Evaluating the AMIA-OHSU 10x10 Program to Train Healthcare Professionals in Medical Informatics

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Abstract

The promise of health information technology (HIT) has led to calls for a larger and better trained workforce in medical informatics. University programs in applied health and biomedical informatics have been evolving in an effort to address the need for healthcare professionals to be trained in informatics. One such evolution is the American Medical Informatics Association's (AMIA) 10x10 program. To assess current delivery and content models, participant satisfaction, and how graduates have benefited from the program in career or education advancement, all students who completed the Oregon Health & Science University (OHSU) offering of the AMIA 10x10 course through the end of 2006 were surveyed. We found that the 10x10 program is approaching AMIA's goals, and that there are potential areas for content and delivery modifications. Further research in defining the optimal competencies of the medical informatics workforce and its optimal education is needed.

Introduction

Although studies have demonstrated the value of health information technology (HIT) in improving the quality, safety, and efficiency of healthcare,[1, 2] there continue to be questions about its dissemination beyond academic settings. One of the concerns about dissemination is whether there is an adequate workforce to achieve the benefits attained in specialized settings.[3]

One example of the need for a well-trained workforce comes from analyses of HIT failure, such as a recent study documenting an increase in mortality after computerized physician order entry (CPOE) in a pediatric intensive care unit.[4] In a follow-up analysis, Sittig et al. noted that several well-known best practices in HIT were not followed, and this could have contributed to the adverse outcome of the study.[5] It is conceivable that appropriately trained informatics professionals could have helped avoid some of the problems that led to the negative results. Of note, several other pediatric institutions with advanced informatics infrastructures have found that mortality did not increase after CPOE implementation.[6-8]

Most educational programs in biomedical informatics have focused on training researchers,[9] despite the fact that opportunities for researchers are limited and there is a major opportunity for healthcare professionals to assume operational informatics roles.[3] One of the frontrunners in educating the informatics workforce has been the Woods Hole Medical Informatics course (WHMI) sponsored by the National Library of Medicine (NLM), dating back to 1993. Since that time few other programs have been initiated to educate informaticians. The biomedical informatics educational program at OHSU was the only AMIA 10x10 affiliated program until recently, when others such as University of Alabama at Birmingham, University of Illinois at Chicago, and Stanford University have joined affiliation.

The American Medical Informatics Association recognized the growing need for professionals trained in applied informatics. Dr. Charles Safran, former Chairman of the Board of Directors of AMIA, has advocated the need for at least one physician and nurse at each hospital in the United States to best guide HIT implementation.[10] Recently, AMIA and American Health Information Management Association (AHIMA) issued a call for increasing the size and scope of the HIT workforce.[11]

In 2005, AMIA and OHSU launched the 10x10 program, with a stated goal of training 10,000 professionals in informatics by the year 2010. A large part of OHSU's interest came from the program's foray into distance education in 1999, which created opportunities for informatics education to a much wider audience.[11] The initial offering of the program from OHSU was favorably received, and by the end of 2007, nearly 400 individuals had completed the course.[11] The OHSU 10x10 program is structured as a three-credit course covering one academic quarter, with the addition of an in-person session at the end where students come together to consolidate their knowledge and interact with their new colleagues. The course contains 10 weekly units, each of which contains 2-3 hours of voice-over-Powerpoint lecture, readings, on-line discussions, and a self-assessment quiz. The course is decompressed over 15 weeks and requires about 4-8 hours of work per week. [11]

The research reported in this paper seeks to answer two questions: (1) What do the experiences of these students tell us about their satisfaction and how it can be improved? and (2) How will these students further

their career or education paths? We used open-ended questions that broadly sought information on course satisfaction, education plans, and career path progress.

While our questions were tailored to directly align with AMIA's 10x10 goals, there is discussion with another such study conducted on the WHMI course. To date, no other participant satisfaction surveys of the other AMIA 10x10 programs are available for review.

