Creation of a CD-Rom to Augment the Didactic Portion of an Orientation Program for New Graduate Nurses in a Pediatric Intensive Care Unit

by

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ABSTRACT

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As the nursing shortage continues, new graduate nurses may begin their career in a pediatric intensive care unit. The introduction of new information or the reinforcement of information learned in nursing school can be presented in different formats during orientation programs. A CD-Rom with information specific to the pediatric intensive care unit is another option for presenting information. The creation of a CD-Rom is an involved endeavor determining the population, topics, and the personnel needed to produce it.

Key Words:

New Graduate Nurses
Multimedia
CD-Rom
Pediatric Intensive Care Unit
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CREATION OF THE IDEA

As a result of the nursing shortage, some new graduate nurses are entering pediatric intensive care unit (PICU) internship classes without pediatric or intensive care unit (ICU) experience as a part of their nursing education. They may also have little theoretical knowledge about pediatric care. This lack of education and clinical experience poses a problem as internship programs typically consist of a didactic and clinical experience with a preceptor who serves as a mentor. The information taught in the didactic portion of the internship is fast paced and many topics are discussed.

This author has taught new graduate nurses in a 16 bed PICU for the past five years serving both as an instructor of the didactic portion and a clinical preceptor. Some new graduates are reluctant to ask questions, not wanting to feel they’re revealing their lack of knowledge. The classroom based didactic portion of their orientation may not be the most effective teaching strategy for these nurses. To help the new graduate nurse succeed and increase his or her knowledge base, optional self-study information must be available. One tool to meet this need is a compact disk read only memory (CD-Rom) with information and learning activities focused on the unit in which the new graduate nurse is orienting. This article describes the use of an instructional CD-Rom for this purpose and the process to design a CD-Rom as an adjunct to the orientation of PICU new graduates.
REVIEW AND ANALYSIS OF CURRENT RESEARCH AND CLINICAL PRACTICE LITERATURE

Multimedia presentations can provide some of the best education as "learners retain up to 75% of what they see, hear and do." Multimedia has been defined as "the combining of text, graphics, audio, video and animation into a single, interactive computer-based environment." A search of the literature regarding multimedia and nursing education revealed several articles. As early as 1995, Gleydura, Michelman and Wilson noted that nursing education and educators will need to incorporate multimedia as part of the educational process to meet the needs of students.

Several researchers compared the use of CD-Roms in nursing education with conventional classroom instruction. Bauer and Huynh investigated the use of a CD-Rom to teach 30 first year nursing students how to take a blood pressure using a sphygmomanometer. They found the CD-Rom a useful educational adjunct for teaching and may be "superior to the conventional form of instruction to convey the theory, reinforce content and learn the many steps of (a) procedure." A qualitative, exploratory evaluation research study by Ross & Tuovinen found that students liked the multimedia approach to learning. They recommended that multimedia be: relevant to the participant, easy to use, promote intellectual engagement, and be colorful and interactive.

Maag conducted an experimental study to determine effectiveness of a multimedia learning tool. The experimental multifactorial design used 96 undergraduate nurses from two west coast universities. Students were divided into one of four groups: text only, text and image, multimedia, and interactive multimedia. The material given to the students focused on basic math review and medication dosage calculation instruction.
Although they found no significant increase in test scores, they did find increased student satisfaction with the interactive multimedia and suggested that method may motivate students to learn.7

There are, however, some barriers to multimedia use in nursing education. Initially, the lack of a computer or computer access was an obstacle to using multimedia or CD-Roms, but computers are now more affordable and there is increased public access to computers able to run CD-Roms.8 New graduate nurses typically span many age ranges and some are not as computer literate as others.9 Nevertheless, according to Adams, CD-Roms enable the student to experience "truly flexible learning, in which students access educational resources regardless of time or location."9(p6)

REVIEW AND ANALYSIS OF EXISTING CD-ROMS OR COMPUTER PROGRAMS

The use of computer technology in the education of nurses has increased over the last five years.10 Pharmacology guides, nursing textbooks and simulated learning activities have been available on CD-Roms or computer disks since 1998.10 There are increasingly more CD-Roms or computer programs available for hospitals and students. A search revealed that the only pediatric based CD-Roms found were connected to textbooks. There are web-based programs available through organizations like the American Association of Critical Care Nurses' (AACN) Essentials of Critical Care Orientation program (ECCO), continuing education and university based web pages.11 An example of a self-study CD-Rom is the set produced by the College of DuPage called "PhysWhiz".
The AACN ECCO is a web-based program that follows the AACN core curriculum of physical assessment, pathophysiology, and pharmacology. The program’s nine modules all include general content information, objectives, and pre- and post-assessment testing. New graduate nurses can complete the modules from home and work at their own pace. The program has slides of information on the topic being presented, narration of information based on the slide and text of the narration. The slides are either pictures or clip art of presented topic or the slides can be a movie presentation.11

The “PhysWhiz” CD-Roms by the College of DuPage have the same information as the AACN’s ECCO program, but on a CD-Rom format.12 The CD-Roms are separated into systems, and covers anatomy and physiology. A reviewer commented that “this program does an excellent job of breaking complex relationships down into more easily understood parts.”13 The CD-Rom has graphics, animation, text and narration. At the end of the CD there is a self-evaluation and the user is asked ten random questions from a test bank.

