



Flexible Learning Project Completion Report

Report Completion Date: (YYYY/MM/DD)

1. PROJECT OVERVIEW

1.1. General Information

Project Name: 2013FL1_MEDI_Krebs

Principal Investigator: Claudia Krebs

Team Members (Table 1.1) - *(Please fill in the following table)*

Table 1.1 - Roles and Responsibilities of the Project Team

Individual	Title/Affiliation	Responsibilities
Claudia Krebs	Sr Instructor, Cellular & Physiological Sciences	

Project Initiation Date: 2013/07/01	Project Completion Date:
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1.2. Project Summary - 1) FMED 426: The creation of professional neuroanatomy / neurophysiology video modules will give the students a conceptual framework to refer to as they work through the content of their weeks. These modules will also allow for students to access the material anytime and anywhere. 2) CAPS 301: Online modules will help students to prepare for the class so that class time can focus on the discussion of functional and applied neuroscience. 3) RHSC 420: The online videos and modules are an integral part of the course required for preparation for all lecture and lab sessions. 4) BMEG 410: Online modules will be a repository of information that these students will use as they navigate the world of neuro-imaging. In the course there will only be time to cover the most basic concepts, these modules will give those students with a deeper interest the opportunity to build a neuroanatomy / neuroscience knowledge base.

1.3. Student Impact (Table 1.2) - *Please fill in the following table for the period of time when your project was active. [Note: Adapt this section to the context of your project if this table does not capture the nature of it].*



Table 1.2 - Student Impact

Course	Section	Enrollment	Term	Type of Implementation (pilot, full transformation, use of online resource, etc.)
FMED 426		289	W2	Full transformation of the lab sessions. Students prepared with online materials for didactic content. Labs were now focused on the application of knowledge to clinical scenarios.
RHSC 420		85	W2	Full transformation. Lab sessions now focused on clinical skills and application of knowledge.
CAPS 301		600	W1	Additional online resource for interested students.
BMEG 410		65	W1	Additional online resource for interested students.

2. PRODUCTS AND ACHIEVEMENTS

2.1. Products and Achievements - Please update the project products and achievements as necessary and indicate the corresponding implementation date [Examples: 10 online interactive lecture modules (SEPT-DEC 2013); A fully flipped course (JAN-APR 2014); Piloted two-stage midterms and final exam (SEPT-DEC 2013)]. Also please indicate the current location of such products [Examples: Department website, Connect, shared workspace, etc.].

Table 2.1 – Products and Achievements

Product(s)/Achievement(s):	Implementation Date:	Location:
Development of new lab manual	January 2014	Connect (Medicol), print
Clinical case development	January 2014	Connect (Medicol)
Interactive modules (8) and lab manual	January 2014	Connect (Medicol) and www.neuroanatomy.ca
Videos (9)	January 2014	Connect (Medicol) and www.neuroanatomy.ca
Library of Nan Cheney drawing	January 2014	Connect (Medicol) and www.neuroanatomy.ca

2.2. Item(s) not Met - Please list all of the intended project products and achievements that were not attained and the reason(s) for this.

Table 2.2 – Item(s) not met

Item(s) Not Met:	Reason:



3. PROJECT SUPPORT – Please provide feedback on the support you received during the life of your project, as applicable. Did the received support meet your needs and expectations? What can you recommend to improve the support process?

Support for the project from both CTLT and MedIT was great. Without the level of excellence and expertise from these partners, the project would not have been this successful.

4. PROJECT EVALUATION

5.2 Expected Long-Term Impact – If applicable, indicate the impact your project is expected to have in this and/or other courses beyond completion.

Table 5.2 – Expected Long-Term Impact

Course(s)	Number of Sections	Annual Enrollment

5.3 Dissemination – Please provide a list of scholarly activities (e.g., publications, presentations, invited talks, etc.) in which you or anyone from your team have referred this Flexible Learning project. Include any dissemination activities you intend to accomplish in the future.

