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USING FINK'S INTEGRATED COURSE DESIGN MODEL IN DEVELOPING A HEALTH IT COURSE

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Abstract:

This paper introduces how Fink's Integrated Course Design model was used to refine a Health Information Technology (HIT) core course – “Clinical Process and Workflow: Analysis and Redesign” – for improving the design and enhancing student learning in this rapidly growing field. The paper describes the course design process centered on Fink's taxonomy of significant learning – foundational knowledge, application, integration, human dimension, caring, and learning how to learn. Example case study assignment, term project and assessment rubric are provided. Student feedback shows that the course enhances student learning and prepares them to meet the needs of healthcare organizations and HIT development.

Keywords: health information technology, course design, Fink's integrated course design model, workflow analysis.

I. INTRODUCTION

Health Information Technology (HIT) professionals are in increasing demand because (1) healthcare providers need help in the adoption and meaningful use of electronic health record (EHR) systems; and (2) the HIT industry needs a workforce skilled in HIT and EHR development. According to the Occupational Outlook Handbook published online by the Bureau of Labor Statistics at <http://www.bls.gov/ooh/home.htm>, “employment of medical records and health information technicians is expected to increase by 21 percent from 2010 to 2020,” while the average growth rate for all occupations is 14 percent.

In light of this, Southern Polytechnic State University in Marietta, Georgia, United States started the effort to design and implement a series of educational programs in the health information technology field, including professional development courses, certificate programs, and degree courses. Currently, we have a concentration in HIT in our program of Bachelor of Science in Information Technology (BSIT) and a graduate certificate program in HIT, which can be taken either as a stand-alone certificate or as part of our Master of Science in IT. In this paper, we share our experience in the curriculum and course development, specifically the design of the course “Clinical Process and Workflow: Analysis and Redesign” centered on Fink's Integrated Course Design model [Fink, 2003].

The paper proceeds as follows. The next section provides an overview of the courses for our HIT certificate program. Section III introduces Fink's Integrated Course Design model and its applications in education. Section IV describes the detailed course design process centered on Fink's model, followed by Section V, the discussion section. The Appendices include examples of the course materials.

II. HIT CURRICULUM DEVELOPMENT

To address the growing demand for highly skilled health IT professionals, the Office of National Coordinator for Health Information Technology (ONC) has funded the Health IT Workforce Development Program, whose main objective is to “graduating high-caliber health information technology professionals interested in supporting the growing and evolving health IT industry” [ONC, 2011]. Taking the 12 ONC workforce roles, our student population, and existing courses into consideration, as well as in collaboration with health IT experts and professionals, we identified and developed five courses for students with an IT background to focus on training for the eight health IT workforce roles as shown in Table 1. Our current five required HIT courses can be completed in two semesters:

- (1) Foundations of Health Information Technology
- (2) Clinical Workflow Process: Analysis & Redesign
- (3) EHR Systems & Applications
- (4) Health Information Security & Privacy
- (5) IT System Acquisition & Integration

Table 1: Roles Prepared and HIT Courses

Workforce Roles	Courses
Practice workflow and information management redesign specialists	(1), (2), (3)
Clinician/practitioner consultants	(1), (2), (3), (4), (5)
Implementation support specialists	(1), (2), (3), (4), (5)
Implementation managers	(1), (2), (3), (5)
Technical/software support	(1), (2), (3)
Trainers	(1), (2), (3), (5)
Health Information Privacy and Security Specialist	(1), (2), (3), (4), (5)
Programmers and Software Engineer	(1), (2), (3), (4)

In the course of “Clinical Workflow Process: Analysis & Redesign,” students are introduced to the fundamentals of health workflow process analysis and redesign as a necessary component of complete practice automation and quality improvement. Students are expected to become familiar with the concepts of processes, process analysis and redesign in the healthcare settings. Workflow and process mapping for healthcare improvement, including detailed guidance, helpful tools, and case studies, are introduced in the course. Quality improvement methods, process validation, and change management are also covered.

The objectives of this course are specified as follows. Upon successful completion of the course, students will be able to:

- (1) identify the elements involved in providing patient care within a complex healthcare setting that need to be taken into consideration when examining and proposing changes in workflow processes;
- (2) create diagrams of processes in the healthcare settings that support workflow analysis and redesign;
- (3) critically analyze the workflow processes in a selected healthcare setting to determine their effectiveness and efficiency from the perspective of those being served (i.e., patients), those providing the services (i.e., professional and non-professional staff), and the organization's leadership (i.e., decision makers);
- (4) propose ways in which quality improvement methods, tools and health IT can be applied within a healthcare setting to improve workflow processes;

- (5) suggest approaches that would ensure the success of workflow redesign from development and presentation of the implementation plan, to facilitation of decision making meetings, implementation of the changes, evaluation of the new processes, sustainability of new workflow processes, and continuous quality improvement efforts to achieve meaningful use; and
- (6) apply to these activities in understanding of health IT, meaningful use, and challenges practice settings will encounter in achieving meaningful use.