NEED FOR ADDITION OF CD-ROM

The purpose of the PICU proposed CD-Rom is not to replace the unit’s didactic portion of the orientation, but to serve as a supplement. The CD-Rom serves as a self-study option for orientees to either reinforce what they learned in their nursing school education, such as the use of blood products use, or to augment the new information learned in the orientation class for the PICU such as the policy on treating patients with diabetic ketoacidosis. The advantage of a CD-Rom over the internet is the CD-Rom’s flexibility. It is not limited by the need for an internet connection. A CD-Rom only needs the computer.5
Handouts, journals and books have always been available for nurses to use for resources with current, up-to-date information. The introduction of the CD-Rom supplements these materials and may be the best medium for the computer savvy new graduate nurses hired into the PICU.

**TARGET POPULATION**

A CD-Rom will be created as an adjunct to the formal orientation of the PICU new graduate nurses. The March 2000 Registered Nurse Population National Sample Survey found the average age of an RN who graduated in the five years preceding the survey was “30.9 years compared to 23.9 years for those who graduated 16 or more years before the survey.”

The new hire orientation at the author’s institution keeps data of new graduate nurse statistics. The breakdown of the PICU nurses who graduated from associate degree and bachelor’s degree nursing programs since 2000 revealed an average age of 24.2 years old, with a range of birth year from 1968 to 1981. This data shows a deviation from the national norm. With no comparable survey of all 2000-2005 Oregon nursing graduates, it is not known if the deviation is because the population of nurses who chose PICU are younger than the national norm or if Oregon graduates are younger.

The PICU new graduate nurses hired since 2000 would be placed in the “Generation Y” category. Although there is no consensus on the actual dates, Generation Y, or Net Generation, can be defined as anyone who was born between 1976 and 1994. Some believe this generation of nurses grew up technologically literate and more independent, resourceful, inventive and self-sufficient problem solvers than previous generations. Nurses from this era prefer action and interaction. They have been
exposed to the computer much earlier than their parents. Most Generation Yer's were playing on the computer in nursery school.\textsuperscript{19} The learning style of this group tends to be more active and visual than verbal.\textsuperscript{18} As an educator, one must be prepared to explore “different and innovative teaching strategies that effectively address students in terms that they easily recognize and comprehend.”\textsuperscript{18(p122)}

There are new graduate nurses who are not in the Generation Y category. Older new graduate nurses and experienced nurses new to the PICU also participate in orientation programs, the CD-Rom needs to be applicable to all who choose to use it. All state board exams (NCLEX) are computerized and so even older new graduates have been exposed to the computer.\textsuperscript{2}

**NEEDS OF INTENDED POPULATION**

The CD-Rom will incorporate three types of learning styles for acquiring information: visual, auditory and kinetic.\textsuperscript{20-21} Visual learners do so by reading and tend to write down most of what is heard. Auditory learners obtain new knowledge primarily through listening and prefer discussions to lectures. Kinesthetic learners do so by practicing or applying what they just learned.\textsuperscript{20} To reach all types of learners, the CD-Rom will incorporate different types of presentations. For the visual learners, there will be written material and graphics; for the auditory learners there will be verbal explanations and for the kinesthetic learners the CD-Rom will demonstrate how a principle works and applying it to realistic clinical situations.

The multimedia approach offers informative, effective and flexible material which can accommodate different learning styles.\textsuperscript{22} As noted previously, the learning style of the intended population, Generation Y nurses, tend to be active, or kinesthetic, and visual
learners.\textsuperscript{18} These nurses have shorter attention spans than other generations of nurses, are comfortable with computer interaction, need more feedback, and work independently.\textsuperscript{18}

These characteristics are congruent with a CD-Rom self-study format.

