

Thinking Big about Teaching Big: A Study on Large Enrolment Courses

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Abstract

The goal of this study is to identify key pedagogical components of a model developed by the United Kingdom Open University. Using the identified pedagogical components, and Luhmann's System Theory (1995) the aim of this project is to extend our understanding and knowledge of effective teaching and learning in large classes (90-120+ students per course).

Introduction

When it comes to first-year courses, the Globe and Mail characterised the situation at many universities as 'large' (Church, 2010). For most academics the demand to teach large enrolment courses is an overwhelming experience. Alongside a lack of information about how to facilitate meaningful learning activities with large groups of students is an inability to provide assessment practices that evaluate more than just how well the students can memorize the course material. This coincides with societal demands about not only how much university students have learned, but what they can do upon graduation (e.g., employable competence). Additionally, research has shown that large enrolment courses often create barriers to learning for students (e.g., student anonymity, passivity) resulting in difficulties for students to engage with their learning (Exeter et al., 2010); we also know there is an inverse correlation between engagement and attrition (Tinto, 1993). There has been no shortage of solutions offered for high enrolment courses, especially within the educational technology community (e.g., blended learning, flipped classes, and student response systems) which aim to compensate for the larger societal issues (e.g., reduced funding, differential tuition and increasing enrolments). However, large enrolment is a complex phenomenon with no ostensible quick and/or simple fix.

Large enrolment classes are a high risk for students, instructors and institutions. As funding to postsecondary institutions seems destined to continue to decrease for the foreseeable future, alongside imposed tuition increase restrictions, large(r) enrolment courses will continue to characterize at least the introductory courses in many undergraduate programs. That is, with the exception of the OU. The OU provides a noteworthy heuristic of an effective response to large enrolment. With an intake of approximately 250,000 new students every year, the OU has consistently been ranked as one of the top universities, nationally and internationally through national student ratings. The OU has the ability to teach at scale as well as provide students with one of the highest ranked student experiences. This is even more remarkable given the OU has an open entry policy.

The goal of this mixed method longitudinal study is to determine if key components of a pedagogical model developed for teaching to scale (mass enrolment) by the Open University (OU) in the United Kingdom (UK) can be effectively used in other institutions of higher

education that have large enrolment courses (90-120+ students per course). Partnering with teaching and research units in comparable universities in Denmark and Canada, *the aim of this project is to contribute to our understanding(s) and knowledge of effective teaching and learning in large classes using the key pedagogical components of the OU model.*

This project proposes the following objectives:

- (1) Working with principal instructors of large enrolment courses and associated teaching assistants (TAs) / tutors, the partnership team will assess, design, develop and implement a teaching program using the key components of the OU model.
- (2) Identify significant relationships between key pedagogical components of the teaching program developed in objective 1 and *engaged experiences* in large courses.
- (3) Using the findings in objective 2, track changes in *successful undergraduate experiences* over 4 years (participants will be purposively selected from courses categorised as large enrolment and high risk).
- (4) Explore the different ways in which students and instructors (including TAs and tutors) experience a *quality* education in large undergraduate courses and the teaching program implemented in objective 1.

A *successful experience* in large enrolment courses will be measured using course completion rates (a passing grade). Indicators of *engaged learning experiences* will be identified using the *National Survey of Student Engagement (NSSE)*. Indicators of engaged undergraduate teaching experiences will be identified using the *Faculty Survey of Student Engagement (FSSE)*. Indicators of a *quality education* will be identified using the *Dimensions of Quality Report*.

Need for the study

The central challenge experienced by many universities since WWII has been the inability to provide low cost, wide access and high quality learning experiences at the same time – frequently referred to as the ‘iron triangle’ (Daniel, Kanwar, & Uvalic-Trumbic, 2009). Technological developments over the last four decades have proposed breaking the iron triangle through such initiatives as moving from bricks to clicks (online, distance learning), flipped and blended learning models, machine learning and assessment, gaming and simulation, and mobile learning. Beginning in 2012, many universities added Massive Open Online Courses (MOOCs) to their online learning opportunities. While MOOCs have garnered the interest of senior administrators through the seductive possibility of breaking the iron triangle, the reality is, most academics will never teach a MOOC and most students will never complete a MOOC. In contrast, both academics and students will likely be involved in high enrolment courses.

