RESEARCH BRIEF

Development and Testing of a CD-ROM Based Tutorial for Nursing Students: Getting Ready for HIPAA

Veronica D. Feeg, PhD, RN, FAAN; Adel Bashatah, MS; and Christena Langley, PhD, RN

ABSTRACT

The purpose of this study was to develop and test a CD-ROM tutorial for nursing students to educate them on how the rules and regulations of the Health Insurance Portability and Accountability Act (HIPAA) affect them as they engage in patient care activities in hospitals. The project was completed in two parts, the first of which was production of a stand-alone, audio lecture, image and text self-instruction on CD-ROM to distribute to students as they began their clinical experience. The second part compared the effectiveness of learning the HIPAA content via CD-ROM to a text-directed, self study method.

Students were pretested and randomly assigned to one of the types of instruction based on their seminar group assignment. One group received the CD-ROM, *Getting Started with HIPAA,* along with a journal article on HIPAA, while the other (control) group received only the journal article. All students were instructed to prepare for a test on their under-standing about HIPAA by the end of the clinical rotation. The test was analyzed, and items clarified to yield a reliable Web-based examination with 20 questions, 18 of which were used in the analysis. The students' scores were analyzed before and after the instruction, and the methods of instruction were compared.

The study findings demonstrated significant differences between experimental-group and control-group students' performance on a knowledge test of HIPAA, as well as overall satisfaction with learning the material by CD-ROM among students who used it. The tutorial is now available for all students, and the Web-based examination provides automatic scoring to a preestablished competence level.

The Health Insurance Portability and Accountability (HIPAA) Act of 1996 was the guiding force for federal policy on the use of computer-based patient records. HIPAA required Congress to enact medical record confidentiality protection legislation. It also challenged all systems to operationalize four objectives:

- Improving portability and continuity of health care insurance.
- Reducing costs of administering health care.
- Providing for standardization of information exchange between employers, providers, payers, and beneficiaries.
- Protecting patient confidentiality.

The HIPAA rules were enacted on April 14, 2003, and required providers and payers to develop and implement basic administrative procedures to protect health information and the rights of individuals regarding that information. After this date, it became imperative to train all members of the workforce and students who engage in work activities with patient records to understand the rules and regulations to safeguard protected health information. These new training requirements forced hospitals to implement continuing education for staff and ask that students from our university receive instruction on HIPAA and the importance of confidentiality and privacy prior to their clinical experiences.

Anticipating a large group of students about to start their summer clinical experiences in our program, faculty quickly sought to develop methods to reassure the clinical institutions that students had received education on the HIPAA rules and regulations relevant to their rotations. It became imperative to find an efficient mechanism to present content rooted in federal policy language and create an effective learning experience that would go beyond a simple directed reading assignment and testing for understanding.

Given the nature of the content and students' learning behaviors, it was hypothesized that students' self-instruction could be enhanced with audio and visual displays, and made appealing by allowing students to learn the material at their own pace and in their own homes. This study focused on developing and testing an appropriate and effective method to ensure students would be adequately

prepared for working in environments with HIPAA-protected health information. The importance of the study was related to the pragmatic aspects of implementing a policy-driven, educational need in a short period of time, while recognizing a variety of student competencies based on their different exposures across clinical placements.

The research questions for this study were:

● Can nursing students be competently trained on the new HIPAA rules and regulations related to patient information via a CD-ROM-based tutorial?

● Is it more effective to prepare students for using HIPAA-protected health information by CD-ROM self-instruction than by directed reading self-instruction?

● Can a valid and reliable Web-based test that measures content-specific HIPAA knowledge be created?

Literature Review
HIPAA Regulations

HIPAA was enacted to protect patient privacy and the confidentiality of health information. The regulation states that:

> ...the entire health care system is based on the willingness of individuals to share the most intimate details of their lives with their health care providers. (CFR 45 §164.502[g], cited in Maradiegue, 2000)

Privacy is a fundamental right and as such, must be viewed with respect by all health care workers and be emphasized to new health care workers as they begin working in patient care.

