

Open UToronto MOOC Initiative: Report on First Year of Activity

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The University of Toronto took the lead among Canadian universities, beginning our exploration of the Massive Open Online Course (MOOC) arena in the summer of 2012. With little research or data available on this emergent phenomenon, a strategy of learning through the experience of design and implementation was adopted in order to inform our understanding of the potential impact both within our institution and beyond. Under the umbrella of the broader [Open UToronto](#) initiative, the following overarching goals were identified:

- Contribute to the education community and the broader public through sharing of institutional expertise and open curriculum content
- Explore and evaluate a range of pedagogical approaches and open course platforms
- Leverage use of open educational resources through integration into University of Toronto degree program courses
- Showcase the University of Toronto's capacity as a leading institution for teaching, learning and research
- Advance global innovation in online learning through development of new course structures, methods and instructional strategies.

The University of Toronto currently has partnerships with two MOOC platform providers. In July 2012 an agreement was put in place with [Coursera](#), an education company that provides a specialized MOOC platform at no cost to the university. A second partnership arrangement was undertaken with the [EdX](#) initiative, a non-profit created by founding partners Harvard and MIT. In both cases the learning environment is hosted by the partner organization, and course content design and instruction is the responsibility of the University of Toronto.

To date, seven Coursera MOOCs have been offered across a range of discipline areas. These short, fully online "coursettes" ranged from 4 to 8 weeks in length, and have attracted more than 500,000 registrants before, during and after the scheduled sessions. Seven more MOOCs, including new EdX-hosted offerings are currently in the design phase.

The following is a summary of MOOCs that have been offered, scheduled or are in development.

MOOCs Offered

Description	Platform	Sessions	
Learn to Program: The Fundamentals Jennifer Campbell and Paul Gries Department of Computer Science	Coursera	Oct. 2012	Aug. 2013
Neural Networks for Machine Learning Geoffrey Hinton Department of Computer Science	Coursera	Oct. 2012	
The Social Context of Mental Health and Illness Charmaine Williams Factor-Inwentash Faculty of Social Work	Coursera	Jan. 2013	June 2013

<u>Aboriginal Worldviews and Education</u> Jean-Paul Restoule Ontario Institute for Studies in Education	Coursea	Feb. 2013	
<u>Learn to Program: Crafting Quality Code</u> Jennifer Campbell and Paul Gries Department of Computer Science	Coursea	March 2013	
<u>Statistics: Making Sense of Data</u> Alison Gibbs and Jeffrey Rosenthal Department of Statistics	Coursea	April 2013	
<u>Introduction to Psychology</u> Steve Joordens Psychology – UT Scarborough	Coursea	May 2013	

MOOCs Scheduled in Next Six Months

Description	Platform	Sessions
<u>Behavioral Economics in Action</u> Dilip Soman Rotman School of Management	EdX	Oct. 2013
Our Energetic Earth Bryan Karney Faculty of Engineering	EdX	Oct. 2013
Death 101: Reliable Measurement of the Causes of Death Globally Prabhat Jha Dalla Lana School of Public Health	EdX	May 2014

MOOCs Currently In Proposal Development

Description	Platform	Sessions
BiInformatic Methods I BiInformatic Methods II Nicholas Provart Department of Cell and Systems Biology	Coursea	TBC
The Logic of Business: Building Blocks for Organizational Design Mihnea Moldoveanu Rotman School of Management	EdX	TBC
Library Advocacy Wendy Newman iSchool	EdX	TBC

Patterns of Activity:

Of the total 366,424 registrants during Coursera MOOC sessions completed to date, 207,566 accessed video content, thus 57% may be considered to be active learners. Many of these learners were curious about the subject area, browsed for information on particular topics or explored the MOOC format in general, taking advantage of the ease of registration to participate to the level appropriate to their needs and interests. The aggregate completion rate for Coursera MOOCs offered to date is 8% for all registrants, and 17% for active learners, which is well within the normal range for this mode of delivery. A total of **6 Coursera MOOCs** are currently complete.