This course provides students more insights into healthcare delivery system in the United States, the standard workflows in different healthcare settings and how to analyze and redesign the current workflows to accommodate adoption of electronic health record systems. As this course is closely related to the healthcare practices and involves many case studies and real world problems, the problem-based learning and student-centered learning strategy is considered in the course design and hence Fink's Integrated Course Design model is adopted.

III. FINK'S INTEGRATED COURSE DESIGN MODEL

Fink's Integrated Course Design (ICD) model provides a practical and integrated guidance in the shift from a teaching paradigm to a learning paradigm [Fink, 2003]. It has been widely adopted in design and delivery of student-centered courses [e.g., Allen and Tannert, 2007; Fallahi, 2011; Ziegenfussa and Lawlera, 2008]. In his 2003 book "Creating Significant Learning Experiences," L. Dee Fink proposes a taxonomy of significant learning around which a specific twelve-step methodology is introduced for designing and redesigning college courses.

Fink's [2003] taxonomy of significant learning is based on and extends beyond Bloom's [1994] taxonomy by stressing important learning goals in higher education such as "learn how to learn." Unlike Bloom's [1994] taxonomy, Fink's [2003] taxonomy is not hierarchy but relational. The six areas identified in the significant learning goals, as shown in Figure 1, are: foundational knowledge, application, integration, human dimension, caring, and learning how to learn. It is believed that significant learning is achieved through in-depth situational analysis, effective teaching and learning activities correlated to the course objectives, and appropriate feedback and assessment procedures [Fink, 2003].

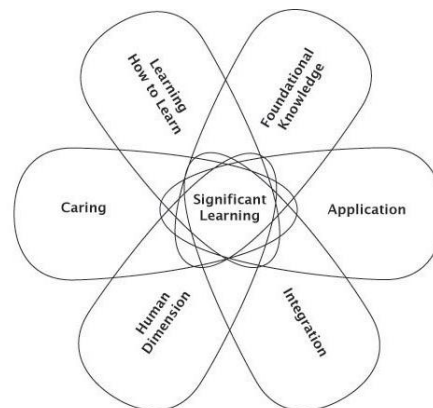


Figure 1: The Interactive Nature of Significant Learning [Fink 2003, p.33]

The twelve steps of process for course design, as Utschig et al. [2010] summarized, are: (1) identifying the situational factors (course size, level, student and instructor preparation, etc.); (2) learning outcomes for the course; (3) feedback and assessment; (4) outlining the course teaching and learning activities in which active learning is encouraged; (5) integrating and aligning learning outcomes, assessment, and learning activities; (6) laying out course topics; (7) choosing teaching strategy for the course such as problem-based learning, team-based learning or accelerated learning; (8) integrating course structure and the instructional strategy; (9) choosing a grading system and assigning appropriate weights to each part of grade; (10) preparing adjustments to

potential teaching difficulties; (11) writing the course syllabus to clearly communicate the information to the students; and (12) creating an evaluation system for the course and the teaching.

IV. THE COURSE DESIGN USING ICD MODEL

The use of Fink's Integrated Course Design model with the objectives of Clinical Process and Workflow course led to teaching, learning, and assessment activities designed using problem-based learning strategy. This is a very practical course with theoretical foundations. The long-term goal for the course is to ensure the students to retain the process and workflow analysis and redesign skills after the course is completed. Students usually respond well to real-life examples. Thus, real-life scenarios and case studies were used to supplement the foundational material.

In the six areas of learning goals, the foundational material was (1) taught using lectures, case scenario videos, and assigned readings; and (2) assessed using multiple-choice quizzes and short answer questions. Students applied the foundational material in case studies that were evaluated through rubrics to ensure that students' work met expectations for each assignment. The material was integrated as the student used additional knowledge and tools in increasingly complex assignments through the semester. The human dimension was addressed in discussion-based debate topics that required the student to develop and support positions based on course material and literature reviews. Caring about the course material was encouraged through guest speakers including medical and health IT professionals, and through a required clinic visit. These activities helped students change their feelings, interests or values in relation to the subject especially after volunteering opportunities with local clinics and healthcare programs. The learning how to learn skills were developed through the use of a variety of sources of information and introduction to professional health IT organizations and health IT certifications. This helps students learn how to keep on learning about the subject after the course is completed. Table 2 illustrates the course design using Fink's Integrated Course Design model.

Table 2: Using Fink's ICD Model for an HIT Course Design

Fink's Taxonomy		Teaching and Learning Activities
Foundational Material	Understanding and remembering information and ideas	Lectures and assigned reading assessed by multiple-choice and short answer quizzes
Application	Skills, critical, creative & practical thinking	Use software package to document and analyze the processes and workflows described in case studies
Integration	Connecting ideas, people, and realms of life	Clinic term project requiring real world clinic visit, analysis and use of tools discussed in lectures
Human Dimension	Learning about oneself and others	Opinion-based debate topics that required positions supported by research
Caring	Developing new feelings, interests, and values	Guest lectures by Medical and IT professionals; clinic visit and staff interview; student reflections
Learning to Learn	Becoming a better student, inquiring about a subject, self-directing learners	Use of a variety of sources of information and the application of the skills; introduction to professional health IT organizations and certifications; discussions and reports supported by appropriate sources (academic and professional)

Appendixes I, II, and III display one case study, the clinic visit project requirements, and an assessment rubric to illustrate the teaching and learning activities used in the course,

respectively. The case studies and clinic visit project were well received by the students; as one student commented: "The real world assignments were effective. I enjoyed applying the concepts to real world projects."