The values of protecting patients' personal information must be instilled early in nursing students' career to ensure that violations of basic privacy do not occur. While protection of patient information is important, communicating patient information is also essential for health care providers to function effectively and provide quality care. It is necessary for nurses to have and use patient information in the course of their daily work, and because of the facility of computer systems, it has become even more

imperative for nurses to be cognizant of where and how that information is used. Therefore, all nursing students should be educated about the intent of the HIPAA regulations prior to their clinical experiences in hospitals, as well as the essentials of privacy, to balance their understanding of access to information. Finding the best way to teach this type of content warranted looking to self-instruction, which can be managed by students at their own pace.

Self-Instruction

Self-instruction can be developed for optimal learning when the elements are right. Herrick, Jenkins, and Carlson (1998) stated that self-directed learning modules provide many advantages for staff development, including flexibility, accessibility and portability, self-pacing, and self-responsibility. Flexibility allows students to use the modules at their convenience. Educators are available as facilitators and consultants, rather than as teachers. Accessibility and portability means students may work with the modules at home or in school when they have fewer other demands, and educators do not have to devote as much time to teaching as they would in the classroom. Self-pacing means students can complete the module and learning objectives at their own pace. For content that is information rich, students can spend as much time as they need to assimilate the information. Self-responsibility means students assume responsibility for their learning, thereby experiencing an increased sense of accomplishment. These advantages suggested that the HIPAA tutorial could be developed in a module and delivered via CD-ROM.

Many studies on self-directed learning and modules have been based on early work by Allen Tough (1979) and the writings of Malcolm Knowles (1973), which showed that most adult learners benefit by some of the self-directed forms in their learning experiences. Some studies on self-directed learning modules have been applied to nursing in the areas of continuing education and staff development. For example, Emblen and Gray (1990) in-

vestigated the self-directed learning practices of RNs and found they spent an average of 313 hours per year on independent or self-directed activities, of which 217 hours were attributed to professional topics. Although the sample was small and the study was limited due to participants' recall, it appears that nurses actually engage in self-directed learning.

In a review of the literature on self-directed learning in nursing education, O'Shea (2003) elucidated the multiple definitions of self-directed learning, as described by Knowles (1975) and Iwasiw (1987), whose works on adult learning set the stage for educational research to test the characteristics of self-directed learning as it relates to learners and content. O'Shea described the multiple forms of self-directed learning, including reading, informal discussion, independent study and self-instruction packages, guided study, group work, learning contracts, and computer-assisted learning. These forms must take into account learner characteristics. Some learners prefer direct, teacher-structured activities, while others do not. As a result, self-directed learning is believed to be a collaborative process between educator and learner to reduce anxiety for students. Educators should assess students' background for readiness to use the appropriate technology.

In addition, several authors have identified benefits to self-directed learning for continuing professional education, such as confidence and autonomy (Lunyk-Child et al., 2001) and motivation and self-directedness (Furze, 1999). Adding computer technologies, such as computer-assisted or computer-managed instruction, to self-instruction opens up possibilities for creative teaching-learning enhanced by multimedia and interactivity.

In a study on computer-managed instruction, Halloran (1995) compared the effectiveness of traditional classroom lecture with computer-managed instruction using keypad questions. The results did not demonstrate a significant difference in terms of class achievement. However, the

findings demonstrated a trend toward improved examination grades among students using computer-managed instructions, which may be related to the convenience of the presentation type (i.e., self-directed, as well as computer enhanced).

Bauer and Huynh (2001) conducted a study on nursing students who used a CD-ROM tutorial program or traditional classroom instruction to learn how to measure blood pressure. Although the results did not show that using the CD-ROM was superior to traditional classroom instruction, it suggested the CD-ROM was a better method for allowing students to learn more in their own time, with better direction at each point of the learning process.

In another study, by Brown, Kirkpatrick, and Wrisley (2003), a new Web-based course designed for RNs pursuing a baccalaureate degree was evaluated. The course was designed to provide flexibility, and incorporated traditional and nontraditional study methods. Thirty-three senior RN students who were enrolled in the online nursing leadership course participated in the study. The results underscored that learning that occurs in relative isolation from the traditional classroom setting requires motivation and commitment, and that the characteristics of successful learners using technology are unique. Most students found the technology-based learning more time consuming and demanding.