**CONCEPTUAL GUIDES FOR THIS PROJECT**

Two pedagogical theories applicable to this CD-Rom innovation are Mayer's dual-coding theory of multimedia learning\textsuperscript{23} and Knowles adult learning theory.\textsuperscript{24} Mayer's theory is an expansion of Paivio's dual coding theory.\textsuperscript{25} Paivio hypothesized the connection between verbal and non-verbal learning which provided a framework for the multimedia based education.\textsuperscript{25} Mayer expanded on Paivio's theory adding animation and narration to the multimedia computer-based presentations.\textsuperscript{25}

Mayer and Sims' summarized three research issues contiguity effect, the role of experience in the contiguity effect, and the role of ability in the contiguity effect.\textsuperscript{23} They formed their own predictions concerning learning from words and pictures. They found that students were better able to understand what they had learned when both visual and verbal explanations were presented together than when explained separately.\textsuperscript{23}

Knowles identified six characteristics of adult learners: 1) autonomous/self-directed, 2) a foundation of life experiences and knowledge, 3) goal oriented, 4) relevancy oriented, 5) practical and 6) need to be shown respect.\textsuperscript{24} The characteristics of the adult learner are well suited for the use of a CD-Rom to adjunct an orientation program. The use of a CD-Rom works best with those who are self-directed and have life experiences to assimilate the skills and information presented. "Adults are not content centered; adults are self directed and problem centered, and they need and want
to learn useful information that can be readily adapted. Adults need a climate that enables them to assume responsibility for their learning.\textsuperscript{26(p228)}.

The andragogical learning process model, the art and science of helping adults learn, is the perfect model for this form of education.\textsuperscript{21} This model provides resources to help learners acquire information and skills. The adult learner's mind set is the critical factor in the model and the effectiveness of the learning. When adult learners understand how the acquired information will help them become better nurses, they enter instructional situations with a clearer sense of purpose and take what they learn as more personal.\textsuperscript{21}

**CHOOSING THE TOPICS**

There is no standardized/national PICU orientation curriculum. The American Association of Critical Care Nurses (AACN) has a core curriculum for pediatrics that encourages topics for education. The Core Curriculum for Pediatric Critical Care Nursing's include nine topics that use a systems approach.\textsuperscript{11} (see Appendix A) The topics for the CD-Rom will incorporate the nine sections of the AACN pediatric core curriculum. In addition, it will integrate suggestions and questions raised by participants in the author's PICU orientation and from a needs assessment of these participants conducted by the author. The informal needs assessment surveyed ten newly hired PICU nurses including seven new graduate nurses and three experienced nurses regarding their internship program. (Appendix B) A list of topics to be included in the CD-Rom was created. (Appendix C)
DEVELOPMENT OF AN INSTRUCTIONAL CD-ROM

Moule, Gilbert and Chalk outlined their production of a CD-Rom, identifying issues that need to be resolved before production can begin. The first five issues identified include: the needs of the target audience, content, methods of delivery, assessment and evaluation. The authors then created a storyboard of their information to help them put together the flow of the CD-Rom. Storyboarding is when each section is written out from screen to screen, identifying where photographs, graphics, video or text needs to be placed. This helps the author identify what needs to be done for each section and to visualize the flow of the CD-Rom and note where there may be missing details.

A key person in the production of a CD-Rom is the programmer. This person has the technology skills necessary to integrate all the components of the CD-Rom. A programmer who has experience with multimedia production is recommended, since the CD-Rom will incorporate all formats of media: photographs, graphics, video and text. The project also requires a person who collects pictures and graphics and obtains copyrights before production begins. Some CD-Rom development teams have a lawyer on the team to obtain the copyrights.

INSTRUCTIONAL DESIGN OF THE CD-ROM

As a CD-Rom for PICU nurses, each topic will incorporate content about the care of the child as well as family centered care. The goal for the CD-Rom is to help the nurse care for the patient to the best of his/her ability and integrate the education related to the developmental needs of children. Each topic will also include a review of anatomy and physiology and childhood diseases. (See Appendix C for list of topics.) Although this
CD-Rom is geared towards new graduate nurses, the topics presented can also be a review for experienced nurses.

Each topic begins with an overview of the module, objectives and a pre-test. The CD-Rom will consist of multimedia presentation. Power Point slides will accompany audio and visual media. For example, the topic of the syndrome of inappropriate antidiuretic hormone secretion (SIADH) will show pictures of the renal tubules and the adrenal gland, and the topic of anti-hypertensives will show pictures of the renin-angiotension cycle. Each slide will also have a narrative portion describing what is being demonstrated on the slide. The narrative will also be written on the screen for those nurses who prefer to read the information and there will be the option to turn off the sound. After the presentation is completed, a post-test will be administered.

LIMITATIONS

A limitation of this project is that it is partially based on the suggested needs of new graduate nurses in only one PICU in the Pacific Northwestern United States. Other new graduate nurses in other parts of the USA may have other needs. Each PICU has its own specific needs. The author’s PICU is moderately sized and the patient population varies to include all types of injuries and diseases except burn patients. The topics suggested for this project CD-Rom may not be useful or appropriate for other settings.