MOOC Activity Summary Data for Completed Scheduled Sessions - July 25, 2013						
Activity and Completion Statistics	total registrants	active learners*	posts in discussion	successfully completed	percentage registrants who completed	percentage active learners who completed
Complete						
Learn to Program: The Fundamentals	80000	75450	23055	8240	10%	11%
Neural Networks for Machine Learning	49550	15903	5192	1398	3%	9%
The Social Context of Mental Health and Illness	23491	8193	13289	1423	6%	17%
Aboriginal Worldviews and Education	20966	8860	34112	3381	16%	38%
Learn to Program: Crafting Quality Code	53974	17224	4709	3352	6%	19%
Statistics: Making Sense of Data	62488	36356	5224	2825	5%	8%
Total	366424	115042	207566	17794	8%	17%

* an active learner is person **who watched at least one video**

An unexpected ongoing pattern of activity is learner registration and use of MOOC materials after the scheduled session is completed. An additional 136,008 users have registered and are seen to be active in Coursera MOOCs after the close of scheduled MOOCs. Additional research is needed to understand the implications of this activity and is being taken up by faculty researchers.

MOOC Summary Data During Archive Period - July 25, 2013			
MOOC archive	registration at end of session	total registration to date	# archive users
Learn to Program: The Fundamentals	80000	139852	59852
Neural Networks for Machine Learning	49550	77464	27914
The Social Context of Mental Health and Illness	23491	34060	10569
Aboriginal Worldviews and Education	20966	30056	9090
Learn to Program: Crafting Quality Code	53974	76945	22971
Statistics: Making Sense of Data	62488	68100	5612
Total Archive Users			136008

Research Program

To further our understanding of these new online course formats, Online Learning Strategies (OLS), together with the MOOC instructors, have developed an extensive research program around MOOCs and inverted (flipped) classrooms. Some of the topics being investigated include:

- Student demographics and learning goals/approaches
- Range of pedagogical approaches that are available to instructors
- Patterns of engagement and learning among participants.

The faculty members contributing to this research program to date are:

- Paul Gries and Jennifer Campbell (Learn to Program; Crafting Quality Code)
- Alison Gibbs and Jeffrey Rosenthal (Statistics: Making Sense of Data)
- Steve Joordens (Introduction to Psychology)
- Charmaine Williams (The Social Context of Mental Health and Illness)
- Jean-Paul Restoule (Aboriginal Worldviews and Education)

Two of these courses (Statistics: Making Sense of Data, and Introduction to Psychology) have received special support from the Gates Foundation to research their MOOCs. The Statistics MOOC is also being used in another Gates funded project, a multi-campus study of MOOCs as a deeply integrated instructional resource for blended learning at universities across the Maryland system.

Current Data Analysis Activities and Studies

Quantitative Data Analysis: The Coursera platform provides rich data on learner interaction with the courses, and we will complement this learning analytics data with data on student demographics and learning intents from intro- and exit-surveys. The OLS is coordinating individual research projects by the different PIs, and facilitating access to data from Coursera, as well as compiling general demographic data now available. See *Appendix A: Demographic Report on University of Toronto Coursera MOOCs*.

Qualitative Analysis of Instructor Experience and Design Outcomes: In addition to the research on learners, and student interactions with courses, we are also interested in instructors, their experiences and attitudes, and the process of constructing courses. OLS has launched a separate research project, supervised by Dr. Carol Rolheiser from the Center for Teaching Support and Innovation (CTSI), which aims to interview all UofT MOOC instructors about their experience of building and running a MOOC, as well as analyzing the course designs and pedagogical approaches of the various courses.

A full institutional research report is anticipated in August 2013. As well, research studies being undertaken by individual faculty members are forthcoming in the near future. Online Learning Strategies is facilitating a MOOC research group that is working collaboratively on joint studies, development of protocols for ethics review and discussion of data management and analysis strategies.

Design Process:

Given that both our Coursera and EdX partnerships are institutional initiatives, each of the MOOCs proposed for development at the University of Toronto is first reviewed by the divisional Dean, and also endorsed by the Office of the Provost. Advice on governance and process is provided by the Open UToronto Advisory Committee. A workflow for developing an open online course was developed and published in February of 2013. This documentation along with additional resources to support planning and design is available on the [Open UToronto web site](#):

- Overview of Approaches to Open Course Content
- MOOC Resourcing and Planning Guidelines
- MOOC Design and Development Guidelines
- MOOC vs. Degree Courses – FAQs

Our design process relies heavily on a team-based process. Typical teams include the instructor(s), educational technology leads, librarians, AV technicians and TAs. While development teams meet regularly to discuss design and production plans, we have also held regular “round table” meetings where all teams could meet together to discuss ideas and progress.