Methods

Questions for this qualitative survey were developed based upon the information sought from the research. The survey was piloted among 16 graduate students, all of whom had taken at least one on-line class at the graduate level, not at OHSU. Modifications for clarification were made to the survey instrument based on this feedback. In a single-stage web-based 24-question survey administered via Survey Monkey, data were collected from March 1 to April 6, 2007 from those who had completed the AMIA-OHSU 10x10 course before the end of 2006. All 170 participants who completed the course were notified by email of the survey availability and provided a link to it, with three subsequent email reminders. Of the 170 eligible for participation, 166 had valid email addresses. Of those 166, 88 responses were obtained, with those not having answers beyond the demographic data discarded, resulting in a net response of 48% (n=79). Due to the anonymity of the respondents and the lack of mandatory personally indentifying information, it was unrealistic to attempt to survey the remaining 52% who did not answer.

Using an inductive approach and drawing on evidence from participant responses, the content was analyzed to identify patterns that led to common themes under which all responses were coded and categorized. Responses were then further analyzed for more inclusive categorization leading to interpretation under: 1) content and delivery, 2) likelihood of continuing education in health informatics and the direction of continuing education (online, institution of higher learning, conferences, etc.), 3) career path directions, and 4) potential program modifications. Since increased interaction was an unexpected finding under potential program modification, further coding ascertained whether respondents were referring to increased online or face-to face interaction.

After the coding was complete, the four aforementioned categories were organized to facilitate some comparative analysis of the data.

Results

Over a 37 day period 79 respondents completed the 24 question open-ended survey. It was not mandatory to answer every question and those left unanswered are reported as such in the results. There was 2:1 male:female representation, with 72% of the participants between 40 and 59 years of age and 10% over 59 years. Sixty-eight percent of the respondents were physicians. Through self-reporting in an "other" category 11% were a combination of jobs including, but not limited to, pharmacists, analysts, or researchers. The remaining respondents fell into a variety of job classifications.

This introductory informatics course was intended to provide a general framework from which students could build upon, and 47% of the participants reported that general knowledge or terminology was the extent of any specific IT knowledge necessary for their job at the time of having taken the 10x10 course. Forty-nine percent of the participants noted that the education derived from this course was instrumental to overall career enhancement.

Flexibility was thought to be a key advantage in course participation. Although the response was in favor of the online and flexible nature of the course delivery, 14% reported the desire for more classmate interaction. The potential for increased participant interaction revealed itself to be the major area for considered change.

Course Content and Delivery Modality

The questionnaire sought to examine past participant satisfaction with the course content and the course delivery modality. A majority (66%) of the respondents gave replies that could be categorized under "depth and/or breadth of the content was very valuable."

"The most valuable aspects of the course was the opportunity to step back and take a more global view of the multifaceted role informatics has on improving health. The 10x10 provided a firm foundation of basic informatics history, concepts and terminologies as well as a broad overview of the discipline. It allowed me as an applied clinician to 'know what I did not know'. Well trained professionals are good at head nodding with acceptance of concepts that they might really require further clarification and training. I humbly felt a whole lot better with my 'Titles' after the course." MD, Applied Informatician, now a Post-doctoral Fellow in Health Informatics at a NLM Informatics Training Program

The value of the instructor was positive, with 42% saying that the instructor made a big difference, cit-

ing important attributes such as "calm," "attentive," and "answers email quickly."

Respondents volunteered information about the time commitment of coursework. Although there were comments that the course required a great deal of work, most mentioned that the flexibility of online afforded them the opportunity to take this course, when otherwise they would not have.

