67-308 - Innovation Studio: Healthcare Information Systems

Spring Semester, 2015

Course Summary
May 12, 2015

CMU Professor:

Donald P. Taylor, Ph.D., M.B.A.

dontaylor@cmu.edu

(412) 956-1000 cell

UPMC Organizational Contact:

Ameer Ali, Pharm. D.

Manager of Clinical Advisory Services

alias@upmc.edu

UPMC Enterprises

COURSE OVERVIEW

Innovation Studio: Healthcare Information Systems is a half-semester, 6-unit elective course in Information Systems at Carnegie Mellon University. This course is an in-depth, applied opportunity for students to engage with real-world healthcare information systems, developers, end-user constituents, healthcare policy, and sustainable trends in healthcare information systems unmet needs. Students will apply their learning experience through the development of a final project.

Project teams in this course will focus on rapid development of a system, system design, user interface/user experience design, mobile app, or innovative business requirements document. To accomplish this, teams will have to talk to real users; observe users in their native environments; think about real physical, technical, and social constraints; and understand how to solve real needs (or pain points). Novel connections and collaborations beyond each student's boundaries and comfort zones are strongly encouraged. Each team will propose its own project, seek approval by the instructor and develop the project to a realistic point of conclusion by the end of the semester.

COURSE DESCRIPTION

Healthcare information systems are intended to improve patient outcomes while reducing the cost of clinical care. However, the United States spent $2.7 trillion on health care in 2011 that is estimated to be $4.78 trillion (19.6 percent of the U.S. economy by 2021). The healthcare information systems market is projected to be $31.3B in 2017. With the highest per person expense on healthcare and healthcare information systems, the United States only ranks in the median compared to other countries for healthcare quality. Although healthcare information systems (e.g. electronic health records) are improving, challenges persist within most healthcare information technology (HIT) solutions because of a lack of attention to workflow (e.g. transition of care), human interface design, and interoperability. This course will educate and expose students to the clinical information workflows that are underserved by current solutions but that may yield a significant positive impact on clinical quality and cost. Students will solve real-world healthcare information systems challenges in a team-based format.

Learning Objectives:

Upon successful completion of the course, each student should be able to show tangible evidence of growth and maturity in the following areas consistent with the levels expected of graduates from top-tier Information Systems programs.

1. Identify, research, evaluate, recommend and demonstrate appropriate 'right sized' innovative solutions to meet healthcare information systems stakeholder requirements. Quantify the impact of the

problem being solved by the information systems solution and diagram how their solution positively impacts stakeholders' objectives.

2. Demonstrate ability to adapt tools, techniques, technologies and methods to achieve realistic project goals.

3. Demonstrate ability to work effectively as a cooperative team member.

4. Apply practical 'right-sized' project management techniques to project development.

5. Demonstrate mastery of, or ability to learn, new or unfamiliar technologies, development environments and tools, as needed.

Student Demographics:

22 undergraduate students from Carnegie Mellon University completed the course.

Majors:
Information Systems: 60%
Computer Science: 15%
Electrical & Computer Engineering: 10%
Humanities & Social Sciences: 15%

Year:
Seniors: 40%
Juniors: 50%
Sophomores: 10%

Projects:

Six projects were selected by the student teams (Table 1). These projects were selected among approximately 10 projects identified by Dr. Ali.

Team	Team Name	Project Sponsor	# Students	Summary
1	Predictive Analytics	Lincoln Smith	4	Applications & ethics to predictive analytics: pressure ulcer prevention
2	GE Next Gen Imaging	Frank Anstett	4	Vendor neutral archive market overview & feature scope
3	GE Healthcare Mobile - UX	Frank Anstett	1	User experience (UX) design for wound management VNA (MICA)
4	YoupayWePay	Mohinder Dick	6	Technical assessment and recommendations to improve the WePay application
5	GE Healthcare Mobile - SWOT	Frank Anstett	1	SWOT and 5 Forces analysis on mobile VNA for wound management
6	UPMC AnywhereCare	Pamela Lougheed	6	End-user survey and profiling to assess comfort of patients interacting with their health records

Table 1. Six self-selected project teams composed of 1-6 students.

Student evaluations:

