Student and Instructor Perceptions of a First Year in Active Learning Classrooms: Three Lessons Learned

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This article presents an evaluation of an active learning classroom (ALC) initiative at the University of Ottawa. Preliminary results indicate three broad trends to inform future practice and classroom design: 1) Despite advances in educational technology, there remains a strong appetite for low-tech, interactive learning opportunities; 2) Instructors feel that consistent institutional support is necessary to foster innovation in the classroom, particularly for course redesign; 3) a collaborative strategy, bringing together multiple institutional stakeholders, is necessary to ensure a whole-of-university approach to optimal use of the ALCs. This article briefly reviews ALC research, outlines the methodology of the program-evaluation protocol, discusses the three central findings, and concludes with potential directions in ALC research.

Nous examinons ici une initiative, menée à l'Université d'Ottawa, de classe d'apprentissage actif (CAA). Les résultats préliminaires permettent de dégager trois tendances qui permettront d'orienter les pratiques et la configuration de la classe : 1) malgré les avancées dans les technologies éducatives, l'intérêt pour les méthodes simples et pour l'apprentissage interactif ne se dément pas; 2) Les enseignants croient que l'innovation en classe, et tout particulièrement la refonte des cours, sont tributaires d'un soutien institutionnel constant; 3) pour utiliser toutes les ressources de l'université et ainsi faire un usage optimal des CAA, il doit y avoir une stratégie de collaboration regroupant différents intervenants de l'établissement. Dans notre article, après avoir survolé la recherche au sujet des CAA et défini la méthodologie du protocole d'évaluation de programme, nous présentons les trois résultats principaux et nous proposons, en guise de conclusion, trois avenues possibles pour la recherche sur les CAA.

Active Learning Classrooms (ALCs) are teaching and learning spaces dedicated to the promotion of interaction and engagement. These spaces are designed to encourage student collaboration, be flexible enough to support multiple instructional approaches, and minimise barriers between instructors and students (Chiu & Cheng, 2016; Metzger, 2015). Following the growing development of ALCs across higher education institutions over the last decade, the University of Ottawa piloted a room of its own in 2014. This eventually led to the construction of four ALCs of various sizes and designs, ranging from 54 seats to 117 seats, that opened in the fall of 2018. To gauge first time expectations and experiences of both instructors and students, the Teaching and Learning Support Service set up an evaluative protocol that permitted data collection at regular intervals throughout the first year of use. This data largely served two goals: first, to provide formative feedback to the instructors facilitating in these spaces, and secondly, to help enhance the physical spaces along with the support (training, consultations, etc.) and resources offered to both instructors and students. An ancillary goal was to put in place a sustainable evaluative protocol that would be meaningful and efficient.

This article shares three lessons learned from an initial analysis of the first year of operation for the new ALCs. Program evaluation and data collection work is still ongoing; however, this essay offers an opportunity to share preliminary findings with other institutions seeking to plan for future ALCs or to optimize the use of existing spaces. A brief review of research on ALC user perceptions is presented, followed by a description of the evaluation questions and process driving the data collection. We then discuss the lessons learned: the continued desire for low-tech classrooms, the importance of institutional support to enable innovative instruction, and the need for collaboration to facilitate optimal ALC use. The conclusion offers a brief summary of future opportunities.

Active Learning Classroom: Past Perceptions

Perception studies are familiar territory for scholars of teaching and learning who are interested in ALCs. Perception studies are widely used in SoTL far beyond active learning classroom research (Groen et al, 2016). Foundational studies of ALCs at the University of Minnesota (Brooks, 2011) and the Student-Centered Activities for Large Enrolment Undergraduate Programs (SCALE-UP) project at North Carolina State University (Beichner et al, 2007; Beichner, 2014) first focused on measurable outputs such as student grades. However, understanding student perceptions of purpose-built learning spaces was set as a high priority even in these early stages (e.g., Brooks, 2011, p. 725). In the years following, instructor perception in particular "has driven the evidence-based call for preparatory materials and pedagogical support for instructors in ALCs" (Murphy, 2019, p. 8). While some research on ALCs has focused specifically on instructor or student perceptions in isolation, many investigations have incorporated both sources as well as quantitative elements like student course performance and/or failure and withdrawal rates.