Some studies have found that there are many positive learning outcomes of using multimedia computer technology for instructional purposes, particularly for self-instruction, including a reduction in time spent with the material and an increase in motivation and self-confidence among learners. Napholz and McCanse (1994) found that interactive video instruction increased efficiency in cognitive learning in a baccalaureate nursing education program. In addition, Wong, Wong, and Richard (1992) found that computer simulation could be used to effectively evaluate nursing students' decision-making skills. These and other studies that support

the use of computer-based training, including the use of CD-ROM tutorials, add a dimension of effectiveness when these methods are compared to traditional teaching.

Sparling (2001) stated that narrow topics to meet specific needs are best suited for the self-directed learning design. Staff development educators choose learning modules for topics that are repetitious or need consistent implementation. Although it is not clear that computer-delivered instruction is superior to either classroom instruction or directed reading (Bauer & Huynh, 2001), the advantages of self-instruction via computer technology suggest that faculty could develop CD-ROM-based tutorial content, on information such as HIPAA rules and regulations, and can expect comparable, if not superior, results.

In summary, self-instruction delivered by CD-ROM can be an effective teaching method for nursing education, especially when the content needs to hold learners' attention. Information relevant to adult learners' needs is best presented using multiple teaching modes, including visual and auditory, and a combination of interactivity between these senses that engages recall and application of background knowledge and experience.

For this study, a CD-ROM was developed to introduce students to an overview of the HIPAA legislation relative to their clinical practice. This computer-based program integrated text and sound with a self-paced series of screens to hold learners' interest and allow for repetition to improve understanding.

Method
Design

This study investigated the effectiveness of a CD-ROM tutorial in helping nursing students learn information about HIPAA as it applies to their clinical settings. The project used a pretest-posttest, experimental design to evaluate effectiveness of instruction. The CD-ROM tutorial was developed by adding voice-over lecture to PowerPoint® slides with timed

graphic and text presentations. The content was generated by combining materials that hospitals submitted to the nursing program related to their HIPAA requirements (*HIPAA Training Handbook for the Nursing/Clinical Staff,* 2001) with resources from the university, including regulatory documents such as U.S. Department of Health and Human Services rules (Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services, n.d.), journal articles (Lawson, Orr, & Klar, 2003; Maddox, 2003; Ziel & Gentry, 2003), and conversations with experts.

The final product was a CD-ROM, titled *Getting Started with HIPAA,* which was distributed to each student to use at home or school. Use required that students had speakers or headphones and a computer running Windows 98 or later. The length of time to use the program depended on the students as they interacted with the information. Students reported spending an average of 28.7 minutes with the CD-ROM, generally at home.

Sample

All students enrolled in the summer clinical rotations were expected to have received some instruction on the HIPAA policies and procedures. Prior to beginning the summer session, all students were pretested on their knowledge of HIPAA and given a short handout about HIPAA on completion of the pretest. They were directed to learn the content for a repeat test to be given during the course.

A total of 146 students from 15 clinical placements and assigned to one of 7 seminars were eligible for the study, but some students failed to return usable pretests to their instructors. The seminar groups were randomly assigned to receive the CD-ROM tutorial and were instructed to use it at home to prevent contamination among students in the same group who received different instructions. Each seminar group was randomly composed of students from all of the clinical placements, such that the group assignments to CD-ROM or directed reading were only hetero-

TABLE 1

Mean (*SD*) Comparisons and *t*-Test Results for Pretest-Posttest Differences by Group for All Students

Group/Score	Mean (*SD*)	%	Pretest-Posttest Difference by Group	*t*
Experimental group (*n* = 61)[†]	—	—	1.54	1.95*
Pretest score	13.1 (2.20)	72.8	—	—
Posttest score	14.7 (2.15)	81.7	—	—
Experimental group (*n* = 27)[§]	—	—	2.30	2.71**
Pretest score	13.1 (2.15)	72.6	—	—
Posttest score	15.4 (2.50)	85.4	—	—
Control group (*n* = 64)	—	—	0.77	NS
Pretest score	12.7 (2.06)	70.6	—	—
Posttest score	13.5 (1.82)	75.0	—	—

*p = 0.05.
**p < 0.01.
† All experimental group students (n = 61).
§ Only experimental group students who reported using the CD-ROM (n = 27).
Note: NS = not significant.

