development software: EditPlus Text Editor v3.21
- Graphic authoring: Adobe Flash CS5
- Web coding and html development: Adobe Dreamweaver CS5
- Web image editing: Adobe Photoshop CS5 & Adobe Illustrator CS5



**Fig.2.** Structure of System

In the operation phase, produced content was uploaded on the web. Learners had the login process in the main page and needed to be approved by the instructor to use the site and then could access lessons and activities.

During the evaluative phase, the evaluation survey assessed the users' perception of the learning environment. Specifically, it consisted of 14 statements, with seven statements for each of the two categories: instructional values and instructional function. Users were required to respond to each statement a five point Likert-type scale where 5 equals strongly agree and 1 equals strongly disagree.

The interactive learning consists of 14 multimedia lessons. Within each lesson, the visuals on screen included video lectures and powerpoint slides. Navigation of the lessons was sequential from Lesson 1 to Lesson 14 and no lesson could be skipped. The learning environment contained a number of features including (1) its

size was 800 x 600 pixels; (2) a listing of all lessons, with showing which lesson was completed by the users; (3) graphical aids indicating what lesson the learner was in (4) a control panel containing a back button, a replay button, and a next button (Figure 3).

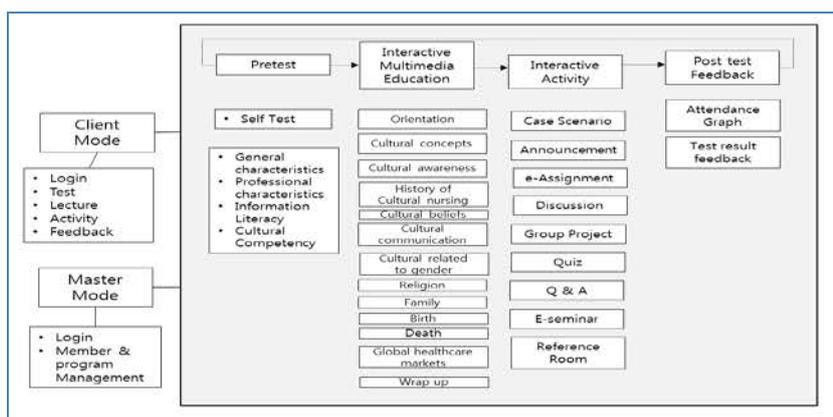


Fig. 3. Design of Web-based Interactive Education

### 3 Results

The web based learning was evaluated for two attributes, i.e., instructional value and instructional function. The results from users indicated high satisfaction of the participants and good quality of the web-based learning medium. The users found the web-based learning unit entertaining (4.30±.55) and could easily learn from it (4.20±.54). It enabled them to grasp easily the main concepts of the multicultural healthcare (4.00 ±.42). Interactive multimedia and interactive case scenario could effectively demonstrate the situation and context of multicultural healthcare by transforming the abstract content into concrete practice situation (4.00±.69). Additionally, quizzes and feedback assisted them to review the content and to assess themselves for knowledge development. The results also suggested that the participants perceived the web-based learning unit as a useful tool for controlling the speed of learning (4.00±.34) and holding attention (4.20±.23). Regarding web-based design, most users indicated that the developed unit was appropriately designed, and the content in each chapter was not excessive (4.01±.35). It was easy to navigate and follow (4.08±.38). The features in terms of voice, font, color, animation, graphics were of high quality (4.20±.30) and appropriate to the level of participants (4.00±.20). It was perceived as an appropriate interface for participants' learning process (4.01±.45).

### 4 Discussion

This study described the development and evaluation process of an interactive multimedia such as online lecture and quizzes to facilitate healthcare professionals' participation and comprehension of multicultural healthcare education. Distance

## Using Interactive Multimedia Web Interface for Multicultural Healthcare Education

learning is an opportunity for nurse educators and institutions to develop a learning environment in order to enhance continuing professional development [5]. It provides options for lifelong learning for healthcare professionals-including those working in community settings-that is effective and cost efficient. Development of web based professional development programs can contribute to widening the participation of community healthcare professionals in lifelong learning, practice and role development [6].

In this study, multimedia lectures with interactive case scenario were used. Augmentation of self-directed learning via an interactive multimedia can provide the users with the significant advantage of increased knowledge and skills. Interactivity, practice exercises, repetition, and feedback seem to be associated with improved learning outcomes. This may be due to the interactive feature of the unit with animation, colorful pictures, interactive quizzes, exercises and case scenarios [7].

## 5 Conclusion

The web-based individualized interactive education is an innovative approach that provides a mean for healthcare workers to improve their competence for new technology and knowledge. It empowers nurses with different knowledge levels to enhance their competence for multicultural healthcare. This study considers the opportunities that web-based and online education programs can provide community practitioners to promote professional skills while maintaining a work-life balance, and the role of the lecturer in successfully supporting professionals on web-based learning programs.

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