Of particular interest was the EdX Design Workshop day, when design teams gathered at CTSI for a day of learning, collaborative planning and discussion of instructional challenges in the MOOC environment. Two guests from EdX visited from Boston for the day to provide coaching on use of the EdX tool kit and provide advice on MOOC video production strategies. The event was loosely based on the Course Design Institute model that is offered annually by CTSI. The EdX MOOC cohort is using and adapting well-established design theories and models to the MOOC environment. These include:

- [Backward Design](#)
Wiggins, G. P., & McTighe, J. A. (2005). *Understanding by design*. ASCD.
- [Community of Inquiry](#)
Akyol, Z., & Garrison, D. R. (2013). *Educational Communities of Inquiry: Theoretical Framework, Research and Practice*. IGI Global.
- [Best Practice Models for e-learning](#)
Staffordshire University. (n.d.). *Best Practice Models for e-learning*. Retrieved July 31, 2013, from <http://learning.staffs.ac.uk/bestpracticemodels/>

Each MOOC team is responsible for the design and structure of content and learning activities, specific to their discipline and learner needs. In each of our MOOCs, the learning design undertakings extend beyond provision of lecture material. Individualized activities, discussion frameworks, assessment processes and community building have been the focus of exploration, pushing the boundaries of constraint within the large scale of the MOOC environment.

Inverted Classroom Design

Several of our MOOCs have been, or will be used as curriculum content for use in redesign of University of Toronto degree courses for the inverted classroom or “flipped” model. These include:

- Learn to Program: The Fundamentals
- Learn to Program: Crafting Quality Code
- Neural Networks for Machine Learning
- Statistics: Making Sense of Data
- Behavioral Economics in Action

The inverted classroom design strategy leverages the MOOC platform to deliver course content in advance of scheduled classes. As a result, the amount of time spent on active learning strategies during scheduled meeting time can be increased. A typical format involves viewing instructor-created videos and completing online tasks or quizzes assigned as homework. Students arrive prepared to apply their new knowledge by solving problems or doing practical work together in the classroom, guided through the process by the instructor. Other possible benefits are use of the materials prior to a course commencing, to ensure all students are familiar with prerequisite content and skills, or during a course for remediation on any challenging concepts or lessons.

Three of our faculty members in the Faculty of Arts and Science have research studies underway that are specifically focused on learning more about the potential of the inverted classroom model. Our involvement in the development of MOOCs has sparked broader interest in both the potential of online instructional design strategies as well as innovative approaches to campus-based degree course curriculum.

Next Steps:

We are moving from the early pioneering phase into our second year of exploration of the potential of the MOOC model. Our faculty and teams are well informed by our experience to date, but all agree that we have much to learn within the fast-shifting MOOC landscape. We are now entering a period where MOOCs are being offered for a second time, with adjustments and adaptation based on student and instructor feedback. Six new MOOCs are in the design phase, with registrations rolling in for the most recently scheduled sessions. Research teams are engaged in data gathering and analysis. As we move into this next period, our strategy going forward has three underlying principles:

- Learn about the potential of emergent online models from the leading edge of design and instruction innovation.
- Provide design support and team-based development strategies to build capacity and ensure the quality of our online learning initiatives.
- Engage in research and evaluation activities to gather evidence and inform our future planning related to MOOCs and online learning.

Acknowledgements:

This report reflects the collective achievement of all those involved in supporting design and implementation of our MOOCs at the University of Toronto. Colleagues whose continuing commitment to ensuring the highest quality experience for our learners include our award-winning faculty, instructional design teams, library colleagues, educational technology professionals, teaching assistants, advisory committee members and many others who have contributed to our success.

Appendix A: Demographic Report on University of Toronto Coursera MOOCs Prepared June 16, 2013 by Stian Haklev

Background

In order to support MOOC-related research and evaluation processes, the Office of Online Learning Strategies is involved in administrating access to detailed user data sets from Coursera and cleaning it for analysis. The data is being stored centrally and made available for a range of purposes, including Institutional planning processes. It will also be used in a research study among five MOOCs that launched between January and May 2013. The course instructors are all co-PIs on the ethics proposal, and will share the analytics data. For a full description of activities visit: [Open Utoronto MOOC Research and Evaluation](#).

The data

In addition to the intro- and exit-surveys, for students who choose to respond, we also have access to learning analytics data for all students in the chosen courses, including when students log on, their activity, their success at quizzes, etc. The data is anonymized, but we are able to link intro- and exit-surveys with student activity for each individual student. The co-PIs are planning to explore the relationships between different variables, but for this initial institutional report, we are simply reporting some of the key variables from the intro-survey.

