



Effects of Interactive E-Books on the Anxiety Level and Satisfaction of ICU Patients' Family

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ABSTRACT

In an Intensive Care Unit (ICU), patients' families play a very important role; however, they often lack medical knowledge and are extremely anxious, which could affect their ability to take care of the patients. The effects of giving conventional paper-based instruction are limited in terms of improving patients' families' understanding of the facilities and the rules in the ICU and in reducing their anxiety. Therefore, in this study, an interactive e-book was developed to present the nursing education content to ICU patients' family members. An experiment was conducted to compare the learning performances and perceptions of the patients' family members learning with the interactive e-book and those who learned with the conventional approach.

The research results showed that the nursing e-book significantly improved the learning performances of the ICU patients' family members, although their anxiety was not immediately reduced. Moreover, the family members perceived that the e-book was useful and easy to use, and generally showed high satisfaction with its use. This reveals the potential of using interactive e-books to improve the quality of nursing service in hospitals.

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INTRODUCTION

Medical care in the 21st century tends to be family-centered. Family-centered caring can improve the communication of patients, family, and medical staff and hence improve the patients' recovery. In the past, the nursing staff gave patients or family members nursing instruction or an introduction to the ICU environment by way of paper-based instruction, which was often found to cause difficulties (Cypress, 2013; Torke et al., 2016). For instance, using conventional paper-based instruction, it is difficult for the nursing staff to clearly explain the operating procedures of the medical equipment to the patients' families. In addition, most of the nursing staff are too busy to ensure that the patients' families really understand the provided instruction (Yusof, 2015).

A multimedia digital e-book can let nursing staff provide health education more conveniently because it not only integrates health information, but also offers interactions and multimedia with audiovisual information (Bernard & David, 2001). After thorough investigation, few studies regarding an interactive e-book for ICU health education were found, as most instruction has been given via paper or video. With the advancements in technology, we applied an interactive e-book on ICU health education for patients' families. It was expected that, via presenting the ICU-related knowledge in an interactive manner with multimedia, the family members of the patients could have better learning achievements and be more satisfied with the instructional mode.

purpose:

This study aimed to use an interactive e-book to present the health education of the ICU and apply it in an ICU nursing instruction activity to let information technology be truly implemented in nursing instruction and simulated contextual education.

METHODS AND MATERIALS

This study attempted to combine mobile devices with e-book teaching software and to use the interactive practice functions to develop a multimedia interactive e-book learning system. Therefore, a multimedia interactive e-book mobile learning system was developed.

A sample of 80 ICU family members was recruited. participants were randomly assigned into either the experimental group (n = 34) or the control group (n = 46), The two groups of patients' families had different learning activities. The experimental group used a multimedia interactive e-book mobile learning system to learn while the control group used oral one-to-one health education instruction. A certain medical health education pamphlet was chosen as the learning content. After the learning activity, the two groups completed a post learning questionnaire

RESULTS

A combination of e-books and mobile learning in nursing instruction.

The e-book editing software (SimMagic eBook) produced by HamaStar was used as the tool for the teaching material design. It was expected that through interactive e-books, the patients' families could be assisted to understand the functions of the devices in the ICU, the rules of the wards, and how to comfort the patient. Figure 1 shows the system structure of this study.

System interface and function design

The e-book was divided into three chapters: rules of wards, devices and facilities, and comforting patients. The content was retrieved and modified from the nursing pamphlet in a northern medical center, and it was discussed, organized, and summarized with the help of three nursing professionals at that medical center. The structure of the e-book content is shown in Figure 2.

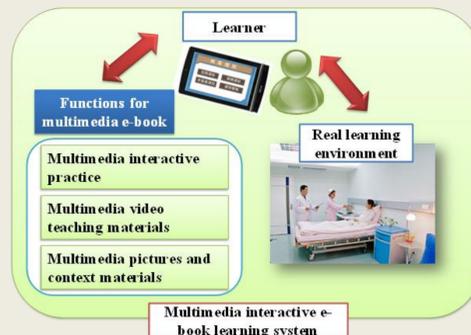


Figure 1. Structure of the interactive e-book system.

Perceived helpfulness

Table 1 shows the t-test result of the post-questionnaire ratings of the two groups. A significance was found for the perceived helpfulness of the two groups with $t=2.195$ ($p < 0.05$). This implies that most family members were more accepting of the instruction of the ICU equipment and environment from the interactive e-book system than from the traditional approach (being presenting with printed materials by nurses).

