

Use of OER and Interactive Online Learning in an Introductory Financial Accounting MOOC

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Abstract

The paper describes the development process, present status, and research plans for *Introductory Financial Accounting*, a free Massively Open Online Course offered by Athabasca University. The course was launched in September 2021 to reduce educational costs for students, provide a pathway to university credit, and encourage more students to consider the institution's Bachelor of Commerce program. The course allows students to explore the field of accounting without pressure or financial risk, and at their own pace. The instructional material used is an open educational resource, [Introduction to Financial Accounting \(Based on International Financial Reporting Standards\)](#). Learning material for each unit is integrated with sophisticated interactive online exercises and tailored feedback. There are also auto-graded quizzes at the end of each of five modules that can be attempted as often as desired. Learners can review material and receive feedback in a non-threatening learning environment. Discussion forums are available for student-student interactions. These are also monitored on a volunteer basis by an academic expert. A frequently-asked question database is being expanded as the project proceeds. A total of five badges are awarded to learners as they progress. This is automatically tracked and communicated via email. When learners complete 75% of the material, they can purchase a certificate of completion and attempt an online invigilated exam if desired. If the exam is successfully completed, credit can be awarded for ACCT 253: Introductory Financial Accounting. This is a required 3-credit course in Athabasca University's Bachelor of Commerce program. The paper also describes a proposed research program. This will correlate social presence indicators in three different types of discussion forums with relative success and persistence measures.

Keywords: xMOOC, introductory accounting, community of inquiry, CoI survey, badges, D2L Brightspace, open education resources

Use of OER and Interactive Online Learning in an Introductory Financial Accounting MOOC

Introductory Financial Accounting is a free MOOC (Massive Open Online Course) offered by PowerED, a for-profit learning unit at Athabasca University. The course opened in September 2021. It may be classified as an xMOOC, or eXtended Massive Open Online Course. For instance, the learning process is highly-structured and the path through the course is specified. The MOOC is divided into five modules. These cover the accounting cycle, how to analyze and record financial transactions, and how to report those financial transactions in financial statements. Students also learn how to interpret financial statements using ratio analysis and explore the basic technical skills needed for financial accounting. When the MOOC is successfully completed, learners should have the skills, knowledge, and critical thinking abilities to be able to prepare and analyze a set of basic financial statements.

Various pieces of the MOOC have been developed over the last 20 years, starting with the development of an open educational resource [Introduction to Financial Accounting](#). In 2012, this OER was adopted as the text for Athabasca University's ACCT 253: Introduction to Financial Accounting. This is a required 3-credit course in the Faculty of Business' (FB) Bachelor of Commerce program. Because texts are provided as part of students' tuition and ACCT 253 has over 1,000 enrolments per year, the university reduced its costs of purchasing commercial texts by over \$200,000 per year when it adopted this free learning material. Some of these savings were used to contract with a third party, Lyryx Learning, to produce complex, algorithmically-generated interactive online activities. These activities and the OER material are housed on Lyryx servers. Students are linked from AU's Moodle learning management system at appropriate places in the course. The Lyryx activities are used for both formative and summative purposes. They provide detailed feedback to students as they progress through the course. By providing a small amount of financial compensation to Lyryx, an agreement was reached to make these ACCT 253 online activities available to MOOC learners as well.

The idea to offer a MOOC in introductory financial accounting had been discussed for several years between two Faculty of Business accounting professors, Dr. Tilly Jensen and the presenter. A serious effort to launch the MOOC commenced in early 2019. Initial meetings were held among the two accounting faculty members, an FB instructional designer, and an interested Moodle developer from the university's Information Technology department. An informal survey of introductory financial accounting MOOCs offered elsewhere was undertaken. Overall, most of these courses were at the graduate level, covered only part of what should constitute a full, three-credit undergraduate accounting course, had rudimentary learning materials, or had fixed start and end dates. A market seemed to exist for a MOOC that would feature:

- online learning for anyone with a computer, web browser, and Internet connectivity;
- the ability for learners to start the course when desired and proceed at their own pace through the material;
- equivalent learning resources and content coverage as an undergraduate introductory financial accounting course;
- discussion forums;
- a frequently-asked question database; and
- the possibility for successful completers to earn credit towards to AU's Bachelor of Commerce degree.

The only significant differences in learning design are that MOOC learners would not have one-on-one access to accounting tutors or AU support staff as they do in ACCT 253. On the other hand, the MOOC is free.