The survey

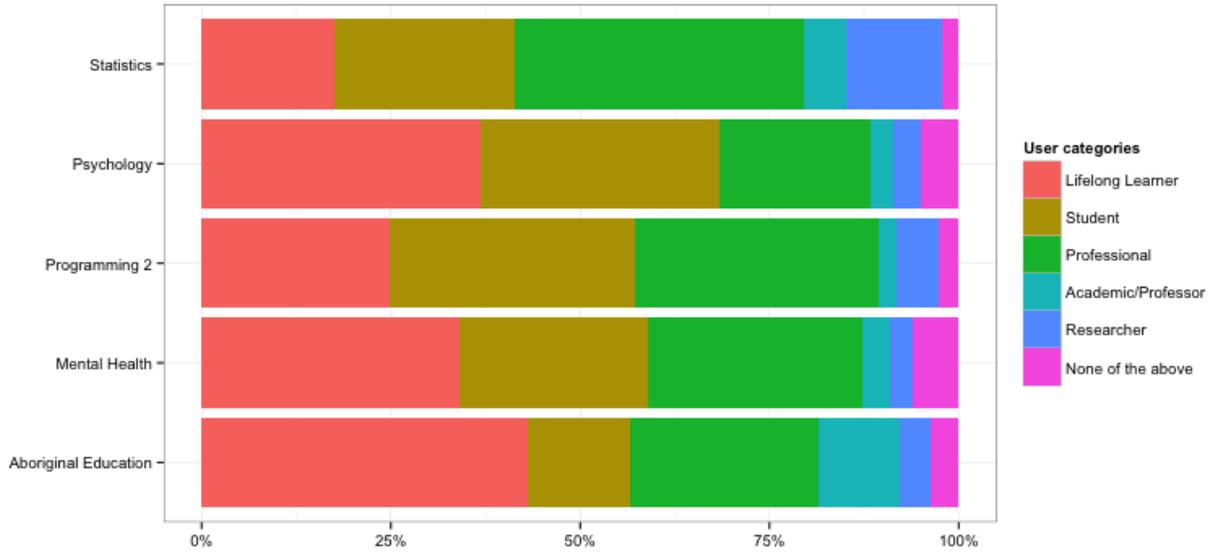
A generic intro- and exit- survey was developed, and offered to students in all courses (with some additional questions and categories for specific courses). This survey, with adaptation as appropriate, will be used in all future UofT MOOCs. Due to the timing of the ethics proposal, the survey was offered to participants in The Social Context of Mental Health and Illness, and Aboriginal Worldviews and Education quite late in the course, which can explain the low response rate.

MOOC Courses

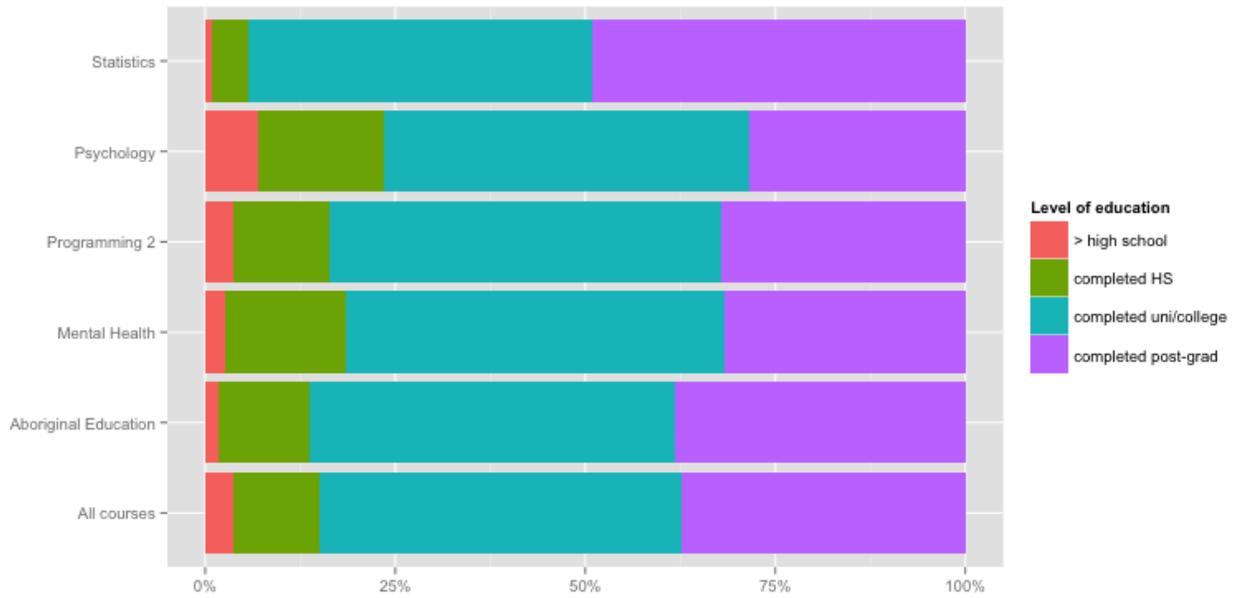
Course name	Instructor(s)	Enrolment	Response rate
The Social Context of Mental Health and Illness	Charmaine Williams	22.500	6%
Aboriginal Worldviews and Education	Jean-Paul Restoule	20.600	8%
Learn to Program: Crafting Quality Code	Paul Gries Jennifer Campbell	54.700	17%
Statistics: Making Sense of Data	Allison Gibbs Jeffrey Rosenthal	51.500	34%
Introduction to Psychology	Steve Joordens	60.700	32%

