

View Project

General Education/Awareness Project Information	
*1. Project	Public Education
*If you selected other, above, please specify	
*2. Who is the target audience for the planned project?	High risk group
*3. What is your estimated size of the target audience?	50000
*4. How was this target audience determined?	None of the above
If none of the above, briefly describe the method used to determine target audience	
Student and staff population size of a 3-campus university	
<p>* In the space provided below, please provide a brief synopsis of the proposed project and then identify the specific goals and objectives of your project.</p> <p>To develop a Fire Escape Learning Instrument eXperiment (FELIX) training program - a video-game style simulation, accessible via Internet, and built to provide a realistic hand-on experience to teach how to safely escape from a building on fire. In FELIX, a participant controls an avatar (a virtual body) through the residence hall while the building is on fire and takes decisions which demonstrate skills about fire safety (e.g. Do they check the door before opening it? Etc.). FELIX creates a personalized performance report of each participant, based on the skills listed in our vulnerability statement (Section 6a).</p> <p>This project will address the difficulty of annually training over 5,000 new persons at OSU to a satisfactory level of knowledge retention and with very limited resources. The ultimate goal is to make FELIX a standard procedure for any new person on campus, and a resource available at any time for anyone.</p>	
<p>* 5. In the space provided below, please explain your experience and ability in developing and conducting (i.e., timely and satisfactory project completion) past fire prevention and safety projects. Additionally, please demonstrate the experience and expertise you have in managing the type of project you are proposing:</p> <p>OSU Technology Across the Curriculum (TAC) has been developing Virtual Learning Environments (VLE) like FELIX for almost 4 years. A similar project to FELIX is "WAVE", a 5-year interdisciplinary project funded by USDA NIFA AFRI in which TAC is developing a virtual simulation environment to improve health and nutrition education. WAVE will be deployed in August 2015, and will be used by more than 320 high school students simultaneously. The WAVE project is the latest example of TAC's team experience developing large problem-solution focused projects, and collaborating with other entities to develop content and software.</p> <p>TAC is already collaborating with OSU Enterprise Risk Services (ERS), specifically with Michael Bamberger (Emergency Preparedness Manager) and Jim Patton (Fire Prevention Officer at OSU) and has developed a proof of concept of the FELIX simulation. FELIX's prototype is implemented using the Second Life platform and currently has a reproduction of an apartment style residence hall. (See Section 6.f for access). Jim Patton is providing TAC with fire expertise for content development. Michael Bamberger is TAC's connection to the OSU's campus safety programs and residence halls, where the target student audience is located.</p>	
<p>6. The narrative portion of the application should contain supporting information that allows for evaluation of this project. If you are applying for a grant in the Fire Prevention and Safety Activity, your Narrative Statement must address the evaluation elements as outlined in the Funding Opportunity Announcement.</p> <p>Keep in mind that the evaluation of your application will also be based on a clear understanding of your proposal, your ability to meet the objectives of the program, and your probability of successfully delivering your project to the population targeted. You need to fully explain how the funds will be used to accomplish the goals of your project. To that end, be sure to include descriptions/justification for all budgeted items - items not justified may be disallowed.</p>	

Your narrative is broken out into 5 separate sections which are required, with an optional Additional Comments section. Each section will address each of the criteria on which your application will be evaluated and scored. Due to the built in "time-out" feature, we recommend you create the narrative text in your word processing system and then copy it into the spaces provided below. Images, attachments, and special characters of formatting (i.e.: quote marks, bold print, bullet points, symbols, etc.) are not allowed.

***6a. Vulnerability Statement: What is the vulnerability in your community that you have identified? What statistics correspond with and support your project and target audience? Please describe the steps which were taken to determine the vulnerability and target audience and describe the methodology for determining all of the above.**

OSU requires all new students (freshman and international students) to reside in residence halls on campus. This is typically the first long-term living experience away from a home environment for more than 5,000 occupants, and OSU has experienced several incidents typical of young adults learning to live, cook, and reside in a shared space. When a single incident occurs, over 200-800 occupants of the building are affected and have to know how to respond correctly to evacuate and protect themselves.

The current verbal and static web-based presentation method of educating residents is conducted upon initial occupancy, but these methods are not the best for obtaining knowledge and skill proficiency, which is needed throughout the year, not just the first week after training. This has been anecdotally observed during scheduled and un-scheduled evacuation incidents by resident hall leadership. This then translates to poor performance once the student moves out of the controlled residence hall environment and into different living and work arrangements, where they are even more dependent upon these life skills that they were taught during their residence hall experience.