At the end of the course, all 22 students were provided with an anonymous online form to evaluate the course, instructor, and UPMC Enterprises. Twelve students responded to the survey. Results indicate a favorable trend toward offering the course again and in collaboration with UPMC Enterprises (Figure 1).
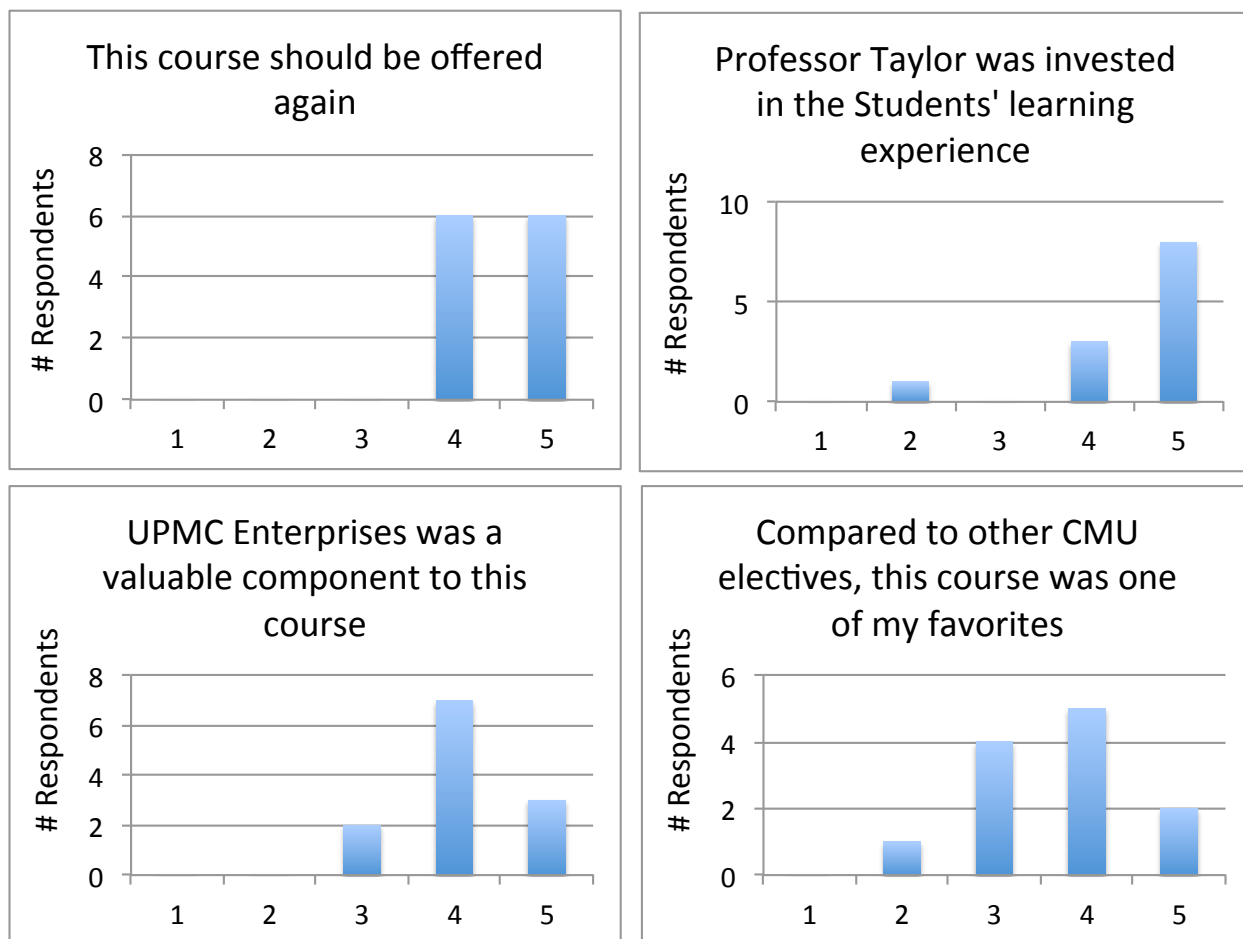
Figure 1. Student evaluations. 1 = Significantly disagree; 5 = Significantly agree. 12 respondents from 22 total students.

The survey included free text for students to provide suggestions to improve the course. These suggestions include:

- "Projects should be assigned/vetted for viability prior to the start of the semester."
- "The clients should be aware of the short time frame (especially with Carnival) and limit the scopes this way."
- "I can only stress that this class should be a full semester, other than that it was a great course."
- "I answered 'Full Semester' to the above question based on the current format, but I'm sure it's possible to keep it a mini course with some modifications. I say full semester because the amount of time we have to do a project limits the amount of things we can do."

One of the students provided the following narrative:

"**I do believe this course offers one of the most valuable and unique experiences available at CMU**. In other courses, we have the opportunity to interact with and build applications for third

party businesses. However, rarely do we have the opportunity to engage in projects that may one day actually have a significant impact.

Through our interaction with UPMC, the students are **introduced to an environment and network** that we would not have access to by any other means. Personally, this course has introduced me to local and national corporations advancing the way medical businesses operate.

I think that this course could significantly benefit from a **full semester timeline and dedicated teaching assistants.** The full semester would ease the pressure to produce large-scale solutions in a small period of time. The dedicated teaching assistants would enable students to ask questions about the content of the course as well as technological aspects of their project.

Although I think the UPMC projects are valuable for students to involve themselves in an ongoing project, I think that requiring students to select from that pool is very limiting. I think that there is **huge potential for student generated innovation**, which isn't currently a path in the course. Overall I would suggest that UPMC is utilized as a resource rather than a foundation.

If the course were a semester long, the students could potentially learn about industry standards, policy, and the future of medical IT before projects are chosen. After hearing the presentations given by the two startups as well as the case about "medical lab process in Africa", I personally had many ideas for projects. Realistically, I could have built almost all of them over a semester's time. If these presentations were given at the beginning of the class rather than the end, I would guess that most groups would choose to work on projects generated by students.

Overall, I think this course is more valuable, has more potential, and prepares students for the work world better than almost all the courses currently offered by the IS department. I also think that this is an [*sic*] topic that could be expanded to a content area, required core course for the program, and even multiple courses.

Personally, I would really want to take a Healthcare project course where students suggest and implement their own ideas."

Conclusions:

The student survey results suggest that the CMU students greatly benefited from both the studio format, and the content domain area provided by UPMC Enterprises. Many students indicate they believe this should be a full-semester course, though I suggest we conduct a mini 2 in the fall in order to work out additional details to prepare for a Spring 2016 full-semester course.