Learning strategies and resources to enhance learning and flexibility in thematically related geoscience courses (Short form)

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Project Description

This project aims to enhance the flexibility, quality and efficiency of learning and delivery for related Distance Education (DE), face to face (F2F) and blended courses. The 3-fold approach will be to 1) apply current DE best practices to F2F courses, 2) adapt F2F best practices for use online, and 3) introduce new resources that work in both settings. Choosing related sets of courses ensures that resources and strategies developed all will be usable in multiple courses and at various levels of our degree programs, thus providing contextual threads and consistency of learning tools throughout the principle EOAS Departmental curricula.

The specific tasks to carry out are detailed in Appendix I and the budget proposal spreadsheet. Describing the project in terms of nine specific actions to be taken enables estimates of time to complete that are based on estimating how long each task or set of tasks will take to develop, implement and evaluate. Therefore the project is more appropriately outlined in terms of these tasks rather than courses. No single course will be modified in a major way, but all courses in the tables above will benefit to greater or lesser degrees depending on which learning activities, strategies and materials are applicable in that course.

Research and experience show that the challenges of translating F2F experience and best practices into the DE setting, and vice-versa, are non-trivial. We intend to leverage our successful track record as participants since 2007 in the CWSEI, and develop partnerships with DE expertise within UBC. This project is ambitious and depends upon capitalizing on the current enthusiasm among EOAS faculty for building upon the gains made during the CWSEI. Based on experience in our Department and at UBC, such enthusiasm is a key factor in success of educational innovation efforts. The Department sees this as an opportunity to continue developing expertise, best practices and flexibility for all stakeholders, including students, instructors, our department, the Faculty of Science, and the institution.

Courses and Project Teams

Distance education (DE) and face to face (F2F) courses are chosen for improvement based on opportunities to share existing content and Research-Based Instructional Strategies (RBIS) in the two modalities. This sharing of best practices will enhance the flexibility of instruction and learning in DE, F2F and blended settings, and enable opportunities to create new, enhanced learning strategies to benefit students and instructors across the various EOAS program and service curricula.

This two year project will focus primarily on one sets of courses, with some attention to a second set. Each set involves related content, learning goals and teaching strategies. The project team will consist primarily of one TLF hired at 0.75 full time equivalent (fte) for the duration of the project. The Department plans to top up this person to 100% and have him/her carry out department related duties, including some teaching, in a manner consistent with the rank of “Lecturer”.

Course set #1, "Earth History and Paleontology"

These courses focus on the study of Earth's geological and biological history and they share both materials and learning activities. This course set is an ideal, constrained setting to develop our strategies for sharing between DE and F2F settings, and leveraging the best opportunities from each context to support flexibility in the other. For course descriptions start at http://eos.ubc.ca/courses/ .

Table 1: Course set #1

Four courses involved			# stu/yr	Stu. type	Instructors
DE	EOSC116	Mesozoic Earth	310	All	Longridge
DE	EOSC326	Earth and Life thru Time	250	3rd yr Sci	Longridge
f2f	EOSC116	Mesozoic Earth	200	All	Sutherland, Francois, Mortensen
f2f	EOSC326	Earth and Life thru Time	150	3rd yr Sci	Sutherland
Other related courses that will benefit					
f2f	EOSC222	Geological Time	50	2nd yr geosci	Paul Smith
f2f	EOSC425	Paleontology	40	3-4th yr geosci	Sutherland

Course set #2, "Origins and Stewardship of Earth's Resources"

These courses involve the study of rocks and minerals, how and when they form, and how to search for them. They have related knowledge and skills that students must learn, and several represent thematic threads that EOAS students follow through 2nd, 3rd and 4th years as they pursue Earth sciences degrees. We will develop learning activities using existing tools (e.g. "Visible Geology" and "Google Earth") for modular use in these courses.