A recent incident at OSU confirms the statistics and observed behavior that we want to address. In May 2014, a small fire in the Men Restroom of the Memorial Union building triggered the fire alarm. The responding firefighters had to forcefully evacuate the building (http://www.dailybarometer.com/news/fire-forces-memorial-union-to-evacuate/article_3696448c-da61-11e3-8abd-0017a43b2370.html)

An interview process was designed and implemented to collect data to determine if what was being observed was in-fact true. The questions described a fire situation that gradually escalated in the residence hall. Samples of questions are: 1. Imagine this room is your dorm room. It is late at night and you are lying on your bed. Suddenly, you hear the fire alarm. What would you do? 2. Now, you made it out of your room, and you are standing in the hallway, and the hallway is full of smoke from ceiling to floor. What would you do?

The questions covered the skills identified by the OSU Fire Prevention Program as necessary to evacuate and survive a fire situation. These same skills are taught aforementioned training method. Over 20 OSU students currently living in or have lived in residence halls were interviewed in 30 minute sessions. Post analysis of the study indicates:

- 50% of the participants did not demonstrate they knew to check the door's temperature before opening it
- 95% of the participants declared they would try to go through a hallway completely filled of smoke.
- 10% of the participants declared they would likely not evacuate upon hearing the fire alarm.
- 80% of the participants would rely on others to call 9-11
- 65% of the participants did not demonstrate knowing what to do if they were stuck in a room during a fire.

Our interviews also revealed some examples of the less than desired knowledge/decision process being used: When asked: "What else could you possibly think about doing for your safety?", the following answer was given: "There is also the power of googling! It takes 20 seconds to Google it and to get a list of 10 things to do, in those 10 things there might be one bullet that brings me aware of something to save my life." When asked what they would do for their friends pet living next room: "I do not particularly like cats, but if it was a dog I would probably open the door".

***6b. Implementation Plan: Provide details on the implementation plan which discusses the proposed project's goals and objectives. What are the methods and specific steps that will be used to achieve the goals and objectives? If applicable, what examples can you provide of marketing efforts to promote the project? Who will deliver the project and what partnerships may be involved along with how they will support this project? How will the materials or deliverables be distributed?**

FELIX is a continual collaboration between TAC and OSU Enterprise Risk Services (ERS). Within ERS, TAC is closely collaborating with the Fire Prevention Officer and the Emergency Manager. We have established an MOU to specify the partnership and expectations for each agency to ensure success of the project. The methodology to

achieve our goals and objectives is:

Design decisions: Expand and develop the existing experimental/learning prototype of FELIX (based on one residence hall and a fixed fire source) to meet a more universal building environment and diverse training population. TAC will collaborate with ERS to complete FELIX's design to include:

1-Adding more universally representative buildings of Assembly, Business, Mercantile and Residence functions. OSU Campus provides a diverse building structure and population to gather various types of user feedback on the pilot project. OSU has an existing building database for a variety of buildings that are an excellent sample of the building styles (span a period of years from 1857 through 2015 and include interior designs from open format to individual rooms) and materials (i.e. wood, stone, brick, concrete, and glass) used throughout the United States.

2-Expanding FELIX to include multiple population demographics. OSU has current and accurate data of its supported population, which includes college aged students, adult learners, adult faculty/staff, after-hour organizations, pre-school children, and activities of all ages. Additionally, OSU controlled venues and events are stereotypical of what can be found throughout any community - conference centers that host a wide variety of ages and activities, athletic arenas with seating from 300 to 55,000 various aged spectators, pre-school aged children, etc.

3-Refine learning objectives and additional learning materials (audio and/or video recordings, visual display in the simulation, downloadable reference texts) to support participants and instructors using FELIX

4-Develop an Instructor's control board. Even though participants can go through the simulation in autonomy, FELIX will provide tools to help Fire Safety instructors monitor the students, and control the simulation (e.g. make the simulation harder or easier, decide the type of building, print a report of the student's performance etc.)

5-Develop and implement experimental protocols: TAC will design protocols for experiments to evaluate several types of pedagogies (e.g. whole groups doing the simulation at the same time, one-on-one tutoring etc.) and how to maximize the use of FELIX with each type of group. The Avatar form of teaching is very novel but becoming more mainstream and we want to ensure its effectiveness as a teaching tool.

