FY16 Innovations in Teaching with Technology Awards: Enhancing Student Learning in Health Screening Implementation through use of Decision Trees Heuristics and Branching e-Learning Interaction

FY16 Innovations in Teaching with Technology Awards

<table>
<thead>
<tr>
<th>Proposal Title:</th>
<th>Enhancing Student Learning in Health Screening Implementation through use of Decision Trees Heuristics and Branching e-Learning Interaction</th>
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<td>Department(s):</td>
<td>Applied Clinical Sciences</td>
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<td>Funding Awarded:</td>
<td>$25,400</td>
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Teaching and Learning Challenge and Significance of Challenges

Healthcare professionals are required to gain professional service exposure as part of training requirements, but often do not know how to properly identify at-risk patients or be able to engage in decision making heuristics when at-risk patients are identified. Health screenings differ from diagnostic testing and monitoring. In a health screening, the patient has not exhibited signs or symptoms of disease. In diagnostic testing and monitoring, the patient either has signs and symptoms of disease or a previous diagnosis. Students need guidance and oversight to develop competency in technique and require background necessary to provide evidence based health screenings.

Prior to 2012, no formal process was available to provide feedback mechanisms. In 2012, the College of Pharmacy implemented training sessions for three health
screenings areas frequently offered by the College to the local community. The screening areas were selected based on disease states that represent an important health problem that impact the total student population, where the disease is understood, tests are available and costs of screening and resources are reasonable.

A mentoring structure was imbedded in the health screening process with initial screening roles being designed for undergraduate or early didactic professional students with opportunities to learn to undertake advanced roles (device use and counseling) later in the educational process. Undergraduate student groups with associations to the Carver College of Medicine, College of Public Health, College of Nursing, and College of Dentistry are exploring adoption of these processes to provide interdisciplinary health screenings and opportunity for interaction of pre-medical undergraduate students with their future medical peers.

Although a substantial improvement to previous policies, streamlining of the process could benefit students and creation of further transparency related to the decision-making heuristics or processes through branching tree e-learning interaction. Many individuals oversee students at health screenings. Supervisors often struggle to give constructive and timely feedback or help communicate influences of decisions. Barriers to student understanding of appropriateness of screenings include opportunities for feedback, time constraints, various professional knowledge and specialization, lack of standard training of supervisors, and diversity of students’ needs and abilities. Students need an immediate feedback mechanism to make alterations in providing health screenings to patients. eLearning modules and authoring tools may provide guidance on why specific screening questions are used, where critical decisions are made, how to communicate the decision making, and mechanisms to target resources based on patients risks and needs. No tool currently exists that allows for selection of desired screening areas and decisions made in the health screening process.

Clinical guidelines provide recommendations on what patients should be screened for common disease states such as diabetes and high blood pressure. However, considerable variation exists in healthcare providers determinations of whether or not patients meet suggested criteria for screenings.

Innovative Application of Technology to Enhance Student Learning

Proposed Phasic Implementation:

Phase I

Elearning branching tree modules will be created to teach students how to do health screenings. Then, the elearning modules will be used to guide the students to make
the correct decisions in pre-build scenarios related to diabetes and cardiovascular health screenings.

Phase 2

An application would be made through use of elearning branching tree authoring tools that is meant to gather data about how well the students are applying what they learned about decision-making in provision of real diabetes and cardiovascular health screenings. The tool would track student performance in the field to help us understand as educators how to improve the health screening e-learning modules and improve student instruction.

Phase 3

Assessment stage to determine if instructional scaffolding for the application is needed to assist the students in the field and/or improve the elearning modules. Instructional scaffolding is a learning process designed to promote a deeper level of learning. Scaffolding is the support given during the learning process, which is tailored to the needs of students with the intention of helping the students to achieve the learning goals.

Phase 4

Implementing changes to the scaffolding product and elearning modules.

Goals / Objectives:

- Stimulate student awareness of evidence based health screenings decision heuristics through use of decision trees.
- Analyze student's current decision heuristics related to provision of health screenings.
- Produce a tool to provide real-time feedback provided to students through integration of decision tree technology into health screening service instruction.
- Revise the health screening process provided by student groups at the University of Iowa, Colleges of Pharmacy, Medicine, Nursing, Dentistry, and Public Health to facilitate further mentorship of undergraduate pre-medical students.
- Collect pilot data on student decision heuristics through technology to create future technology and tools for health screening trainings.
- Determine if the elearning preparation or instructional scaffolding for the real world health screenings improves student performance.