An ongoing instructional challenge that many instructors and students face in publically funded universities is large-enrolment classes (90-120+ /course) (Kanuka, 2008). While certainly not massive, these courses are big and in many ways big class sizes (vs. massive) can be more challenging than teaching a MOOC. For example, large enrolment classes require instructors to reduce what Moore (2007) describes as the ‘transactional distance’ which is, in its simplest sense, the communication distance (or ‘cognitive space’) between

instructors and learners that often occurs in large classes. In massive courses, neither students nor instructors have an expectation of reducing the transactional distance. In high enrolment courses, however, many instructors believe they can facilitate personal connections with their students and, thus, make earnest efforts to provide meaningful interactions. Some instructors have also been motivated to use net-based communication technologies to assist in connecting with their students in large classes. Results of research on the use of technologies to facilitate meaningful learning in large enrolment classes have been, and continues to be, uneven. Results from a second-order meta-analysis of over 40 years of research concluded that we still do not know the effective strategies for teaching with technology (Tamin et al., 2011). *There is a need to gain a better understanding of a quality education with net-based communication technology that facilitates engaged teaching and learning, which is scalable for high enrolment and high risk courses resulting in successful undergraduate experiences.*

Relevant Scholarly Literature

Our review of the research on teaching and learning in large enrolment courses reveal that most of the research conducted are case studies by instructors (most often in the sciences – see the Bibliography in the reference section) that include instructional strategies the researchers have used and found to be effective in their large classes (see also Kerr, 2011). Many of these studies report on the use of student response systems, flipped classes, classroom assessment techniques, blended learning, course management systems, the use of various forms of social media and other kinds of net-based interventions. While interesting, generalising widely to other disciplines is difficult, or simply inappropriate. Many of these case studies are also non-theoretical which makes them of limited value in providing a significant contribution to the body of knowledge in teaching and learning in higher education. More recently, an exploratory study on teaching and learning in large classes universities was commissioned by the Higher Education Quality Council of Ontario. The outcomes of this study include a description of issues in large enrolment classes based on a review of literature (Kerr, 2011). The issues include: student issues, course management issues, resource and institutional support issues, teaching and learning strategies, and assessment. The report recommends further research into these issues. The result is a corpus of research revealing instructional techniques that are effective in specific cases (see also Kerr, 2011), and also infrequently generalizable beyond specific courses/disciplines and/or instructors – though, there are some noteworthy exceptions (e.g., Gibbs, Lucas & Simonite, 1996). A review of the large course enrolment research by Toth and Montagna (2002) found most studies have weak design methodologies, with half of the studies examined defining achievement as simply the students' class grades alone. More recently an exploratory report on teaching and learning in large classes at Ontario universities was commissioned by the Higher Education Quality Council of Ontario (Kerr, 2011). The outcomes of this report include a description of issues in large enrolment classes: student issues (e.g., isolation, distractions, feelings of anonymity), course management issues (e.g., course design, student organisation, communication), resource and institutional support issues (e.g., funding, space, equipment), teaching and learning strategies (e.g., preparation time, active learning strategies, interaction), and assessment (e.g., formative, authentic, feedback). The report recommends further research into these issues.

The most notable research conducted in North American on large enrolment courses was by the PEW Learning and Technology Programme in 1999. The aim of this research project was to show that “it is possible to improve learning while simultaneously reducing the cost of instruction. We can indeed have our cake and eat it too” (Twigg, 1999, p. 4).