Construction: Once the project's collaborative leaders have approved the Design of the various components, TAC will virtually construct the buildings and code the simulation in the buildings. This software engineering phase will involve extensive testing of the platform with volunteer testers from the OSU community. The construction of FELIX will focus on three priorities: 1. Teach the right thing 2. FELIX is easy and enjoyable to use 3. Instructors need minimum time and effort to learn to teach through FELIX.

Pilot Test: The pilot is when we test FELIX with the people whom FELIX is meant to serve – instructors and learners. The pilot and construction components are very much intertwined, as it is how we obtain feedback as each component is built and modified before the final product. Therefore, TAC has partnered with Shawn Simons and Alvaro Llanos ("After The Fire", survivors of the Seton Hall University fire in 2000 in South Orange, NJ, which killed 3 other students). Their real-world experience feedback will be very important to making FELIX relevant and accessible.

Deployment: The deployment of FELIX will consist of a joint effort between TAC and ERS to implement with the OSU population via standardized training (annual employee and student training, focused presentations, integration of FELIX into the new student and employee orientation required training/checklist) and special events (pre-event training for facility ushers).

Dissemination: We intend to present the results of our surveys and evaluation to key national conferences on fire safety (e.g. Center for Campus Fire Safety Fire Forum, Campus Fire & Security Safety Expo) and online education (e.g. Immersive Learning Environment Network) to disseminate FELIX nationally. Also, information will be distributed via the Emergency Management communication channels to augment the distribution to Fire Safety channels. FELIX's open-source code and documentation will be available freely on Internet for others to use and customize to their environment. It is possible for anyone desiring a copy of the simulation to buy a region in Second Life and install their own copy of FELIX for their own usage.

A timeline is presented in section 6.f

***6c. Evaluation Plan: Will the proposed project be periodically evaluated for its impact on the community? If yes, describe the methodology and steps you plan to take in order to conduct the evaluation.**

FELIX's evaluation plan has 4 steps:

1. Conduct a more encompassing assessment across all the representative groups at OSU (faculty, staff, other students etc.). The assessment will have the same format described in our Vulnerability Statement (section 6.a), and will be adapted to the population and building (e.g. adult faculty/staff won't answer questions about a residence hall). This assessment forms the benchmark for our analysis (represents the average level of skills on Fire Safety of our target population).

2. Evaluate FELIX's teaching performance during Deployment: After using FELIX (not immediately, but within a month), participants will complete an interview identical to (1). The comparison of both assessments (before and after using FELIX) will form the evaluation of FELIX's performance as a tutoring program.

3. Evaluate FELIX's ease to use: Immediately after using FELIX, instructors and learners will be asked a short series of questions to evaluate their comfort with the system (e.g. a short questionnaire to scale participant's comfort or confidence from 1 to 10.). If a pattern is identified, we will produce recommendations on the best ways to use the system to facilitate the usage by the community.

4. Evaluate marketing strategy: Our evaluation will also contain information relative to the efficacy of the marketing campaign. If a pattern is identified, we will summarize recommendations on what is the best way to advertise such a novel training system in order to facilitate its adoption in the community.

***6d. Cost Benefit: Does your project demonstrate a high benefit for the cost incurred? Are the costs associated with the project reasonable for the target audience that will be reached? If so, demonstrate the above in addition to the cost benefits and how you plan to maximize the level of funding that goes directly into the delivery of the project.**

The main items of the budget are as follow:

- Indirect charges: OSU and FEMA have agreed on a rate for indirect charges. Indirect charges are used to maintain the computer labs we will use to run the Pilot and Deployment. It also maintains the technologic infrastructure (e-mail, servers, computer systems) we must use to implement FELIX.
- Personnel: This covers the programmers costs, designer costs, personnel costs for conducting assessment directly related to creating FELIX.
- Travel: This covers the travel expenses of two persons for each year of performance in order to disseminate FELIX nationally. See Section 6.b.Dissemination for additional details.
- Participant Incentives: This item covers the cost to conduct studies. A small incentive (e.g. gift-card, pizza etc.) is extremely helpful to find participants for the pilot phase in a timely manner.

Additionally, OSU will provide non-monetary involvement, through the collaboration with ERS Michael Bamberger and Jim Patton.