V. DISCUSSION

The course - "Clinical workflow process: analysis & redesign" - was first offered in our program in the spring 2012 semester. Fink's Integrated Course Design model provided exciting and insightful guidance during the course design process. By following his twelve steps of the course design process, we first identified the learning outcomes and the learning and teaching strategies. We then determined the assessments and rubrics which were in alignment with the learning outcomes and learning activities. The course design went beyond the introduction of foundational material and integration of real world case studies, it also incorporated several guest speakers including a medical doctor, a HIT project manager, a HIT company personnel recruiter, and an HIT consultant.

Student feedback shows that they are satisfied with the course and they feel more confident in the job interviews as they have talking points about their real world case study analysis and recommendation projects.

Further research may focus on the assessment of the student learning effectiveness and applications to online and international students as most of the international students lack the first-hand experience with the healthcare systems in the United States. The learning portfolio for the course and the overall HIT certificate program can be developed and refined.

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APPENDIX I. PROCESS DIAGRAM ASSIGNMENT

Watch the video titled "How Life Should Be after You've Implemented Electronic Medical Records." As you watch the video, list the process steps (or draw a flowchart) for scheduling a patient visit that are shown in the video. Answer the following questions in a Word document.

Questions:

1. What are the steps in the process?

Hint: you should present a reasonable list of process steps explicitly stated in the video.

2. Develop a process diagram for the steps in the video. If you are not ready to use any flowchart drawing software yet, a hand-drawn diagram is acceptable.

APPENDIX II. TERM PROJECT ASSIGNMENT

The objective of this assignment is to analyze 1-2 real world clinic work processes using skills learned in this class. The report should include an analysis of the current process including process steps, information needs, roles, process flows and data flows. The report should conclude with recommendations for suggested redesigns. The completed EHR survey should be included as an attachment to the report.

To complete this assignment:

1. Choose a provider (a clinic site) and document one or two real world workflow processes (patient scheduling, e-prescribing, lab tests, etc.). If you are not able to find a site to visit, interview staff at a clinic site to obtain the process steps of a specific process. Then, define:
 - 1) The steps of the process.
 - 2) The decision points (e.g., Is the patient new? Does the patient have an appointment? Has any patient information changed? Any exceptions present? etc.).
 - 3) The information needs (e.g., patient ID and contact information, patient medical records, lab specimen(s), etc.).
 - 4) The roles involved in the process.

2. Create a 1-2 page workflow (ISO 5807) and data flow (Yourdon) to document the process. Other commonly used methods may be used to document the process.
3. Identify any non-standard (e.g., exceptions) or redundant steps in the process and make redesign recommendations.
 - 1) Use "process change matrix" and "BRAND change matrix" as templates for your recommendations (see Unit 7 slides). Illustrations are shown below.
 - 2) If there are none, acknowledge this in your analysis report.

Process change matrix example

"As Is" process	"To Be" process	Action required for change	Responsible person(s)
(example process) Patient arrives Patient checks in Patient pays co-pay			

"BRAND" change matrix example

Process	Benefits of the action	Risks of the action	Alternatives of the perspective action	Nothing: doing nothing at all	Decision
(example process) Patient arrives Patient checks in Patient pays co-pay					

4. Have the chosen clinic take the short EHR adoption survey.
5. Write a professional report about the clinic, the visit or interview process, and the process analysis and redesign recommendation in legible, easy to read format. Add any references in APA format.

APPENDIX III. TERM PROJECT ASSESSMENT RUBRIC

Objective/Criteria	Performance Indicators (total 40 points)		
	Needs improvement	Meets expectation	Exceeds expectations
Professional report	(7 points) Report includes most required components. Not proofread.	(13 points) Presents all required information (steps 1-4) in logical format.	(15 points) Well organized, presents all required information in logical format. Includes elements from Assignment steps 1-4. Few errors.
Define process or processes using definitions and diagrams	(6 points) Process not well defined.	(9 points) Defines steps, decisions, information needs, and roles. Includes ISO5807 and Yourdon diagrams.	(10 points) Defines steps, decisions, information needs, and roles. Includes accurate ISO5807 and Yourdon diagrams.
Identify nonstandard or redundant steps and makes redesign recommendations	(6 points) Recommendations not clearly defined.	(9 points) Includes Process and BRAND matrixes.	(10 points) Effectively uses Process and BRAND matrixes.
Provider EHR survey	(0 points) Missing	(5 points) Completed provider EHR	(5 points) Completed provider EHR

		survey included.	survey included.
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