By redesigning instructional approaches and using technology to achieve cost savings through large enrolment, introductory courses in this ambitious project set out to break the 'iron triangle'. While the project was declared a success by those who participated, more than a decade later it is difficult to determine how this has transformed American higher education in a significant way. The absence of long-term change should not be surprising if we consider the three decades of research conducted by researchers Ernest Pascarella and Patrick Terenzini. In a landmark review of twenty years of research, Pascarella and Terenzini (1991) reported that simply going to university makes a difference (e.g., improved cognitive skills, greater verbal and quantitative competence, and different political, social, and religious attitudes and values) but were unable to identify significant differences between institutions (e.g., ivy league versus large, publically funded institutions) once the quality of the entering students was taken into account. Specifically, the strongest indicator of a successful university experience is the calibre of the students entering university.

For obvious reasons, this finding is troublesome, or what Daniel (2012) describes as " ... nonsense. To give but one example, the OU, which has no academic admission requirements, has awarded over a million highly regarded degrees to its students" (para. 43). Beginning with the notion that the calibre of students should not be the only indicator of a successful university experience, most universities are not evaluated (solely) based the calibre of incoming students. Most often actuarial data and expert ratings are used as university success indicators (e.g., graduation rates, racial diversity, admissions selectivity, research funding, student-teacher ratios and standardized test scores). These data have long been assumed to reflect institutional quality. However, there is scant evidence that the attributes actuarial data measure have a decisive impact on student learning (Labi, 2014; Saisana & D'Hombres, 2008). More recently in North America, the National Survey of Student Engagement (NSSE) has been used to determine an institution's effectiveness in student learning. The NSSE asks students to rate their educational experience by reporting on a series of questions relating to five benchmarks of engaged learning. Although there exist problematic issues when using NSSE to assess students' leaning (e.g., correlation is not causation) more than a decade of research does, nevertheless, reveal a strong correlation between the NSSE engagement benchmarks and successful learning (success being defined as program completion). As such, NSSE scores may be a better measurement of how universities teach than many of the actuarial data that find their way into university evaluations. While not dismissing limitations of the NSSE (e.g., there are things about learning we cannot measure accurately), NSSE has demonstrated it can measure engaged learning – the loss of which is the central concern in high enrolment courses. NSSE has also undergone rigorous psychometric analysis, showing to be both reliable and valid (see, for example NSSE Psychometric Portfolio). As a final point, NSSE also provides an instrument for instructors (Faculty Survey for Student Engagement – FSSE). *For these reasons, we are proposing to use the NSSE and FSSE for engaged learning and teaching as a framework.*

With respect to a *quality* education, we are proposing that a definition be grounded in the evidence-based literature. Acknowledging that some dimensions of a quality education cannot be measured, there are dimensions of quality that can, and have, been quantified. In particular, repeated research over time has, with good consistency in findings, revealed that the number of class contact hours have little to do with educational quality (Gibbs, 2010) and instructors who have teaching qualifications (e.g., Teaching Certificate in Higher Education) are more highly rated by their students than those who do not have such qualifications (Nasr et al., 1996). To frame the differing kinds of dimensions of quality, Biggs (1993) identified three interacting variables: presage (variables that exist within a university context before a student

starts learning), process (variables that characterise what is going on in teaching and learning) and product (variables that influence the outcomes of the educational performance). This study is proposing to focus on the *process* variables which Gibbs (2010) has identified as: class size; total study hours (contact and independent); teaching excellence; research environment; intellectual challenge; formative assessment and feedback. These variables are also benchmarks included in the NSSE. Hence, *student success*, a *quality education*, and *engaged learning* are intersecting constructs. *The 'Dimensions of Quality' report (Gibbs, 2010), which includes the NSSE and FSSE benchmarks, will be used as indicators of a quality education in this study.*