Discussion:
Students will be guided through a step-wise process and decision-making related to identification of patient eligibility for receiving health screenings and subsequent actions to lower patient disease state risk through use of e-learning tools. Development of the tool and e-learning branching tree modules will provide opportunities for collaborative-based inter-professional learning. Undergraduate pre-Medical and health profession students may participate in a shared process and use of structured workflow using the tool.

Estimates of Impacted Students per College at the University of Iowa:

 Minority Association of Pre-Health Students (MAPS)

• 80 pre-medical undergraduate students

MAPS is an academic support group that motivates, encourages, and prepares pre-health students to become competitive health profession applicants in a field that is increasingly becoming more culturally diverse. It provides moral support and the resources needed to guide underrepresented students throughout the challenges of the pre-health undergrad program at Iowa; provides tools to help students become familiar with a variety of health care fields; prepares pre-health students who may be from an underrepresented minority group, a medically underserved area, and/or students from a disadvantaged background; is strongly tied with the UI Carver College of Medicine faculty and students interested in pursuing a career in medicine, dentistry, physical therapy, public health, or pharmacy; helps offer opportunities for students to gain experiences to become competitive professional school applicants.

 Student National Pharmaceutical Association (SNPhA)

• 40 pre-medical undergraduate students

Offers students opportunity to develop leadership skills; develops role of minority health professionals; educates communities to better healthcare practices and increases awareness and understanding of prevalent disease conditions.

 Women in Science and Engineering (WISE)

• 275 pre-medical undergraduate students potentially impacted

Connection with Pharmacy Student Ambassador interested in providing education and support events open to UI STEM (science, technology, engineering, and math population).

Health Profession College Undergraduate Students at University of Iowa Graduate Students at University of Iowa

(Professional Degree)
Pharmacy Undergraduate Students at Iowa: 430 Graduate Students at Iowa: 428

Medicine Undergraduate Students at Iowa: 1,396 Graduate Students at Iowa: 664

Dentistry Undergraduate Students at Iowa: 271 Graduate Students at Iowa: Pre-Doctoral: 327 Graduate/Resident: 78

Nursing Undergraduate Students at Iowa: 523 BSN: 348; RN-BSN: 191; MSN: 9; PhD: 27; DNP: 173

Totals Undergraduate Students at Iowa: 2620 Graduate Students at Iowa: 2245

The ability to collect information on decisions made during health screening will provide opportunities for additional learning opportunities which may include, but not be limited to, discussions, student-moderated discussions, collaborative presentations, demonstrations and simulations. Knowledge of decision-making steps generated through e-learning decision-tree modules and authoring tools can be further used on international rotations to provide emphasis of global health risks and similarities between local and international decisions.

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<th>What resources will you need?</th>
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<td>We have an ability to provide the knowledge related to appropriate variables for health screenings and associated clinical content (e.g. counseling; risk factors; etc.). We have a basic knowledge of eLearning tools. To be realistic, this project will be accomplished in Phases. We will need personnel to develop the activities further throughout the phases beginning with Phase 1. Specifically, we will need a pre-medical student to engage to become a subject matter expert (learn additionally about health screenings; diabetes; and cardiovascular diseases and help to develop content); an instructional designer in the form of a student or staff at the Center for Teaching and finally and undergraduate student to work as an authoring tool developer.</td>
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<th>What is your rough estimate of</th>
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<tr>
<td>Budget Component / Estimated Expense</td>
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<tr>
<td>Personnel</td>
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<tr>
<td>Project Manager (Dr. Abrons) / No funding requested</td>
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<tr>
<td>Subject Matter Expert (Pre-Medicine Student) / $20-30/hour x ~200 hours</td>
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<td>Instructional Designer - Student / staff at the Center for Teaching</td>
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Costs? Authoring Tool developer - Undergraduate student

Total $15,000

There is potential in the future for the University to witness a possible return on investment. Licensing of the end product would be beneficial to provide potential future revenue streams to the College and University. We plan to pursue this in the future. Other funding sources are not currently available or being used.

Article number:
104506