Anxiety level

Table 2 shows the result of the analysis of covariance. After excluding the effects of the covariant variable (pre-questionnaire of anxiety for the family of patients) on the dependent variable (post-questionnaire of anxiety for the family of patients), no significance was found for the result of the questionnaire of anxiety for the two groups ($F(1,77) = 3.151$, $p = 0.08 > 0.05$). That is, using an interactive e-book learning system for health education instruction did not affect the anxiety of the patients' families.

Learning satisfaction with the interactive e-book

The statistical result of the experimental group's learning satisfaction is shown in Table 5. It is found that the means of a higher proportion of the items are above 4.0, except for that of the item "using the e-book learning system helps me discover new problems" (i.e., 3.97). These results show that the families believed that using the interactive e-book to learn was generally beneficial for helping them to learn the health care knowledge and to learn about the ICU environment. They enjoyed reading the e-book, which could be due to its interactive learning design

	Group	N	Mean	S.D.	t
Perceived helpfulness	Experimental group	34	4.26	0.44	2.195*
	Control group	46	4.00	0.58	

Table 1. Perceived helpfulness

Variable	N	N	Mean	S.D.	Adjusted mean	Std. error	F
Post-questionnaire	Experimental group	34	2.42	0.62	2.41	0.09	3.151
	Control group	46	2.18	0.70	2.19	0.08	

Table 2 Anxiety level.

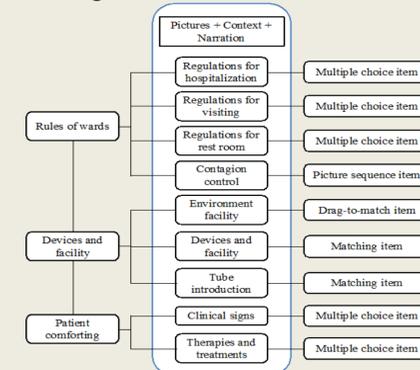


Figure 1. Structure of the interactive e-book system.

Item	Mean	S.D.
1. Using the e-book learning system to learn health education is more interesting than previous introduction approaches.	4.02	0.57
2. Using the e-book learning system helps me discover new problems.	3.97	0.62
3. Using this learning system makes me think in a new way about the health education issue.	4.05	0.73
4. I really enjoy using this e-book learning system.	4.02	0.67
5. I hope I can learn other relevant contents in this way.	4.00	0.73
6. I hope I still have the chance to learn using the e-book learning system.	4.15	0.59
7. I would recommend this e-book learning system to other people.	4.14	0.65

Table 3. Statistical results of satisfaction with the interactive e-book.

DISCUSSION

The study is valuable since there is a lack of research on applying e-books for family members to learn the required knowledge for taking care of patients in ICU. From the questionnaire analysis and the knowledge test, it was found that the experimental group outperformed the control group on the acceptance (perceived helpfulness and perceived ease of understanding) of the ward regulation instruction and learning satisfaction as well as their test scores. The acceptance of health education instruction means that the technology-enhanced interactive e-book could be used to replace the conventional paper-based instruction approach to help the families of patients learn the ICU regulations and knowledge. These results were in line with the findings of Hwang, Yang, and Wang (2013) and Chang, Hung, Hsu, Liu, and Wang (2017), who reported the potential of using interactive e-books or multimedia for improving learners' achievements and learning perceptions.

some limitations. the multimedia interactive e-book was developed for adults. The subject is limited and the results might not be able to be generalized to some particular conditions, such as the family members of those patients in the gynecology, obstetrics, or pediatrics units, as well as those with cancer. For future research, it is suggested that more applications and conditions can be considered by taking the features and needs of different medical departments into account (Edwards, Voigt, & Nelson, 2017; Sonnevile et al., 2017). In addition, integrating effective learning tools or strategies, such as knowledge construction tools, into the implementation of the e-books could be a good direction for providing better instructional facilities to the families of patients.

CONCLUSIONS

To sum up, the interactive e-book not only eased the load of the first-line nursing staff, but also has the potential to promote the family members' competence of taking good care of the patient. For future research, it is suggested that more applications and conditions can be considered by taking the features and needs of different medical departments into account. In addition, integrating effective learning tools or strategies, such as knowledge construction tools, into the implementation of the e-books could be a good direction for providing better instructional facilities to the families of patients. ◦

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