

First Year Mathematics Courses Repository

Principal Investigators/ Contact information

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Short Project Description

The First Year Mathematics Courses Repository is a resource supporting an ongoing national dialogue among instructors and educational developers about teaching first year mathematics at Canadian universities. This sharable dynamic online repository contains extensive data that includes content, learning outcomes, modes of delivery, and connections with other courses and programs.

Full Project Description

Goals

The goal of the proposed project is to create an online repository that will contain extensive data about first-year mathematics courses at Canadian Universities. The repository will provide an open, organized, comprehensive, and searchable web resource of information for math instructors and educational developers. The repository will be a major tool that will enable the Canadian university mathematics teaching and the educational development communities to collaborate across the country in their efforts to provide the best post-secondary mathematics education possible.

Background

Canada's university mathematical teaching community is facing a number of significant challenges and opportunities. These range from managing increasingly diverse classes of incoming students, to understanding and addressing the impact of modern technology on teaching and delivering courses.

To our knowledge, there is no source of any kind that provides a comprehensive picture of the current state of teaching mathematics at the first-year undergraduate level in Canada. We believe that only by sharing experiences, gathering data, and looking at research-based decisions and strategies, our teaching community can come up with ideas and initiatives for university faculty and educational developers to restructure mathematical programs and to respond to the demands that the realities of today's living place on us and our students.

This ongoing national dialogue is not a project that will end with a publication of a final report containing a list of recipes. Quite the opposite: we see the national dialogue as an ongoing process that will, as part of strengthening our community, create and maintain a sharable dynamic online resource.

Hence this proposal to the EDC community for its support to build the repository.

Why This Work is Important and Timely

The main purpose of the “First Year Math Courses Repository” is to provide an open, organized and comprehensive resource of information about first-year mathematics courses at Canadian Universities. The repository will contain extensive data that will include detailed descriptions of course content, resources and technology used, learning outcomes, and modes of delivery.

In addition to creating a comprehensive list of first year mathematics courses, the repository will provide means to establish how these courses are interconnected with other courses:

Vertically: To what degree, and how, is the structure of level 1 math courses driven by current secondary school math curricula?

Horizontally: How do level 1 math courses compare across Canadian post-secondary institutions, in terms of overall structure, modes of instruction, and content?

Across: What are the roles that level 1 math courses play in various academic programs?

The national dialogue presents an opportunity for Canadian university math instructors and educational developers to share their experiences about developing and teaching introductory math courses with their peers. It is also our belief that this work would inspire dialogue on providing disciplinary-specific support through concerted effort among members of the educational development community. The authors of this proposal are convinced that this kind of critical exchange, across multiple communities, of information, opinions, and practices will lead to a joint action and thus benefit all involved, their institutions and students, and Canadian society more broadly.

Capabilities of PIs to accomplish this project

Xin has been working in the field of learning design, educational development, and program evaluation for the past 20 years. She has conducted research at a variety of institutions, including SFU, Brigham Young University, and China Academy of Science. Jungic and Lovric are 3M National Teaching Fellows.

Fit With EDC Living Plan

- *Engaging our Community:* The repository enables cross-country collaboration; it provides a forum for dialogues about important issues identified across Canadian campuses; faculty and educational developers facing similar challenges will brainstorm/ discuss/ share

potential strategies to advance the issue and connect with other organizations with related passion to build a network

- *Building Resources*: The repository hosts a database; provides a comprehensive list of the related current literature; and is itself a knowledge resource.
- *Facilitating systemic and organizational change*: The repository is an agent of change; it is a tool that enables Canadian university math teaching community to take a systems perspective to the ongoing processes; and as such it helps instructors and educational developers to see the place of the current and future math courses as part of the big picture.
- *Teaching and Learning quality*: The repository provides arguments to those who are developing and facilitating the enhancement of the quality teaching and learning of mathematics at the entry university level; it contains data that will be used to support valid, meaningful, and appropriate assessment of teaching and learning processes, practices and programs; it provides a collaborative space for effective, evidence-based, and complex discussions about quality teaching and learning; it is a place for sharing evidence-based strategies, practices, and tools; and provides an opportunity to examine policies, identify gaps, and inform institutions about ways to improve the quality of teaching and learning of mathematics.

Timeline

This initiative will be completed between December 2017 and April 2018, culminating in releasing the fully functioning repository at the Fields Institute's sponsored conference "First Year University Mathematics Across Canada: Facts, Community and Vision" in April 2018.

(1) December 2017: Creation of a contact list of all mathematics departments at universities in Canada and establishing contacts with instructors.

(2) January 2018 - February 2018: Creation of the interface that will be used to enter data

(3) February 2018 – April 2018: Monitoring of data entry, cleaning up the data, and generating summaries

Intended Outcomes and Dissemination

The outcome of this project is an internet-based repository of information about level 1 mathematics courses taught in Canada. It is not a duplication of previous or existing work, as such resource does not exist in Canada. This open access comprehensive repository will contain:

- logistical information about level 1 mathematics and statistics courses
- learning outcomes and structural information
- teaching strategies, modes of delivery
- teaching practice reflections
- searchable list of references

Once we complete the repository, we will advertise its existence both within mathematics teaching and education development communities.

Budget

Tasks are based on the research assistant rate of \$25/hour, including benefits

Tasks	Hours	Cost
RA to create a contact list of all mathematics departments at universities in Canada; to contact instructors and communicate with them as needed	10	\$250
RA to create and maintain interface that will be used to enter data*	60	\$1,500
RA to monitor data entry, clean up the data, and prepare summaries	50	\$1,250
TOTAL	120	\$3,000

* There will be no need to create this interface from scratch; instead, RA will adjust an existing, free (or almost free) online interface.

References

Jungic, V., and Lovric, M., *Call for National Dialogue: The Present and Future of Teaching First Year Mathematics at Canadian Universities*, CMS Notes, Volume 49 No. 5 (2017), 10-12.

Next Steps

Our envisioned national dialogue is a longer term project, spanning several conferences and meetings. As it progresses, so will our repository. With new funds (possibly from Canadian Mathematical Society) we will further enrich the database and keep it current, as it will remain the major resource supporting our initiative.

Agreements

[x] We agree to provide the EDC community, who funds this grant, with access to resulting information and resources for which the copyright remains with the authors.

[x] We acknowledge that we will submit an interim report and a final deliverable.