TABLE 2

Mean (*SD*) Comparisons and *t*-Test Results for Posttest Scores of the Experimental and Control Groups

Group/Score	Mean (*SD*)	%	*t*
Experimental group (*n* = 27)[§] posttest score	15.4 (2.50)	85.4	4.10***
Control group (*n* = 64) posttest score	13.5 (1.82)	75.0	—

§ Only experimental group students who reported using the CD-ROM (n = 27).
***p < 0.001.

geneous in that different hospitals or units may have provided additional HIPAA instruction.

The final sample of 125 students completed all parts of the pretest and posttest; 61 students received the CD-ROM (experimental group), and 64 did not (control group). All of the students were given a posttest on the last day of class, at which time the students in the control group (directed reading) were offered the CD-ROM for their future clinical rotations.

Not all of the students in the experimental group indicated on their posttests whether they had used the tutorial or how much time they spent using it. In fact, only 27 students actually recorded on the form that they spent any amount of time at all using the CD-ROM. This group was analyzed separately, in addition to the total experimental group of students who may or may not have used the CD-ROM.

Instruments

Effectiveness was defined for this activity as knowledge of HIPAA content and was measured by a 20-item, multiple-choice test based on the content presented in the instruction. The test highlighted the most salient elements of HIPAA rules and emphasized important points. The questions were generic and not based on any particular hospital details.

The total score on the test was a summation of correct items out of 18 and ranged from 0 to 18. regarding content validity, the instructional content and test (pretest and posttest) were reviewed by two experts in HIPAA legislation and hospital implementation of HIPAA training. Items and content were clarified based on the reviews.

The posttests for the experimental group only (to minimize contamination based on guessing) were submitted to an item analysis to determine relevant statistics for each test question. After modifying two items with poor point biserials and adjusting scoring procedures, the split-half reliability was adequate (KR-20 = 0.62).

Satisfaction with the instructional method was measured by students' responses related to the learning process via the CD-ROM tutorial. They evaluated five questions on a 5-point scale from "strongly agree" to "strongly disagree."

Procedures

The purposes of the pretest and posttest were explained to all of the students relative to the expectations for their HIPAA competencies in their clinical placements. All students

received the instruction and were evaluated. All students were expected to complete the pretest and posttest with their names on them; however, no penalties were assessed for grades, and the results were not part of students' course grades. Regarding institutional review board approval, the study was defined as "exempt" according to the university guidelines, as one that compared effectiveness of instructional strategies.

Results
Effectiveness of CD-ROM

The final sample consisted of 125 nursing students, the experimental group with the CD-ROM and directed reading (n = 61) and the control group with directed reading only (n = 64). The change scores were calculated from pretest to posttest for each student, and the mean scores for the two groups were compared, yielding a significant difference between the control and experimental groups (t = 1.95, p = 0.05) for all students randomly assigned to the two groups (n = 125) (Table 1).

When only scores of those students who reported using the CD-ROM were analyzed (n = 27), the mean difference in scores was also significant (t = 2.71, p < 0.01), and the posttest scores were also statistically significant, compared to the posttest scores of the control group (t = 4.10, p < 0.001) (Table 2).

Although it is unclear whether all students in the experimental group used the CD-ROM, the findings were clear that the group scores changed significantly over those students who received the only directed reading. The possible improvement in test scores that could be achieved with the CD-ROM ranged from 9% (n = 61) to 13% (n = 27).

Satisfaction

Regarding satisfaction with the instructional method, among students who indicated they had used the CD-ROM tutorial for a period of time ranging from 10 minutes to 1½ hour, the majority reported the topics were organized and clear (70% agreed to strongly agreed), the content was easy to follow (74% agreed to strongly agreed), the information was relevant (83% agreed to strongly agreed), the issues were adequately covered (72% agreed or strongly agreed), and they enjoyed the method of self-instruction (57% agreed to strongly agreed).

