FWI Funding Statement

Name: Dr. Vickie Galea, PhD; Dr. David Harris Smith, PhD
Faculty/Area: Health Sciences/Education Program in Anatomy/School of Rehabilitation Science (Galea) and Department of Communications and Multi Media (Harris Smith).
Project title: Understanding acute pain: Exploring the use of Virtual Learning Environments (VLE) for Health Professionals

Please summarize how the FWI funds have been spent:
A summary by broad category is sufficient, line by line accounting of individual expenditures is not required unless specifically requested. Alternatively, please provide a copy of your FAS for the accounts that have been used for the FWI funds.
Salaries and benefits: The funds have paid the salaries for an undergraduate student in engineering and for a recently graduated Communications and MultiMedia student.
Equipment: no equipment purchased
Event Costs: none
Other (please specify): $511.22 in disposables for motion capture for avatar motion files.

Balance remaining: All funds have been spent
Please indicate how the balance will be spent and when you anticipate that the funds will be exhausted.

Please submit separately a maximum 2-page summary of the results of the project with particular attention to the following details:

Please see attached.

The financial and project reports can be submitted to fwi@mcmaster.ca.
**Report Summary:** Understanding acute pain: Exploring the use of Virtual Learning Environments (VLE) for Health Professionals

1. How has the project fostered collaboration and interdisciplinarity?

From its inception the major strength of this project has indeed been the cooperation and collaboration of many disciplines. The objective of the module was to create a virtual learning environment to help health professionals understand the science of Acute (non-cancer) pain and the eventual application into the pharmacology and management of acute pain. In addition to the co-PI’s being from the faculties of Health Sciences and Humanities respectively we have enjoyed collaborations from the School of Rehabilitation Science (Dr. Monique Muller), Department of Anaesthesia (Dr. Ali Zahran, Dr. Eshaq Alshaqaq and Dr. Norm Buckley) and from Dr. Ilana Bayer, Director, RIVET (Research, Instruction & Innovation in Educational Technologies). This multidisciplinarity has yielded expertise in the design and creation of virtual world experiences, the creation of online learning modules and in the physiology, pharmacology and management of pain.

2. How has the project exposed students to new or emerging research? How has the project offered students an experience beyond traditional borders?

The students working on this project have had several rewarding experiences in the creation of the virtual objects, animations and “bots” that make up the Acute Pain Module. Examples of these experiences are: 1) the work of Bryan Ramoul (engineering student) who has created anatomical avatars where anatomical system (such as the central and peripheral nervous systems) are imbedded within the avatar allowing us to show anatomical and physiological responses in while the avatar is moving. In addition Bryan has created the animated pain pathways used for showing pain signalling shown in the second figure.

Another example of student experience has been the creation of the virtual clinic by Emily Wright – communications and multimedia student. This part of the project has yet to be completed yet Emily's experience in the creation of “Virtual Hamilton” has been extremely valuable towards her work in this project. A sample of the virtual clinic is inserted below:
3. **How has the project challenged the confines of existing programming and advanced new paradigms of research or education?**

While the precepts of problem-based, self-directed learning are well accepted programs such as the ones in Health Sciences that train health professionals struggle with the amount of content necessary to well rounded curricula. In fact the genesis of this project arose when we learned of the alarming paucity of pain education in the medical and The challenge of ensuring the proper basic sciences of physiology, anatomy, Neuroanatomy and pharmacology is a real one and often difficult to overcome. The creation of a virtual world environment to learn and practice content related to the science of acute pain as well as its application to pain management gives students training to be health practitioners several opportunities for learning outside of the regular tutorial or classroom. In addition we hope the interactive nature afforded with Virtual Learning Environments (VLE’s) makes the learning experience interesting and pleasurable, hopefully ensuring that students will use this module several times in the course of their training.

4. **How will the outcomes of the project be sustained or expanded?**

We are using the creation of the acute pain module as leverage for further funding from sources such as Physician Services Incorporated. It is our intention to progress from learning about acute pain to the more challenging science of chronic pain. The advanced outcomes from the Acute Pain Module such as the clinic and the Station concerned with the physiology of both central and peripheral pain receptor mechanisms and their pharmacological interactions are going to be good prototypes and, of course, we have endeavoured to create multi-purpose, multi-user virtual objects as often as possible to use in further VLE’s. In this way we plan to continue expanding the use of VLE’s in the education of health care professionals. The VLE’s created are presently sustainable on MacGRID. We are in communication with other investigators within the GRAND NCE (Graphics, Animation and New Media Network Centre of Excellence) who are also interested in the science of both acute and chronic pain thereby opening further avenues for sustainability.

5. **Please outline any barriers or challenges that may have prevented you from achieving some of your project goals.**

The greatest challenge with the creation of VLE’s such as this one is finding sufficient funds for completion – everything always takes more time than planned or expected because this project is so novel. This is in fact what has happened with the virtual clinic and pain receptor/pharmacology stations. We have recently submitted one further application for FWI funding and, as per above, are seeking funding through sources interested in medical education (PSI). If our applications for funding are successful we can keep our highly talented students working on this project ensuring the completion and enhancement of the prototype as well as the progression towards creating a VLE for understanding chronic pain.