When development commenced, Moodle was used as the University's learning management system. However, implementation of a new interactive learning environment (ILE) was well underway. As a result, university resources were unavailable to develop the MOOC in Moodle. In the fall of 2020, several external MOOC platforms were examined, including Coursera and EdX. However, these organizations' costs structures made the undertaking relatively expensive. Consultations were also undertaken with the University's Centre for Distance Education, which offers several MOOCs in how to learn online and at a distance. These courses use Canvas as the learning management system. However, the terms of use for this LMS limit use to teaching educational technology topics. This precluded course content like introductory financial accounting.

Finally, PowerED was approached in December 2020. This is a separate, for-profit unit within Athabasca University that functions somewhat like a traditional continuing education department. PowerED generally offers non-credit mini-courses, mostly to paying students, mostly about business topics, and mostly with fixed start and end dates. On the other hand, staff did have experience offering non-synchronous courses that could be completed at the desired pace of individual learners, though not as MOOCs. The unit has its own web developers and marketing staff. It contracts with developers as needed to produce branded courses. It has developed an e-commerce site to enrol students and process financial payments, among other capacities. The unit's mandate and operating model fit well with the Introductory Financial Accounting MOOC objectives. PowerED's courses have been offered in D2L's Brightspace interactive learning environment for several years. Propitiously, Brightspace had been recently chosen as the new AU-wide integrated learning environment to replace Moodle.

Over the next several years, the PowerED platform will be gradually merged with that of for-credit academic units.

But start-up funds for the accounting MOOC were hard to obtain. Eventually, the then-Dean of the Faculty of Business agreed to provide \$20,000 of internal funds to cover the estimated start-up costs. It was felt that if successful completers could be awarded credit for a required course in the BComm, more program students could be attracted. With these funds, PowerED agreed to develop and host the MOOC. It contracted with D2L to develop the website. Over the next ten months, regular development meetings took place among the two accounting faculty members and PowerED, D2L, and Lyryx staff. Discussions ranged from small issues like font sizes to larger issues such as how to tie in the Lyryx Learning interactive activities to the Brightspace environment and exchange student progress data between the two platforms. Eventually, an LT1 link was designed. This enables “badges” to be automatically issued by Brightspace intelligent agents. These badges are relatively informal, encouraging emails sent to learners when 15%, 30%, 45%, and 60% of the Lyryx interactive activities have been completed.

Concurrently with the development of the website over the next several months, regular discussions ensued among PowerED, Office of the Registrar, and Faculty of Business staff to develop a process whereby successful MOOC completers could be awarded credit for ACCT 253. There were several regulatory hurdles to overcome. The university has a robust transfer credit program but because the MOOC was internal to AU, transfer credit regulations did not apply. A challenge-for-credit option is also available for students with prior accounting experience to gain credit for ACCT 253. However, at \$374 the fees were considered too high to attract many potential program students. Eventually it was agreed that a learner who successfully finished 75% of the Lyryx learning activities would be deemed to have fulfilled the course requirements. They would automatically receive an email inviting them to purchase PowerED-issued “certificates of completion” to formally confirm the accomplishment to the participant’s employers, for instance. Upon purchase, learners are also informed of the challenge-for-credit option. For no extra charge, they are eligible to write a timed, invigilated, online exam equivalent to the ACCT 253 challenge exam. To be successful, the student must achieve a mark of at least 50%. They can then apply to be awarded ACCT 253 credit on their AU transcript.

The cost of the certificate is \$160. This is less than ½ the cost of the usual challenge-for-credit fee because many of the applicable MOOC processes have been automated. For instance, 80% of the challenge exam is automatically marked. Funding has now been obtained to cover marking costs of the other 20%. The process to request the challenge exam, record the final exam mark, and notify the Office of the Registrar of successful completion has also been streamlined using intelligent agents in D2L Brightspace, among other means. As of March 31 2022, there are 1,081 students active in the MOOC. No students have completed at least 75% of material, purchased the certificate of completion, nor written the challenge exam. Badges have been awarded as follows:

% of MOOC Completed	Number of Learners
15%	7
30%	3
45%	2
60%	1

Proposed Research

Among other criticisms, xMOOCs generally lack interaction among students and between learners and instructors. Interaction tools are provided in the introductory financial accounting MOOC by means of discussion forums. Interaction patterns within various types of discussion forums are the focus of the proposed research program. The study will randomly assign participating students to one of three categories of online interactions. The relative success of learners in each group will be measured. The three categories of interaction are

- no discussion group (control group)
- discussion group with only student-student interaction
- discussion group among students, moderated by an academic expert.