FELIX has many advantages:

- 1-Repeatability at extremely low cost
- 2-Can support up to a 100 connection at once. We estimate being able to train the entire OSU population in less than a year (~40,000 persons).
- 3-Realistic and hand-on experience, involvement, and interactivity to facilitate learning (i.e. learning by doing) without the cost or risk of running people through a simulator trailer or actual building fire.
- 5-Ease of measurement of demonstrated skills without the need for direct instructor interaction (i.e. FELIX generates a report on the student's performance automatically)
- 6-Ease of access via Internet, 24/7, all-year long.
- 7-Ability to create randomize scenario, with controlled level of difficulty.
- 8-Ease of dissemination of the technology outside of OSU.
- 9-Small maintenance cost (Second Life Region costs \$1,770/year)
- 10-Scientific evidences to show that the positive impact on changing behaviors (see section 6.f for references)

FELIX has very few disadvantages:

- 1-Required a household internet connection (5Mb/sec)
- 2-Need 15 minutes training to learn how to use the avatar, for which is incorporated into the beginning of the simulation.
- 3-Need 30 minutes training for the instructors to learn how to use the Control panel
- 4-Due to the complexity of the project development, assessment, and evaluation, FELIX needs a 2-year period of performance to develop a complete package that can be made available to any user (see timeline in section 6.f)

***6e. Sustainability: Is it your organization's intent to deliver this program after the grant performance period? If so, how will the overall activity be sustained and what are the long-term benefits? Examples of**

sustainable projects can be illustrated through the long-term benefits derived from the delivery of the project, the presence of non-federal partners likely to continue the effort, or the demonstrated long-term commitment of the applicant.

TAC has had a long-term commitment with this project. TAC started the development of the FELIX prototype two years ago, on its own initiative. This includes the purchase of the Second Life region's lease and the developer's payrolls. Once the design and software of FELIX are completed, TAC is committed to maintain the Second Life lease on the region and guarantee free access to FELIX for future trainings, studies and continuity projects.

6f. Additional Comments: If you have any additional comments about your project, please provide them here.

TIMELINE

Month 1 to 3: Design decisions

Month 4 to 10: Construction

Month 11 to 16: Piloting

Month 17 to 24: Deployment

ACCESS FELIX's PROTOTYPE:

We invite you to try FELIX's prototype! Go to www.secondlife.com, download the Second Life viewer (it is like an internet browser for virtual environments), create an avatar, then go to the following address in Second Life:

<http://maps.secondlife.com/secondlife/OSU/95/87/2008>

This address is the location of the start of the prototype simulation. Click on the Disco Ball, select 'no' when asked if you want to dance (for your convenience), and the simulation will start! The goal is to get out of the building before the fire gets out of control.

SCIENTIFIC REFERENCES:

There is continued growing evidence and studies which suggest that hands-on simulations like FELIX have a real and measurable positive effect on learning and changing behaviors due to the immersion, interactivity and learning-by-doing effect.

Some selected academic references supporting our work:

[1] Patrick S Bordnick, Amy Traylor, Hilary L Copp, Ken M Graap, Brian Carter, Mirtha Ferrer, and Alicia P Walton. Assessing reactivity to virtual reality alcohol based cues. Addictive behaviors, 2008.

[2] Olaya Garcia-Rodriguez, Sara Weidberg, Jose Gutierrez-Maldonado, and Roberto Secades-Villa. Smoking a virtual cigarette increases craving among smokers. Addictive behaviors, 2013.

[3] Paul Krebs, Jack Burkhalter, Shireen Lewis, Tinesha Hendrickson, Ophelia Chiu, Paul Fearn, Wendy Perchick, and Jamie Ostroff. Development of a virtual reality coping skills game to prevent post hospitalization smoking relapse in tobacco dependent cancer patients. Journal For Virtual Worlds Research, 2009.

[4] Robin S Rosenberg, Shawnee L Baughman, and Jeremy N Bailenson. Virtual superheroes: Using superpowers in virtual reality to encourage pro-social behavior. PloS one, 2013.

[5] Barbara Olasov Rothbaum, Larry Hodges, Benjamin A Watson, G Drew Kessler, and Dan Opdyke. Virtual reality exposure therapy in the treatment of fear of flying: A case report. Behaviour Research and Therapy, 1996.

[6] Debra K Sullivan, Jeannine R Goetz, Cheryl A Gibson, Richard A Washburn, Bryan K Smith, Jaehoon Lee, Stephanie Gerald, Tennille Fincham, and Joseph E Donnelly. Improving weight maintenance using virtual reality (second life). Journal of nutrition education and behavior, 2013.

[7] Darren ER Warburton, Shannon SD Bredin, Leslie TL Horita, Dominik Zbogor, Jessica M Scott, Ben TA Esch, and Ryan E Rhodes. The health benefits of interactive video game exercise. Applied Physiology, Nutrition, and Metabolism, 2007.