Tables reflecting summary data collected into surveys for these five MOOCs are provided below. For more information contact [Stian Haklev](#), Institutional Researcher for the [Open Utoronto](#) initiatives.

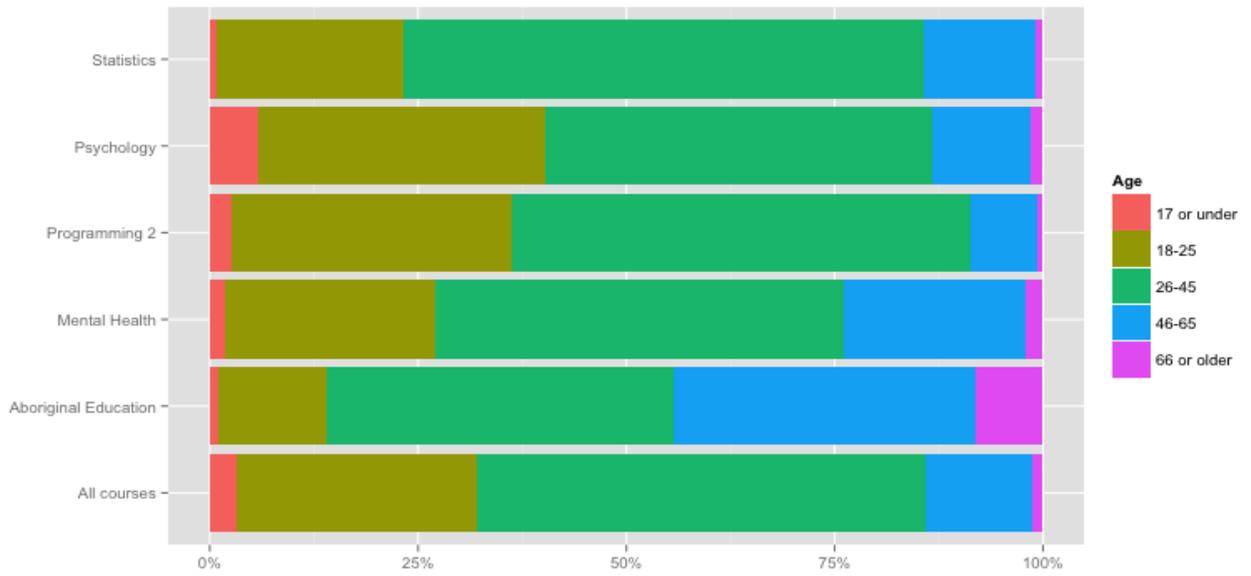
User categories



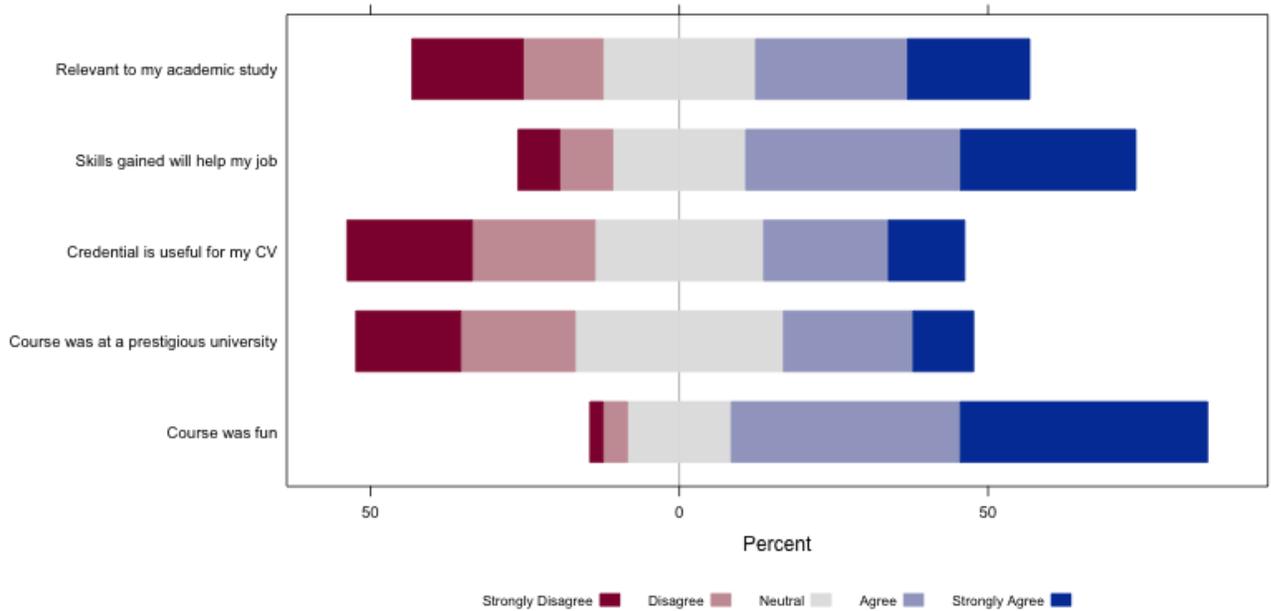
Education levels



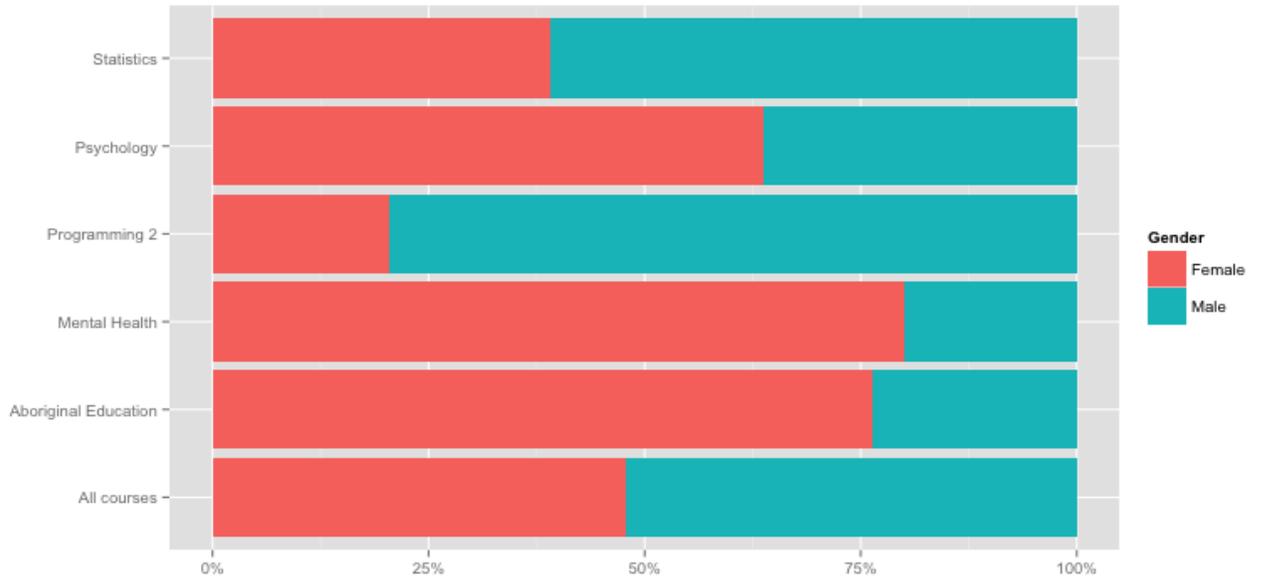
Age groups



Why students enrolled



Gender



Level of English

