



TLEF Project – Final Report

Report Completion Date: (2019/09/30)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Concentrated Blended Learning: the redesign of traditional weekly lectures and labs into blended on-line learning modules for GEOB270 Geographic Information Science (GIScience)		
Principal Investigator:	Sally Hermansen, Professor of Teaching, Department of Geography		
Report Submitted By:	Sally Hermansen		
Project Initiation Date:	2017	Project Completion Date:	December 2019
Project Type:	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation <input type="checkbox"/> Flexible Learning <input type="checkbox"/> Other: [please specify]		

1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g. learning materials, media)
- Infrastructure development (e.g. management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g. active learning)
- Innovative assessments (e.g. two-stage exams, student peer-assessment)
- Teaching roles and training (e.g. teaching practice development, TA roles)
- Curriculum (e.g. program development/implementation, learning communities)
- Student experience outside the classroom (e.g. wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g. co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]



Project Summary

The original project summary is as follows:

Geographic Information Science (GIScience) supports geographic analysis through theory and computer software applications; for example determining the social, economic and environmental impacts of climate change, such as rising sea levels and flooding on Vancouver's False Creek Tidal flats. GIScience (GEOB270), a required course for all geography students, is currently taught in weekly one-hour lecture slots, with one two-hour lab. Course evaluations and focus groups with students indicate pedagogical changes are required to better bridge theory (classroom lectures) to practice (computer software lab assignments conducted in computer labs). A blended learning environment, where lectures and software labs are organized in modules instead of time slots, and where students work on laptops in class, would greatly enhance student learning by integrating theory and practice. In addition, as demand for this course greatly exceeds supply, the longer term goal for Geography is to meet that demand via an on-line version of the course based on the modules and pedagogical approach developed and piloted through this project.

The project enabled the development of on-line and in-class self-directed learning activities to supplement and compliment course modules providing for blended learning and bridging between lectures and labs and assignments. The project also initiated discussion and strategy for the future development of a 'true' blended learning environment, and an on-line course.

The project was deferred for a year to wait for 2 new faculty hires in GIScience in order to include their input into this project as the TLEF primary course is the foundational course for our suite of GIScience. The project was also realigned to support the development a new Minor *GIScience and Geographic Computation Minor* (consultation on core competencies or program outcomes, curriculum mapping, and revisions in core course learning outcomes).

GEOB270 will become the foundations course for this new program, thus the revisions to GEOB270 as per the blended learning outcomes were relevant to discussion for this new Minor.



1.3. Team Members – Please fill in the following table and include students, undergraduate and/or graduate, who participated in your project.

Name	Title/Affiliation	Responsibilities/Roles
Sally Hermansen	Professor of Teaching Geography	Project coordinator, instructor of core course, GEOB270 GIScience
Dawn Mooney	Long-term Sessional Lecturer, Geography	Consultation with new labs and content in GEOB372 Cartography
Emily Leung	Undergraduate student, geography	Environmental scan of Canadian and US universities GIScience programs and faculty Developing learning activities
Mike Jerowksy	Graduate student, geography	Supported: Program learning outcomes for the Minor, GEOB270 and GEOB372 course outcomes, lab changes to GEOB372, learning activities for GEOB270
June Skeeter	Graduate student, geography	Added functionality to Canvas for GEOB270 labs: converted lab answers in pdfs to on-line quizzes
Andrea Han	CTLT	Curriculum outcomes facilitation and support
Jason Myers	ArtsISIT	Consultation on technology for blended learning modules

1.4. Courses Reached – Please fill in the following table with past, current, and future courses and sections (e.g. HIST 101, 002, 2017/2018, Sep) that have been/will be reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

Course	Section	Academic Year	Term (Summer/Fall/Winter)
GEOB270 GIScience	101, 102, 201 (100x3 students)	2019/20 and onwards	Fall/winter
GEOB372 Cartography	101, 201	2018/19 and 19/20 and onwards	Fall/winter
GEOG314 Analyzing Environmental Problems	101	2018	Winter
GEOG374 Statistics	101, 201	2017 2018	Fall/winter
GEOB375 Spatial Statistics	In development		



2. OUTPUTS AND/OR PRODUCTS

2.1. Please **list** project outputs and/or products (e.g. resources, infrastructure, new courses/programs). Indicate the current location of such products and provide a URL if applicable.