Theoretical Frameworks Guiding the Study

The theoretical framework we are proposing for this study is constructive alignment (Biggs & Tang, 2007; Biggs, 1999; 2003). Constructive alignment is one of the most influential ideas in higher education (Higher Education Academy, 2011) and, thus, must be a central consideration in pedagogical actions for high enrolment courses. The basic premise of constructive alignment is that the curriculum is designed so that the learning activities and assessment tasks are aligned with the course outcomes. Alignment of the curriculum is pivotal to understanding how to reduce and/or remove the risks of high enrolment courses. A key issue is a lack of pedagogical understanding by instructors of how to use assessment to design courses effectively. For many instructors, course assessment is something of a postscript – something to be considered after the content and activities have been established. Yet this fundamental alignment between student assessment and student learning is well established (Boud, 1995; Brown, 1997; Brown & Knight, 1994; Ramsden, 1992). Assessment, rather than stated learning outcomes, defines the 'de facto curriculum'; that is, what students actually do in order to pass the course (Kirkwood & Price, 2008; Rowntree, 1987). Others have coined this concept as the 'backwash effect' on student learning (Watkins, Dahlin & Ekholm, 2005). Despite research on the power of assessment to drive student learning, its potential is overlooked in much higher education teaching. Watkins, Dahlin and Ekholm argue that the problem lies in how academic development initiatives have not supported teachers.

This study proposes to use aspects of the OU pedagogical model, learning design (Laurillard, 2012) and validated principles of teaching and learning (Kanuka, 2003) and its subsequent evaluation in a manner that adopts a holistic approach to enhancing the student experience. Underpinning this approach is Luhmann's (1999) systems theory. At the core of Luhmann's theory is communication

This study incorporates the following key pedagogical components, which will be the core of the teaching preparation program and subsequent evaluation:

- a) *Learning design*: designing the teaching and learning process to scale, incorporating constructs required for a *successful* learning experience that are often compromised in large enrolment courses.
- b) *Teaching beliefs and practices*: using learning-centred approaches, implement practices that align the assessment and instructional strategies, ensuring key pedagogical components necessary for a *quality* learning experience are present.

- c) *Teaching excellence*: designing instruction to scale so students continue to receive meaningful instruction and learning activities, timely feedback, and support in their progress and development, resulting in an *engaging* learning experience.

Program Design Phase I, Intervention with instructional staff / course design

Phase one of the data collection will begin by developing instructor training based on the following validated principles of learning design (Kanuka, 2001; 2002).

PRINCIPLE	CONSTRUCTS	DESCRIPTION
<i>Principles of teaching</i>		
Active and purposeful presentation of abstracted phenomena	Complex problems	A problem that is enigmatic and ambiguous with no one or right solution is presented to the learners.
	Interactive	Interactive learning can be described as an active intellectual participation between and among the learners, instructors, and the subject matter.
	Strategic	A repertoire of teaching/facilitating strategies is essential in achieving the planned learning objectives, which is a careful plan of action intended to accomplish the proposed outcomes.
Multiplicity of perspectives to be fully apprehended	Multidisciplinary	A multidisciplinary approach to teaching will involve the relating to, or making use of, several branches of knowledge at once and returning to the same phenomenon from different perspectives.
	Conflicting phenomena	The presenting of two or more occurrences, circumstances, or observable events that are contradictory.
	Multiple sources	A set of information sources with diverse perspectives and positions on an issue.
Relatedness for meaningful understanding	Creditable Source	Phenomena that are presented by a credible authority in the field can support relevance, making the issue(s) and problem(s) worthy of study.
	Authentic Event	The phenomena are related to, or derived, from experience or an actual event.
	Discursive	Conclusions proceed through a reasoned discourse rather than intuition.

	Inquiry based	A close examination, investigation or probe in a quest for knowledge, data or truths.
Diversity of instructional methods	Problem solving	To explain, decipher or resolve something that is enigmatic, meaningless, incomprehensible and/or unintelligible.
	Decision making	A position, conclusion or passing of judgment on an issue reached after generating the alternatives, evaluating the choices, and assessing the consequences.

	Negotiated Learning	Being involved in negotiable learning for assessment gives learners shared ownership in their own learning.
Meaningful assessment	Instructional	Assessment is personally meaningful and used as a positive tool for personal growth.
	Performance based	Involving a demonstration, exhibit or performance in real conditions or authentic simulations.

