A Simulator to Teach Cancer Pain Management Skills

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Abbreviated Abstract

Frequent undertreatment of cancer pain persists despite intensive educational efforts. The reasons include the difficulty in teaching complex pain management skills and the problems associated with evaluating clinical competence. We propose to develop a computer simulator to teach and evaluate cancer pain management skills. The simulator will use multimedia interactive technology to create a high fidelity learning environment. Within this environment, the user can select practice cases, assess a diverse group of patients, and practice with a variety of medications. The complex process of patient assessment and evaluation of treatment will be emphasized. The simulator will use time acceleration to allow a user to efficiently gain experience. Users will gain experience treating complications such as sedation, nausea, vomiting, and constipation. The simulator will provide on-line contextual-based tutoring and a critical case summary at case conclusion.

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Research Team & Affiliations

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Total Budget

$785,158

Research Objectives

The objective is to create a cancer pain management teaching and testing tool that

1. Improves knowledge, skills, and judgment via simulation;
2. Provides supportive reference materials;
3. Offers users assessment and structured feedback;
4. Provides a realistic clinical practice tool;
5. Models various cancer types and analgesics;
6. Generates various symptoms and side effects; and
7. Offers a variety of assessment tools.

Theory/Hypothesis

1. Unrelieved pain increasingly threatens functional capability and psychological well-being as cancer progresses. Unrelieved pain causes many terminal patients to experience needless discomfort and disability (Bonica 1990, Jacox et al. 1994). Gains in knowledge and technological advances now enable informed physicians to relieve up to 90 percent of cancer pain (Levy 1985, Portenoy 1989).

2. Despite educational efforts and clinical practice guidelines, inadequate cancer pain management persists. The simulator expands health care providers' understanding of cancer pain management to improve clinical practice.

3. By providing standardized training and testing, simulators should bring substantial cost savings to health care, analogous to those seen in general industry and aviation (deKoven 1994).

Experimental Design

Final Sample Size & Study Demographics

Data Collection Methods

Outcome Measures

1. *Usability:* How natural is the interface? What aspects are difficult or hard to understand? How would you modify the program? Is the prototype useful? How could it be improved? Would you use the software?
2. *Skills:* Do you have problems interacting with the software? Are the instructions clear and concise?
3. *Learning objectives:* What additional cases would you like to see in the case library? How are the existing cases? How can the design be improved?
4. *Educational support:* Are the support material and courseware useful? How could they be improved? Is the difficulty of the cases sufficient? Are important objectives covered?
5. *Attitudes:* Do you like the software? What would you change?

Evaluation Methods

Research Results

A summary of results includes the following:

1. Greater emphasis was placed on providing learner access to feedback.
2. A need for a debriefing or case recording function was identified.
3. Multiple changes in the graphical user interface were made that included changes to buttons, links, and help sections.
4. A help section was added that provides learners information about how to use the program.
5. Graphics and layout were changed to make the program more engaging and professional in appearance.

Barriers & Solutions

1. Completion delay: We experienced a delay in completion of the product when our original programming contractor pulled out of the project after 2 years. The contractor was unable to produce a product that met our needs and expectations.
2. HealthMark Multimedia secured another contractor to complete the work. However, the lack of progress made in the first 2 years caused a delay of 10 months in product launch.
3. The change in contractors was costly and required that HealthMark Multimedia request additional funding from NCI and borrow funds to complete the product.

Product(s) Developed from This Research

CancerSim, CD-ROM and Internet clinical case simulator to teach and evaluate health care providers' skills in the management of cancer pain