Product(s)/Achievement(s):	Location:
*Environmental Scan GIScience Programs: 22 Canadian and American Universities	Geography
*New Program Outcomes document	Geography
*New Program: new Minor in GIScience and Geographical computation	Geography, Curriculum Committee Documents Anticipated spring 2020 available (at Ministry level currently)
*Survey of students regarding GIScience Minor	Results in Curriculum documents
GEOG314 New GIScience lab (large file with data)	Geography GEOG314 (SHermansen has a copy as well)
*GEOB270: LM: 9 blended learning activities (pdfs of self-directed activities, answer keys, and one video)	GEOG270 Canvas
GEOB270: 5 Canvas supported quizzes (on-line entry of lab answers)	GEOB270 Canvas
Revised learning outcomes	GEOB270 Canvas (pending)
Revised learning outcomes	GEOB372 Canvas (pending)
GEOB372: New lab in support of on-line mapping	GEOB372 Canvas
GEOB372: New lecture in support of on-line mapping	GEOB372 Canvas
Helped support new course proposal GEOB375 for new Minor	Geography In development
Mock up of GIScience program web site	Geography

* Indicate files attached

2.2. **Item(s) Not Met** – Please list intended project outputs and/or products that were not attained and the reason(s) for this.

Item(s) Not Met:	Reason:
True blended learning was not attained.	Currently, technology (proprietary GIS software) and classroom space/configuration and class size and scheduling limited the initial scope of the blended learning.
Assessment of GEOB270 modules	Only course evaluations used not a survey tools, although assessment was done of need for a Minor.



3. PROJECT IMPACT

3.1. Project Impact Areas – Please select all the areas where your project made an impact.

- Student learning and knowledge
- Student engagement and attitudes
- Instructional team teaching practice and satisfaction
- Student wellbeing, social inclusion
- Awareness and capacity around strategic areas (indigenous, equity and diversity)
- Unit operations and processes
- Other: [please specify]

3.2. What were you hoping to change or where were you hoping to see an impact with this project? – Please describe the intended benefits of the project for students, TAs, instructors and/or community members.

a) Establishment of a Minor in GIScience and Geographical Computation (Spring 2020)

Geography has long discussed the development of a Minor and this TLEF gave the necessary initiative and support for the development of curriculum strategy and documents. The Minor has been developed, and has passed through all of the UBC Curriculum Committees and is currently at the BC Ministry. The Minor will benefit a variety of students: Arts and Science Geography, Faculty of Science (Environmental Science), Applied Science (Geological Engineering) LFS and Forestry. A student survey conducted as part of this TLEF indicated clear desire from a variety of students for this Minor. The Minor has also impacted revisions and strategic planning and scaffolding for courses in the Minor.

b) Blended learning activities in the classroom to bridge lecture and lab

The initial plan for this TLEF was to develop a series of blended learning activities (on-line, self-directed, and in classroom) activities for the foundational GIScience course (GEOB270) to enable more substantial bridging between lecture theory and lab practice. These activities were developed, for all three sections of the course. One of the new faculty GIScience hires taught a section of the course for the first time and was able to benefit as well from these activities.

c) Technology revisions to Cartography (GEOB372)

A long-term very dedicated and good sessional has been teaching GEOB372 for almost 15 years, and the TLEF provided support for the development of a new module for the course: Interactive Web Mapping which involved new lectures and a new lab teaching students some coding (html/JavaScript). The TA for this course was the graduate student hired with TLEF funds and he had the opportunity to develop and then revise a



number of the labs in this course over two iterations of the course (it is offered each term), including the new interactive mapping lab, and he delivered the new lectures for the sessional.

d) The integration of GIS in non-GIS courses as a methodology tool

The development of a GIS lab for students in our new course GEOG314 *Analyzing Environmental Problems* was difficult and time consuming, and although this lab was used by students last winter, it proved to be problematic to implement a difficult computer science like lab into a non-GIS course for the instructor, TAs and students. However, a lot was learned in the process (problems using open-source GIS technology, GIScience is difficult for both TAs and students to use as a tool in a non-GIS undergraduate course).