Table 2: Course set #2

Each course involved in small ways only			# stu/yr	Stu. Type	Primary instructor
DE	EOSC310	Earth & Solar System	400	non-sci	Mindell
DE	EOSC311	Earth and its Resources	50	non-sci	Lamberson
DE	EOSC118	Gold / gems	1000	All	Turner
f2f	EOSC110	solid earth	530	Science	Bevier, Mindell, Grimm
f2f	EOSC210	earth sci. for Engineers	240	B.A.Sc.	Hollingshead, Eberhardt
f2f	EOSC220	Intro. mineralogy	120	2nd yr geosci	Scoates, Bevier
f2f	EOSC221	Intro. petrology	80	2nd yr geosci	Kopylova, Sutherland
What'f2f	EOSC223	2nd year field school	65	2nd yr geosci	Bevier
f2f	EOSC321	Igneous petrology	50	3rd yr geosci	Kopylova
f2f	EOSC322	metamorphic petrology	50	3rd yr geosci	Dipple
f2f	EOSC328	3rd year field school	40	3rd yr geosci	Hickey, Hollingshead, Kennedy, Scoates
f2f	EOSC331	Intro. mineral deposits	50	3rd yr geosci	Scoates, Hickey
f2f	EOSC425	Advanced deposits	30	4th yr geosci	Scoates, Hickey
Other related courses that will benefit					
f2f	EOSC329	Hydrogeology	120	B.Sc., B.A.Sc.	Beckie
f2f	EOSC320	Sedimentology	60	3rd yr geosci	Bustin
f2f	EOSC323	Structures	85	3rd yr geosci	Kennedy

Project Objectives

Learning and flexibility will be enhanced by targeting five specific objectives. See Appendix 1 for specific project components.

1) **Ensure teaching and learning associated with each adjustment adheres to common best practices**. Examples are using learning goals, balancing solo/group work, incorporating frequent formative and summative assessments with timely feedback, scaffolding expert skills and behaviors, and encompassing knowledge, skills, attitudes and all Blooms levels appropriately for the course.
2) **Move F2F courses towards a "Blended Active Learning" modality** by repurposing existing DE content and assessments and increasing in-class active learning strategies.
3) **Increase active, experiential and/or collaborative learning in DE** or blended courses by transferring existing F2F active pedagogies, or developing new ones.
4) **Enhance the diversity and frequency of online assessments for both DE and F2F** by incorporating automatic and peer-assisted grading and feedback other than multiple choice questions. This includes increasing feedback on intermediate and final deliverables. In particular, graphical and quantitative modes of thinking and assessment will be pursued.
5) **Increase both expert-to-novice (i.e. opportunities for teachers or TAs to support student learning) and group interactions for DE and F2F settings**. This equates to increasing the frequency and immediacy of feedback on student work or thinking, and improving "tutoring" for large numbers while reducing instructor/TA workloads.

Three more general objectives are:

6) Continue building expertise within the Department that will inform decisions regarding evolution of EOAS courses towards blended, reduced/concentrated time, or even fully online modalities, in ways that are consistent with research based instructional strategies.
7) Ensure that student, instructor, sessional and TA workloads remain acceptable
8) Incorporate professional development strategies to ensure that best practices are transferrable when a course's instructing team changes.

What's In Scope?

- Moderate adjustment of learning goals and shifts in emphasis of content aimed at aligning DE and F2F versions of courses and balancing needs of students with preferences of current and future instructors.
- Some modification of content, but emphasis to be on curating existing material rather than making new content.
- Improvements that preferentially target higher level learning, including frame-working of expert knowledge, and "generic scientific thinking skills" such as critical and creative thinking, communication, and metacognition.
- Emphasize diversity and frequency of practice and assessment opportunities, including ensuring timely and effective feedback to students at intermediate and final stages of work.
- Emphasize peer & group learning, both in class and online.
- Improve self-directed learning and study skills, particularly related to geoscience-specific skills and knowledge.

What's Out of Scope?

- Major changes to course purposes and content.
- Significant creation of raw content for delivery, either in class or online.
- No complete transformations of individual courses.

The Full proposal contains the following additional sections.

Milestones & Deliverables

Resources

Evaluation Strategies

Broader Impact

Research Interest

Risks

Outstanding Questions

Appendix I: Proposed resource collection for both course set #1 and #2