"I was able to gorge on material when I had free time, and set it aside when work was very demanding, and still manage to keep up." Computer Information Technology Professional

"I could only have done an online course with my job responsibilities and time restriction. I travel to conferences and the web based functions allows me to keep up with coursework no matter where located." MD, Director of Medical Informatics

One of the main challenges in providing educational opportunities for today's working adults is to be efficient yet diverse with educational offerings. As informatics continues to evolve as a profession, these and other types of educational opportunities will persist as a viable means for ensuring that the workforce has a stable base of knowledge. It was not surprising that 67% report the online nature of the course as a strength, however 14% still felt that there was a lack of interaction. This was further broken down by what kind of interaction was desired, with 73% of that 14% saying that the addition of synchronous online chat/message boards, etc. would be sufficient and the remaining 27% commenting that the course would benefit from increased person-to-person interaction.

There were aspects of the course delivery that were reported as difficult. However, anything that was reported was below 6% with the exception of 13% of respondents feeling there was too much information in the amount of time allotted.

Health Informatics Education

In AMIA's commitment to train 10,000 healthcare professionals by 2010, this initiative has developed traction in informatics education in a much broader sense. After having taken this 'introductory' course, participants viewed the 10x10 program as a springboard from which they will further their education within the realm of emerging fields of which there is desire to have extensive knowledge.

A total of 52 people (66%) responded that they were in the process of or plan to continue their education (see table 1). Of this group, 20 stated a preference for learning in the online environment and 44 planned to pursue their education in an institution of higher education. We note that there was significant overlap in responses between coursework at the university and the modality of online delivery, as many identifying online coursework also identified an institution of higher learning as the place of enrollment for that coursework, (e.g., The Graduate Certificate in Biomedical Informatics Program at OHSU), where about 35% of these respondents said they are already pursuing additional studies in this program. When we look at the entire 79 respondents, then 23% are pursuing additional studies in this program and these numbers are consistent with figures reported by the program.

Table 1: Type of continuing informatics education (all percentage calculations are based on n=52)

Type of Education	Number	% of respondents
Certificate Program at OHSU	18	35%
Master's Degree	11	21%
Information Sessions	7	13%
Certificate Program other than at OHSU	6	12%
Post Doctoral Work	3	6%
Unanswered	7	13%

Reasons for not continuing educational experiences were varied, with 28% reporting they did not see continuing this path of education as something they planned to pursue and half of those (14% overall) stating that they did not need it for their job.

Career Path Directions

This survey also examined responses on how this training led to current career path enhancement or advancement by comparing jobs and responsibilities prior to and then at the time of the survey. Although there was no substantial evidence of career advancement based solely on this course, there was affirmation that the knowledge gained from this course led to increased responsibilities and credibility (48%) within current jobs and to further solidify the possibilities for advancement (15%).

"My career path has not changed, but completing the course has given me many, many tools with which I have used and will continue to use as I try to get our facility on a smarter course to our integration of technology into the clinical realm. Since participating in this course I have: given presentations to IT […] regarding successful selection and implementation of an EHR, […], contributed to the development of a nursing informatics position […] and am promoting the value of a complementary pharmacy informatics position as well, successfully routed our Electronic Nursing Documentation Implementation

team down a path of standard terminology […] that will yield a SNOMED CT compatible system (this was in part due to a contact I met at my table at the Washington DC AMIA student session last fall). I would have had the desire to take on these tasks or projects prior to the 10 X 10 course...but not the confidence or knowledge to 'go forth and conquer'!!!" Clinical Analyst for a diverse healthcare facility

"This course was an eye opener. As stated I am now formally engaged in an online HIT AA degree. The course was the best thing that I could have done. I hope to move forward in HIT. If not at my current facility then at another." MD in private practice

Most of the job enhancements took the form of using the newly gained informatics knowledge in roles of advisement (22%) and systems analysis and implementation (35%) within current organizations.

Potential Program Modifications

Of the total respondents, 53% thought there would be value in modifying the course, but there was little consensus on what should be modified. Nineteen common categories emerged, each with four or fewer responses except two areas. Six people said that they thought there was benefit in increasing the length of the course, and eleven people thought the course needed more interaction between cadre participants. The interaction referred to by most in this category is in reference to online interaction citing that "More participant interaction--some participants were hardly 'there'" (Computer Information Technology Professional).