3.3. Were these changes/impacts achieved? How do you know they occurred? – What evaluation strategies were used? How was data collected and analyzed? You are encouraged to include copies of data collection tools (e.g. surveys and interview protocols) as well as graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.

a) Establishment of a Minor in GIScience

As discussed in the previous section, the Minor will be established this Spring, and the number of students enrolled in the following years will determine in part the impact of this new program. Even without the Minor though, the time spent as part of the TLEF developing Program Learning Outcomes for the Minor, and Curriculum mapping and scaffolding, and revision to GEOB270 and GEOB372 will have a positive impact on current 450 student who take these courses every year. The work and consultation on the Minor also facilitated discussion of a new course under development in Spatial Statistics, and revision in technology to Statistics (GEOG374).

b) Blended learning activities in the classroom to bridge lecture and lab (GEOB270)

While limitations of course scheduling, classroom design, GIS technology and its dissemination proved to limit 'true' blended learning and bridging of lecture and lab, many course materials were developed for GEOB270 Intro to GIScience (9 blended learning activities, 5 on-line quizzes, and revised learning outcomes). Five of these activities were initially developed with the worklearn/TLEF funded undergraduate student for the winter term of 2019. The TLEF supported the graduate student to work on further revisions of the five, and the development of 4 more for implementation this fall into both sections of the course. In addition, the on-line quizzes were developed in Canvas to facilitated entering answers to labs for students, and facilitating marking for TAs.

c) Technology revisions to Cartography (GEOB372)

As discussed in the previous section, these revisions were completed, tested, revised and used again this fall and will be used in all future sections of the course. The impact for students is substantial: to give them an introduction to coding for interactive map design, and an idea for what will be taught in the 400 level course.

d) The integration of GIS in non-GIS courses as a methodology tool

The QGIS lab was envisioned as a way to introduce students to a free software alternative to ESRI's ArcGIS while they conducted climate change analysis in GEOB 314. A lab originally prepared for ArcGIS was altered



to fit the pipeline for analysis in QGIS. Several things were learned during this experiment: (1) In order to facilitate the teaching of any program, all students should have access to the program on department computers, otherwise teaching time is largely spent troubleshooting IT issues specific to each student's laptop; (2) QGIS, while free and sporting an amazing online community, requires more time to troubleshoot due to the lack of built in support; (3) Some proprietary analysis tools that are native to ArcGIS are simply not available in QGIS, and comparable analysis is not possible without a great deal more GIS knowledge than students in GEOB 314 had coming into the course; and finally, (4) GIS and data analysis requires some background in the logics related to problem solving with these tools - they should not simply be provided to students as a tool that can be used by following a list of commands or button presses.

The instructor for this course has decided not to use this lab again this year as there were too many problems with TAs supporting students in the lab using the open source software.

3.4. Dissemination – Please provide a list of **past** and **upcoming** scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project.

None planned at this time.

4. TEACHING PRACTICES – Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways? Do you see these changes as sustainable over time? Why or why not?

a) All the thought and development of documents around the Minor has enabled discussion and team work for our suite of courses and thus better curriculum mapping, and scaffolding of learning outcomes.

b) More in-depth understanding and use of the LMS Canvas.

c) The learning modules have initiated steps towards a blended learning classroom where there are now in-class and self-directed learning activities to help bridge gap between theory and practice. This in turn has led to discussions of an on-line version of GEOB270, and true blended learning in the future with changes to software access and classroom spaces,

d) for the Cartography course, the sessional teaching the course has now available lectures and labs in support of an upgrade of specific Cartography technology from propriety software to open source software and teaching some coding to the development of open source on-line mapping

5. 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?

For all of the changes made to GEOB270 and GEOB372, and the development of the Minor, what is currently in place will be sustainable with normal yearly revisions over the next 5 years.