Discussion

The primary purpose of this study was to develop and test a CD-ROM tutorial for nursing students to educate them on the rules and regulations of HIPAA. Instruction on the use of HIPAA information in clinical practice was necessary for all students in their clinical rotations. Because the students are assigned to multiple hospitals with different policy details, an effective, general method for establishing reasonable competence related to HIPAA information, which could be delivered in a convenient, self-paced medium, was needed. Students who learned HIPAA by CD-ROM demonstrated greater improvement on the posttest than students who received the information from directed reading alone.

Advantages of computer-based instruction over readings, classroom-based, or laboratory-based assignments have been mixed in the literature. Some authors suggest that if there is some rationale for individual, self-paced delivery methods, then results of the learning effectiveness of these methods are at least comparable to, if not better than, traditional methods.

This nursing program's need to efficiently prepare students using a self-directed assignment justified developing the CD-ROM tutorial. Applying the characteristics described by Herrick et al. (1998), the advantages of flexibility, accessibility, and portability supported the use of the self-directed learning activity, and the self-pacing, repetitive CD-ROM allowed students to engage in language-intensive content designed to maximize learning. This is particularly relevant for regulatory language, such as the HIPAA rules.

The issue of self-responsibility became apparent when many students in the experimental group failed to report whether or not they had used the CD-ROM. Because the experimental learning activity for the study was not considered part of the class expectation for ethical reasons, perhaps the students' commitment to learn the content was weak. The importance of self-responsibility in self-directed learning underscores the need for a learning contract as an absolute necessity to ensure the learning objectives will be achieved in a specified time frame (Herrick et al., 1998).

The findings of this study supported that the students who used the CD-ROM showed a significant increase in their performance on the posttest, evidencing the advantages of using a computerized, self-instruction method for optimal learning of select content, as described by Herrick et al. (1998). Even when analyzed in aggregate of all 61 students who may or may not have used the CD-ROM, the results were significant. Students given a handout of text-only information did not perform as well, suggesting that students who apply one or more forms of self-directed learning have multiple ways of interacting with the information, and given the self-paced presentation of the CD-ROM, have time to learn the content at their own speed.

This study also demonstrated that students' learning outcomes improved when using computer technology, rather than a directed reading assignment, and the reported satisfaction among students who used the CD-ROM was generally good related to content, clarity, and preparation. Surprisingly, however, only half of the students who used the CD-ROM reported enjoying the experience. Computer-based tutorials work best when the medium uses a range of learning activities, and works less well if students are not motivated to engage in the content or use it interactively. The regulatory language of HIPAA, and the associated ramifications on nursing practice, is not content that lends itself to presentations beyond words, audio, and graphics. It is possible that this content would not have been any better enjoyed if presented via a traditional method.

Limitations

This study was undertaken as a practical evaluation of a CD-ROM tutorial developed for a specific learning need; therefore, the students were a convenience sample drawn from one summer clinical rotation. Their clinical experience over the weeks of the study certainly contributed to their learning at least some of the content with or without the CD-ROM.

While significance estimates the probability of a sample's results deviating as much or more than the actual sample results from those specified by the null hypothesis for the population, given the sample size, the statistical significance does not evaluate whether the magnitude of the effect is fundamentally important or meaningful. The measure of importance, or effect size, estimates the two dependent measures by dividing the mean difference by the pooled standard deviation of these two measures. Thus, the effect size of posttest scores between the control (n = 64) and experimental (n = 61) groups is 0.60, a moderate effect size. However, when calculating the effect size of posttest scores between the control group and students in the experimental group who reported using the CD-ROM for a specific period of time (n = 27), the effect size is 0.93, a large effect size. For those students who did, indeed, use the CD-ROM tutorial, the difference after a similar period of time, when practical learning may have occurred, was greatly improved over any changes accrued by the control group.

Conclusion

The results of this study demonstrated the effectiveness of increasing understanding of HIPAA information among students who used the CD-ROM tutorial. The effectiveness is similar to that reported by Napholz and McCanse (1994), who used interactive video to increase learning effi-ciency and make a case for increased student-faculty ratios.