Comparison of Results to WHMI Participant Perceptions

It analyzing the OHSU program, it is helpful to look at another study also examining student perspectives – that of the WHMI program. These two programs, while having similar goals, differ in instruction from a one-week face-to-face intensive fellowship based program (WHMI) to a semester-long distance learning graduate course (OHSU). While it is beyond the scope of this paper to compare the two programs, many similarities emerged in paralleling the results. For example, both studies reported an increase in confidence and perceived credibility within the workplace with more responsibility for strategic advisement and decisions. Breadth of content emerged as a strength in both programs, while increasing course length was cited as an area for modification in both surveys. There was a notable difference in participant occupation. A majority of the WHMI course was attended by librarians, whereas the OHSU course was attended primarily by physicians.[12]

Discussion

AMIA's goals of having the 10x10 initiative broaden informatics knowledge among clinicians are supported by the results of this research. Although 66% reported plans for further study, this did not necessarily mean graduate level coursework (i.e., conference workshops, vendor information sessions, etc.). However, 23% are already enrolled in additional study, primarily in the on-line graduate program at OHSU. Additionally, 48% reported that the knowledge gained from this course led to increased responsibilities and credibility within their current jobs.

The ability to use new knowledge to leverage oneself within his/her current position seems to be valued amongst these 79 respondents. This newly gained knowledge combined with on-the-job training will serve to put participants in a position to champion informatics decisions in their institutions.

This survey addressed a previously identified need for future research of the AMIA-OHSU 10x10 program. The goal is to use these results for course modifications.[13] The experiences of the students who have completed the AMIA-OHSU 10x10 program during the specified period were overall satisfied with the design and delivery of the course. The findings from this research raise additional questions such as, "How many informaticians are really out there?," "What do those who are out there do in their jobs?," and "What are their educational backgrounds?"

While no specific course modifications were made as a result of this survey, it is important to note that course modifications are made more on a continual basis with information gleaned from regular course evaluations, and some of the issues raised from this study had already been addressed.

It is valuable to examine other programs, such as WHMI, to assess similarities and differences. As an area for future research, there is clear need for identification of standard competencies for informaticians in the variety of roles they currently (and could or should) play. In addition, further work must explore their optimal education and training in the field. It may also be helpful to understand the various modalities (face-to-face, distance, semester, intensive, etc.) by which the 10x10 program can or should be offered to accomplish the goal of training 10,000 clinicians by 2010 in a cost effective manner.

This study had some limitations. For one, there exists the possibility that the 52% non-response rate represents more dissatisfied than satisfied students. Considerable variation exists in survey response rates of dissatisfied customers when compared to those who are satisfied.[14, 15] Unlike face to face interviews, there

was the lack of control over the response rate, therefore questions were formed such that areas of weakness and potential for program modification were solicited from all participants. The authors were satisfied with the balance as just over half of the respondents identified areas for modification.

Conclusion

This study verifies the generally positive acceptance of the AMIA-OHSU 10x10 course documented with the initial cohort of students in an earlier study.[13] This analysis further shows that while the course is valuable for their current work and career progression, it is, for many, a stepping stone for additional study in the field. As other programs become part of those supporting the AMIA 10x10 initiative, the findings from this survey can help to shape content that dynamically follows the evolving knowledge base of its students. Combined efforts by AMIA and institutions such as OHSU or NLM can put programs in place for increasing the number of professionals who are trained in applied informatics and for increasing the knowledge and skills of clinicians and other professionals working in healthcare to fulfill the larger goal of improved quality, safety, and efficiency of healthcare.

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Electronic appendix: Survey Instrument http://wfs.cgu.edu/feldmans/survey.pdf?uniq=-9scgkb