COPYRIGHT CONCERNS

An unresolved question relates to the ownership and copyright of this CD-Rom when it is produced as part of a scholarly project for a master’s degree. Who has ownership, the author or the university? Massachusetts Institute of Technology (MIT) gives ownership of a thesis to the student with the condition the university can reproduce
the thesis. The ownership resides with MIT if the student received funds while researching the thesis or if university equipment or facilities was used.\textsuperscript{30} San Diego State University considers the thesis or dissertation to be owned by the student unless there was joint work with a faculty member. In these cases, the university strongly suggests ownership agreements to be in writing before research begins.\textsuperscript{31} The Washington State University (WSU) web site did not have information on student thesis copyright nor did the graduate handbook. Marc Lindsey, a WSU Copyright Specialist, shared that at WSU the students hold the copyright to their work, stating it’s “simply the law”, so WSU has no policy (written communication, October 2005).

**RECOMMENDATIONS FOR PRACTICE/CONCLUSION**

The recommendation is for alternative modalities of information dissemination to new graduate nurses entering a PICU. Rather than teaching the didactic portion of new graduate nurse orientation in a lecture format, nurses should be given information for self study. Younger nurses are more computer literate than previous generations, and to reach these nurses and give them the best chance of obtaining and retaining the information needed to become better nurses.
REFERENCES


*Association of Black Nursing Faculty*, Nov-Dec 2003; 14(6), 121-122.


Appendix A

American Association of Critical-Care Nurses –

Core Curriculum for Pediatric Critical Care Nursing

1. Caring for Critically Ill children and Their Families
2. Pulmonary System
3. Cardiovascular System
4. Neurologic System
5. Renal System
6. Endocrine System
7. Gastrointestinal System
8. Hematology and Immunology
9. Multisystem Issues
   a. Multiple Trauma
   b. Toxicology
   c. Septic Shock
   d. Burns
Appendix B

Questions asked of 10 new PICU nurses in the orientation program of the didactic portion and their needs/wants.

1. What 3 things do you think did not go well?
2. What went well?
3. List 3 things that you would include in an ideal internship program?
4. Set up as one day a week for 12 hours...what would you suggest? Change it, keep it?
5. What was your favorite part?
6. What activities did you find helpful to your practice?
7. What format of instruction did you find most helpful/beneficial?
8. Did you find the notebook helpful or just more paper?
9. Have you looked at it since?
10. What topics should be added to the didactic portion?
11. What else would you like to tell me?
12. If a CD-Rom was available to adjunct the internship program, what would you like on the CD?
Appendix C

Topic for CD-Rom Suggested by PICU New Graduate Nurses and other:

1. Family Centered Care Definition and Incorporation into Care
2. Age Developmental Specifics
3. AACN Core Curriculum Subjects
4. Syndrome of Inappropriate Anti-Diuretic Hormone vs. Diabetes Incipidus
5. Blood Components and Products
6. Clotting Cascade and Diseases
7. New Diagnosis Diabetes and How to Treat
8. PICU Pacemaker Review
9. Ventilator Basics
10. Chest Tube Care
11. PICU Drip Calculation
12. Electrolyte Disturbances: signs/symptoms and treatment
13. Spinal Fusion: Surgery, Recovery and Bedside Care
15. Closed Head Injury: types of bleed, treatment, complications
16. Externalized Ventricular Drain: types of hydrocephalus, care for EVD
CD-Rom for New Graduate Nurse Internship Programs

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Creation of Idea

- PICU Staff Nurse
- Preceptor
- Nurse Educator Online Program

Focus Population

- Doernbecher PICU
- Generation Y
- Their learning style

Adult Learners

- Self Directed
- Life Experiences
- Goal Oriented
- Relevancy Oriented
- Practical
- Need to be Shown Respect

Topic Choice

- AACN
- Core Curriculum for Pediatric Critical Care Nursing's
- Needs Assessment

Possible Topics

- Family Centered Care
- Age Developmental Specifics
- SIADH vs. DI
- Blood Components and Products
- Clotting Cascade and Diseases
- New Diagnosis Diabetes and How to Treat
- PICU Pacemaker Review
- PICU Drip Calculation
- Spinal Fusion Surgery and Care
CD Development Team
- Author
- Programmer
- Lawyer

Design of CD
- Overview
- Objectives
- Pre-test
- Information
- Post-test

Recommendations
- Options for education
  - Books
  - Articles
  - Conferences
  - CD-Rom
  - Guest lecturers

Examples

What would I do differently?

Thank You