The test that was developed and assessed for measuring HIPAA general knowledge is available on the Internet (http://cnhs.gmu.edu/hipaa) for future groups of students, and is automatically scored. In addition, a printable page states that students did or did not pass, based on an 80% or better passing score. Currently, students who are assigned to clinical rotations for the first time and who are required to demonstrate HIPAA knowledge for their particular hospital placement are directed to the Web-based test. Users can enter their names, take the test, and submit the printable page as evidence before or after completing the HIPAA CD-ROM tutorial.

References

Bauer, M., & Huynh, M. (2001). Teaching blood pressure measurement: CD-ROM versus conventional classroom instruction. *Journal of Nursing Education, 40,* 138-141.

Brown, S.T., Kirkpatrick, M.K., & Wrisley, C.D. (2003). Evaluative parameters of a web-based nursing leadership course from the learners' perspectives. *Journal of Nursing Education, 42,* 134-137.

Emblen, J.D., & Gray, G.T. (1990). Comparison of nurses' self-directed learning activities. *The Journal of Continuing Education in Nursing, 21,* 56-61.

Furze, G. (1999). Continuing education in nursing: A review of the literature. *Journal of Advanced Nursing, 29,* 355-363.

Halloran, L. (1995). A comparison of two methods of teaching computer managed instruction and keypad questions versus traditional classroom lecture. *Computers in Nursing, 13,* 285-288.

Herrick, C., Jenkins, T., & Carlson, J. (1998). Using self-directed learning modules: A literature review. *Journal of Nursing Staff Development, 14,* 73-80.

HIPAA training handbook for the nursing/clinical staff. (2001). Marblehead, MA: OPUS Communications.

Iwasiw, C. (1987). The role of the teacher in self-directed learning. *Nurse Education Today, 7,* 222-227.

Knowles, M. (1973). *The adult learner: A neglected species.* Houston, TX: Gulf.

Knowles, M. (1975). *Self-directed learning: A guide for learners and teachers.* Chicago: Follett.

Lawson, N., Orr, J.,& Klar, G. (2003). The HIPAA privacy rules: An overview of compliance initiatives and requirements; The privacy rules contain a maze of mandates and exceptions requiring that entities covered by HIPAA need the best of health care counsel. *Defense Counsel Journal, 70*(1), 127-150.

Lunyk-Child, O.L., Crooks, D., Ellis, P.J., O'Mara L., Ofosu, C., & Rideout, E. (2001). Self-directed learning: Faculty and student perceptions. *Journal of Nursing Education, 40,* 116-123.

Maddox, P. (2003). HIPAA: Update on rule revisions and compliance requirements. *MedSurg Nursing, 12*(1), 59-64.

Maradiegue, A. (2000). The Health Insurance Portability and Accountability Act and adolescents. *Pediatric Nursing, 28,* 417-420.

Napholz, L., & McCanse, R. (1994). Interactive video instruction increases efficiency in a baccalaureate nursing education program. *Computers in Nursing, 12,* 149-153.

Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. (n.d.). *Standards for privacy of individually, identifiable health information.* Retrieved July 13, 2004, from http://aspe.hhs.gov/search/admnsimp/FINAL/Privacy%20original%20docs/PvcPre01.htm

O'Shea, E. (2003). Self-directed learning in nurse education: A review of literature. Journal of Advanced Nursing, 43(!), 62-70.

Sparling, L. (2001). Enhancing the learning in self-directed learning modules. *Journal for Nurses in Staff Development, 17,* 199-205.

Tough, A. (1979). *The adult's learning project* (2nd ed.). San Diego: Learning Concepts.

Wong, J., Wong, S., & Richard J. (1992). Implementing computer simulations as a strategy for evaluating decision-making skills of nursing students. *Computers in Nursing, 10,* 264-268.

Ziel, S., & Gentry, K. (2003). Ready, HIPAA's here: Once the HIPAA privacy rule takes effect on April 14th, you'll have to exert even more care than usual in guarding the confidentiality of patient information. *RN, 66*(2), 67-70.