Invited talks:

August 22, 2014: Karolinska Institute; Stockholm, Sweden. Presentation at the Meeting of the Swedish Society of Anatomists
“Developing strategies for teaching anatomy in a competency-based curriculum”

July 10, 2014: Universität zu Köln; Cologne, Germany. Presentation to the Anatomy Department:
“How undergraduate anatomy education meets professional competencies as outlined in the CanMEDS framework”

Workshops facilitated:

May 14, 2015: Full Day Workshop at Vancouver Island University, Nanaimo: “Flipping to Engage our Learners” as part of their 2015 Science and Technology Teaching and Learning Symposium

July 29, 2014: Full Day Education Workshop at Boucher School of Naturopathic Medicine, New Westminster: “A practical approach to the Flipped Classroom”

March 10, 2014: MDUP Faculty Development Workshop: Dinner and Development Series
“Using Technology in Teaching”



Publications:

Michael Davis and Claudia Krebs: Flipping Out on Neuroanatomy: Applying the Flipped Classroom Model to Neuroanatomy Labs. Canadian Conference on Medical Education 2015

Zachary Rothman, Justin Student and Claudia Krebs: Flipping the Neuroanatomy Labs: A Creative Approach to Producing Videos and Multimedia for Students. Canadian Conference on Medical Education 2015

Claudia Krebs, Parker Holman, Tamara Bodnar, Joanne Weinberg and Wayne Vogl: Flipping the neuroanatomy labs: how the production of high quality video and interactive modules changed our approach to teaching. FASEB J, 2014, 28 (suppl): 211.3

5. DISCUSSION, RECOMMENDATIONS AND CONCLUSIONS - *Reflect on the broader implications of the project. Indicate instances where your project has impacted courses or individuals not identified in your proposal. Include any recommendations you have for future Flexible Learning project leads.*

The overall evaluation of this approach has been very positive and, importantly, students performed significantly better on their exams compared to previous years (see next section).

This email from a 2nd year medical student was particularly meaningful:

“I am a 2nd year UBC medical student and I just wanted to email you to thank you wholeheartedly. I truly appreciate all the work you and your team put into creating this new project of teaching neuroanatomy. The initiative and time you have put into strategizing education to maximize the benefit of the student has been remarkable.

We as students very promptly (almost on cue!) express our frustration but fail to express our gratitude and recognition of the beneficial aspects of the changes our learning is subject to. I admit that there were aspects of this new project that I was having difficulty with but that level of difficulty sometimes exists with the current style of teaching as well. However you and your team have been champions in helping us through these new developments and in being open to feedback. Change can be challenging for both those who are bringing it about and those who are subject to it, but there is a way for both teams to work together and mold the change to maximize satisfaction for both parties. With the openness and dedication of your team, if us students are cooperative, we can come together to achieve that. What has been clear throughout this process was your keen interest in the students learning and I don't know how I can express my appreciation for your spirit in words.

Also I do believe that I learned much more neuroanatomy up to this point, than I would have if this flipped classroom approach wasn't applied. In regards to the new introductions, I am very happy with your reviewing of the cases; this way I know what we as a group have figured out is right. Under you and your team's guidance, I know I will learn this content well. [...]

Thank you Dr. Krebs and team! You all are wonderful at teaching, encouraging critical thinking and pushing us students forward against the boundaries/limits we believe we have. We appreciate you!” – Harman Sidhu, MD class of 2016



The videos and modules are made available on youtube and the publicly accessible website www.neuroanatomy.ca. This open access to information has meant that the reach of these resources has been well beyond the boundaries of UBC: The University of Ottawa is now using these resources in their neuroscience module and the University of Amsterdam has integrated this material into their learning resources for the medical program.

“I am inheriting medical neuroanatomy at the University of Ottawa and was looking for helpful orientation/introduction videos. I was referred to your set of videos found on Youtube, and here: http://www.neuroanatomy.ca/flex_labs/lab1.html?id=1 I just wanted to say that the presentation quality is terrific, and these are great resources.” - Christopher Ramnanan, Ph.D., Assistant Professor, University of Ottawa

“You and your team made really brilliant video tutorials. Seriously, never seen something like this before, this sense of filmmaking (camerawork and editing) in medical education. Colors, audio, animations of the labels, depth of field ... thanks for sharing for free. I’d like to ask if we could integrate the tutorials in our medical school video database from Mediacore”

“as promised, the link shows how you can find your video’s in our Mediacore videodatabase: At the moment, as new items, I featured 7 on our homepage: vumc.mediacore.tv