Non-participants will have access to all course materials and online assessments, but not to discussion forums. These are the same resources that are available to the study's control group. Standard demographics like age, gender, and prior educational experiences will be gathered to discover any anomalies across groups that might affect the findings. Within each interaction type, data will be collected to determine:

1. Completion rates, as a measure of persistence;
2. Knowledge acquisition, as measured by pre- and post-tests;

3. Whether 'social presence' effects as defined in the Community of Inquiry (CoI) framework literature are affected by the different levels of learner-learner and learner-instructor interaction within the MOOC's discussion forums; and
4. If differing social presence effects are detected among the groups, whether these correlate with completion and persistence rates.

Review of the Literature

There are several aspects of the proposed study that should contribute to online, higher education research, and in particular the Community of Inquiry (CoI) literature.

1. As reported by Arbaugh et al, (2008), the CoI survey instrument is a robust and well-evaluated questionnaire used to assess three 'presences' within online learning environments – social, cognitive, and teaching. However, it has been used to measure student engagement in only a few MOOC studies (Damm, 2016). Garrison (2018) suggested that the survey could be useful for further MOOC research. Since the proposed research will be conducted across many volunteers, it should expand the scope of CoI research by verifying whether the instrument is a useful measure of social presence in MOOC environments.
2. Other researchers have assessed the use of peer-facilitated discussions to enhance online higher education courses (Karunanayaka et al., 2016). However, differing modes of online, asynchronous communication (peer-facilitated learning; instructor-moderated discussion forums) appear to have been neither incorporated into MOOC research designs nor evaluated for effectiveness.
3. The CoI framework, and the usefulness of social presence, is predicated on the necessity of sustained, contiguous, two-way interaction in online learning environments (Garrison et al., 2000). This assumption has been challenged (Rourke & Kanuka, 2009; Annand, 2011). The proposed study will inform this debate by administering the CoI survey, assessing relative levels of social presence within different types of discussion forums, then correlating any significant differences with observed MOOC completion rates and other learning outcomes.

Research Procedures

A schematic of the proposed research is attached as an appendix. Volunteers will be invited to participate in the study when they enrol in the MOOC. Interested learners will add their information to the appropriate section of the sign-up sheet. At this point they will be randomly assigned to the control group (no discussion forum) or one of two discussion groups (unmoderated student-student forum; instructor-moderated forum).

A 15-item survey will be administered to gather perspectives on who participates in the MOOC and why. The survey should take about five minutes to complete. A ten-item pre-test also will be administered to all participants beforehand to determine their basic accounting knowledge. If a student writes the challenge exam at the end of the course, this pre-test data will be compared with challenge exam results. The results will be used to approximate increases in introductory financial accounting knowledge. Completion rates across each of the three group types also will be compared. A short, four-item exit survey will be conducted with participants who do not complete the course within one year.

A 34-item Community of Inquiry questionnaire will be administered to all participants. The results will be analyzed to determine differences among measures of perceived social presence in each type of discussion forum in particular. Any statistically significant differences will be correlated with knowledge gains (pre- vs. post-test results) and proxies for persistence (completion rates; level of progress through the MOOC) to indicate whether differences in social presence affect these measures. A study size of about 120 learners in each of the three interaction types should identify significant differences with a 95% confidence interval.

Implications for Future Research

Annand (2019) suggested that the value of the CoI framework as an adequate explanatory model for learning in online higher education needs to be more critically examined. The framework is predicated on a social constructivist paradigm that assumes sustained, contiguous communication is necessary for effective learning to occur. Yet it could be argued that most related research is conducted in environments that use learning techniques more often identified with an objectivist-rational paradigm. Therefore, the framework's underlying assumption of the need for sustained communication among learners needs further examination. In addition, the types of questions that could be pursued in CoI research may have been inadvertently limited by unchallenged assumptions that mistake predominant for preferred practice. For instance, many CoI studies have focussed on cohort-based, graduate-level courses with fixed start and end dates and relatively low student to instructor ratios. The design of the proposed study should produce empirical results that inform questions of efficacy and applicability of the CoI framework in a relatively unresearched higher education environment.

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Appendix

Schematic of Proposed Research

