Using Fink’s Integrated Course Design Model in Developing a Health It Course

Chi Zhang
Southern Polytechnic State University, chizhang@spsu.edu

Karen P. Purcell
Southern Polytechnic State University

Xihui Zhang
University of North Alabama

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

Chi Zhang
Department of Information Technology
Southern Polytechnic State University
chizhang@spsu.edu

Karen P. Purcell
Department of Information Technology
Southern Polytechnic State University

Xihui Zhang
Department of Computer Science and Information Systems
University of North Alabama

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

Table 1: Roles Prepared and HIT Courses

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;
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>
<thead>
<tr>
<th>Fink’s Taxonomy</th>
<th>Teaching and Learning Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundational Material</td>
<td>Understanding and remembering information and ideas</td>
</tr>
<tr>
<td></td>
<td>Lectures and assigned reading assessed by multiple-choice and short answer quizzes</td>
</tr>
<tr>
<td>Application</td>
<td>Skills, critical, creative &amp; practical thinking</td>
</tr>
<tr>
<td></td>
<td>Use software package to document and analyze the processes and workflows described in case studies</td>
</tr>
<tr>
<td>Integration</td>
<td>Connecting ideas, people, and realms of life</td>
</tr>
<tr>
<td></td>
<td>Clinic term project requiring real world clinic visit, analysis and use of tools discussed in lectures</td>
</tr>
<tr>
<td>Human Dimension</td>
<td>Learning about oneself and others</td>
</tr>
<tr>
<td></td>
<td>Opinion-based debate topics that required positions supported by research</td>
</tr>
<tr>
<td>Caring</td>
<td>Developing new feelings, interests, and values</td>
</tr>
<tr>
<td></td>
<td>Guest lectures by Medical and IT professionals; clinic visit and staff interview; student reflections</td>
</tr>
<tr>
<td>Learning to Learn</td>
<td>Becoming a better student, inquiring about a subject, self-directing learners</td>
</tr>
<tr>
<td></td>
<td>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)</td>
</tr>
</tbody>
</table>

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

Appendices 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,
respective. 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.

VI. REFERENCES


ABOUT THE AUTHORS

Chi Zhang is an Assistant Professor of Information Technology in the School of Computing and Software Engineering. She earned a Ph.D. in Information Technology from the University of
Nebraska at Omaha. Her current teaching and research focus on Health Information Technology and Electronic Health Record Systems adoption & use, technology-mediated learning, and best practices of using technologies in virtual and classroom teaching. She is a member of Healthcare Information Management Systems Society (HIMSS), Association of Information Systems AIS-SIG Education and SIG-Health as well as ACM SIG - IT education.

Karen P. Purcell is a graduate student in the Master of Science in Information Technology and a Graduate Assistant at Southern Polytechnic State University. She earned her Bachelor of Engineering from Vanderbilt University. She is interested in Health Information Technology and Quality Improvement. She is a member of Healthcare Information Management Systems Society (HIMSS).


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**

<table>
<thead>
<tr>
<th>&quot;As Is&quot; process</th>
<th>&quot;To Be&quot; process</th>
<th>Action required for change</th>
<th>Responsible person(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(example process) Patient arrives Patient checks in Patient pays co-pay</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   **"BRAND" change matrix example**

<table>
<thead>
<tr>
<th>Process</th>
<th>Benefits of the action</th>
<th>Risks of the action</th>
<th>Alternatives of the perspective action</th>
<th>Nothing: doing nothing at all</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>(example process) Patient arrives Patient checks in Patient pays co-pay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Objective/Criteria</th>
<th>Performance Indicators (total 40 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Needs improvement</td>
</tr>
<tr>
<td>Professional report</td>
<td>(7 points) Report includes most required components. Not proofread.</td>
</tr>
<tr>
<td>Define process or processes using definitions and diagrams</td>
<td>(6 points) Process not well defined.</td>
</tr>
<tr>
<td>Identify nonstandard or redundant steps and makes redesign recommendations</td>
<td>(6 points) Recommendations not clearly defined.</td>
</tr>
<tr>
<td>Provider EHR survey</td>
<td>(0 points) Missing</td>
</tr>
<tr>
<td></td>
<td>survey included</td>
</tr>
</tbody>
</table>