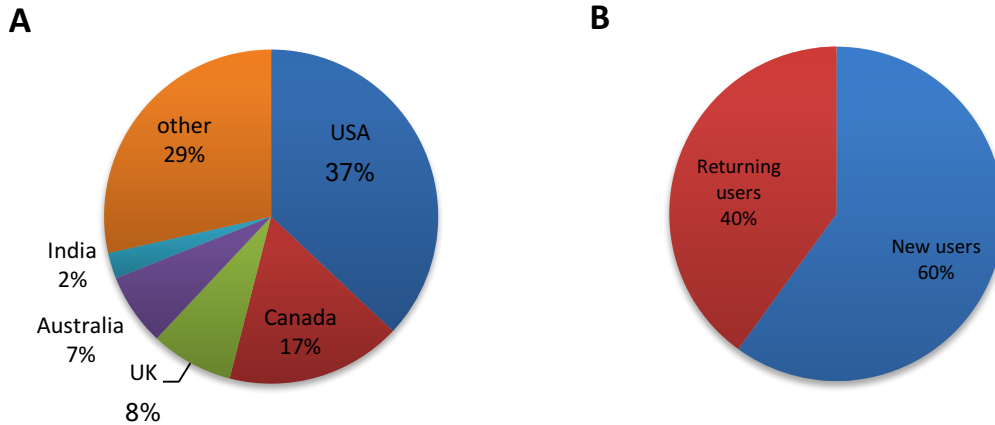
I collected all of them in an own collection: <http://vumc.mediacore.tv/library/ubclogojpeg>”

- Jochen Bretschneider, University of Amsterdam

More importantly, these learning materials are reaching students around the world who are struggling with the content and these videos and modules are an inspiration and re-kindled a desire to learn about the nervous system:

“I am a German medical student and I found your wonderful Neuroanatomy Website through Google. I was getting bored by the lectures here at home and by my books so I started looking for alternative study material. I found your website and I have to say that you (especially through your awesome, understandable (english is not my mothertongue), high quality video tutorials) brought back my motivation and fascination for neuroanatomy!” - Maren Schöneich

The website is used around the world with an average of 5000 page views per day. The majority of users are from the US and Canada; 40% are returning users and 60% are new users.



Graphs showing user data for neuroanatomy.ca in 2014/15: A: countries of origin; B: ratio of new to returning users.

I have received queries to translate the content into Spanish and Portuguese to help with the distribution of knowledge in South America. We have started a collaboration with the University in Sao Paolo for the translation into Portuguese.

5.1. Teaching Practices – *Please indicate if your teaching practices have changed as a result of your Flexible Learning project. If so, in what ways? Do you see these changes as sustainable over time? If not, why do you think that is the case?*

Through this project I have come to the two main conclusions about my teaching:

1. It is absolutely key to partner with the students and have an open dialogue about what works and what doesn't work when implementing a change to the classroom.
2. Class time probably the most valuable thing a university has to offer and it should not be spent with pure knowledge transmission. Much of this can happen outside of the classroom through didactic material that the students can access in a flexible way. In class time should be used for the more challenging aspects of manipulating concepts and ideas, applying them to real life situations, open discussions. This is what faculty are best at and this is what the added value, the "UBC experience" should be.

5.2. Student Involvement in FL team – *Were there any undergraduate or graduate students involved in the development and/or evaluation of your FL project? Please describe their contributions and overall experiences as part of your Flexible Learning team.*

Two graduate students were an integral part of the team while creating the videos and modules. Both had ample experience as Teaching Assistants in this course and were able to bring both their content expertise and their expertise on how best to deliver the content to the students to the table.



In a continuation of the project through a small grant from the department's teaching committee an undergraduate student who had been exposed to the materials in CAPS 301 and a medical students who had worked with the material in FMED 426 participated in the creation of additional online modules.

6. PROJECT SUSTAINMENT - *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g., over the next five years). What challenges do you foresee for achieving the expected long-term impacts listed above?*

We were very deliberate about ensuring that the videos created for this project would be conceptual in nature and modular enough that they can be used in a variety of settings. The videos should stand the test of time and remain current for 5-10 years.

The 26 interactive modules that have been created over the past 2 years are more course-specific, but can be easily modified to suit the specific learning needs of a particular course. The building blocks are in place and can be easily updated and modified. These modules will also stand the test of time and will be used in a variety of courses at UBC.

Another development that has come out of this project is an international collaboration between the University of Lund (Sweden), the Free University of Amsterdam (Netherlands) and the University of Auckland (New Zealand). The aim of this collaboration is to jointly create and examine the effectiveness of educational material for medical students.