Principles of learning

	Setting standards of excellence	Learners take charge in setting standards of excellence, defining benchmarks, and selecting learning activities in ways that are personally meaningful and challenging.
Assume greater responsibility	Learning/thinking strategies	A repertoire of thinking/learning strategies is essential to fully apprehend the multiplicity of complex problems.
	Focus efforts	Learners accurately evaluate their strengths and weaknesses and determine where to focus their efforts to make the learning process personally meaningful.

Meaning making into abstracted phenomena	Making sense	The learning process should require learners to compare, classify, induce, deduce, analyse, abstract and evaluate to make sense of the data or information presented.
	Generating relationships	Learners should be encouraged to be generative, which includes the ability to originate, transform,

		reshape or reinterpret new information through a different scheme resulting in new understandings.
	Reflective deliberation	Characterized by thoughtful mediation or contemplation that uses the powers of the mind to conceive ideas and/or draw inferences resulting in the expression of carefully considered thought.
Reconstructio of meanings	Empathy	It is not enough for learners to know and understand their own worlds; they need to know and understand others. To do so is to have the ability to reconstruct meanings.
	Negotiable meanings	Learning at a higher level is frequently not about discovering more, but about reshaping or transforming new and existing knowledge through the negotiation of meanings with others.
	Diversity	To achieve shared understandings, learners must value diversity.
Evidence of new knowledge	New and multiple perspectives	This requires the ability to understand that there is more than one worldview; it also requires the ability to understand that there may not be 'one' correct worldview.
	Assumption articulation	The careful examination of something; that something being the self.
	Learning strategies	Learners should be required to provide evidence of their ability to develop and use a variety of learning strategies to produce meaningful understandings.

The ideology of the program is to support large enrolment courses through scalable options that achieve a quality learning experience using a conceptual change model in teaching beliefs and practices. Using conceptual change models in academic development have already been shown to be effective in a Swedish context with novice teachers in developing more student centred views of teaching (Price, Andersson & Alhberg, under review). Hence, the teaching program will address fundamental beliefs about teaching. Trigwell, Prosser and Waterhouse (1999) demonstrated links between higher education teachers' approaches/conceptions to teaching and students' approaches to learning. Additionally, adopting a deficit model focused only on teacher training is less likely to address underlying conceptions of teaching, thus failing to enhance instructors' approaches to teaching. Facilitation of this kind of teaching growth in conjunction with developing the teaching program supports progressive teaching and learning, as TAs can adjust their conceptions of teaching before their views become entrenched. This project, then, will provide not only high quality research training experiences for students in the role of research assistant, but also a high quality teacher preparation experience for TAs. This phase of the proposal will provide a unique experience

for students with respect to teaching and learning based on learning theory and the research known to provide successful, engaged and quality learning experiences. We know from existing research the current bouquet of teaching workshop offerings that TAs attend in most North American universities are ineffective at changing their teaching from the way they were taught (Kanuka et al., 2002). The teaching program we are proposing in this phase is an evidence-based strategy based on constructive alignment (the alignment of learning outcomes, instructional strategies and assessment; Biggs, 2003), demonstrated to bring about conceptual change for instructors' beliefs and practices. Further, the learning design proposed in the teaching development program will enable participants to develop as life-long learners with appropriate knowledge fundamental to their continuing professional practice (Kirkwood & Price, 2013b). This part of the project is intended to have instructors adopt learning centred instructional strategies (Andersson, 2010; Mårtensson, Roxå, & Olsson, 2011) resulting in a change in beliefs and practices about teaching and learning, with pedagogically driven learning design as the backbone of educating large groups of students.

Summary

This research intervention into improving the quality of student learning in large class sizes will explore two phenomenon. First it will examine whether a conceptual change model is an effective approach in developing the conceptions of teachers involved in this intervention and hence improve their approaches to teaching. Second it will examine whether the UKOU model is applicable in a face-to-face context and whether it has any impact upon the quality of student learning. As the cost of education is likely to rise in this Canadian context, both for the institution and for the students, it is imperative to examine whether this approach to teaching large class sizes has any effect. The findings of this research are likely to be of value to other institutions facing similar problems with large class sizes and issues about the quality of students' learning in such contexts.

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