Instructor-focused perception studies are typically chosen to offer insight into the challenges of transitioning courses from traditional classrooms (including lecture theatres) into active learning classrooms. A recent study following instructors new to ALCs found that they not only perceived a significant effect on their teaching (specifically, they reported a self-identification as teacher-learner), but that this effect also continued beyond the ALC to impact their teaching and professional trajectories (Phillipson et al, 2018). A study of teaching assistants found that instructors would more readily circulate and converse with students when in active learning classrooms as compared to traditional classroom designs (Chen et al, 2016). Another form that instructor perception studies have taken is the reflection on practice (sometimes called "instructor reflections" or "pedagogical best practices") undertaken by instructors. Contributions from disciplines such as nursing (Fahlberg et al., 2014) and political theory (Murphy, 2017) directly inform the pedagogical practice of future and new instructors in flexible learning spaces while also indirectly informing future research and educational development.

Student-focused perception studies have included a wide variety of topics, largely focused on students' attitudes towards learning and engagement in ALCs. Chen (2015) found that students felt motivated to work when peers in other groups were visibly on-task. A later study by Chen (2018) reiterated that the instructor had a 'vital role' to prevent boisterous students from derailing classmates' abilities to focus. Several studies have reported that students perceive ALCs as "more engaging" (e.g., Cotner et al., 2014, 86; Chiu & Cheng, 2016). Student perception studies sometimes measure impacts in changing pedagogical training, as found in Brooks and Solheim's study (2014) of teaching approaches, which found that instructors who had been trained on active learning pedagogy were perceived as more engaging by students than those in similar rooms who had not received the training. Other times, perception studies focus on different groups within the class: a research team led by Brent McCollum found that students who did not complete assignments perceived active learning classrooms as

less engaging (McCollum, Fleming, Plotnikoff & Skagen, 2017), while Stoltzfus and Libarkin (2016) found that students perceived benefits in learning even when course grades did not improve above expectations.

The specific design of the program evaluation project from which our data emerged focused on a balanced approach that solicited feedback from both students and instructors. First-year adoption studies, such as Lethbridge College's active learning implementation program, saw both student and instructors advise the institution to develop faculty training programs, consider alternative sites for summative assessment, and even to tighten screws on tables (Benoit, 2017). Rands and Gadamer-Topf's (2014) study of the impact of student engagement in new ALCs found interesting agreement between instructors and students on the openness, freedom of movement, and invitation to knowledge sharing. The first-year program evaluation at the University of Ottawa incorporated learning from the depth of perspective available when both students and instructors are invited to participate.

Method

The evaluation process sought to examine how the use of an ALC informs teaching and learning with the goal of enhancing the student learning experience and, more specifically, how classroom design may influence approaches to teaching and consequently affect the student learning experience. The overarching evaluative questions were:
1. What are students' and instructors' expectations of the ALC?
2. What features of the room are most influential to both the teaching and learning experience?
3. How does the ALC affect student engagement and student interaction?

To adequately respond to these questions, data were collected in fall 2018 and winter 2019 from three sources using several different instruments. From an interpretive perspective, triangulation, as exemplified via the use of several data sources, was used as a strategy to ensure the validity of the data (Creswell & Clark, 2017). Firstly, data were collected anonymously via a sticky-note feedback exercise run during the last few weeks of each semester. Feedback provided on 325 sticky notes addressed the percentage of time spent interacting in class, the most helpful features in the ALCs, and suggestions for improvement. While we know that a variety of disciplines held courses during the sticky note feedback sessions, the anonymity of responses means we do not know how equal representation was across faculties. Intra and post questionnaires were used to gauge the student experience in greater detail within six case-study courses chosen to represent a diversity of disciplines, levels of study, and class sizes. Questionnaires featured a combination of Likert-scale statements regarding student engagement and interaction and open-ended questions that sought to identify features of the ALC that best facilitated, and inhibited, learning (n=100). Secondly, instructor data were solicited early in the semester via survey (n=16) and following the end of the semester via focus groups (n=16) for all instructors teaching in the ALCs.

Individual interviews were also conducted with the instructors of the six aforementioned case courses. Thirdly, class observations were conducted by a member of the Teaching and Learning Support Service team. Using a template spreadsheet, observations recorded at five-minute intervals identified student and instructor behaviour in the classroom space. Categories of observation included types of classroom activities (e.g. lecture, group activities, class discussion), the mode of content delivery (e.g. slides, handouts), instructor behavior (e.g. consulting with students and physical location within the room), and levels of on-task student behavior. The movement within the classroom space of both instructor and students was recorded.

Questionnaire, focus group, interview, and observation data were thematically coded by assigning units of data to different categories. Data were then analyzed for any emerging categories from recurring themes. Data used in the context of this

article were originally collected as part of a program evaluation process. Three particularly noteworthy themes emerged from the initial qualitative analysis, namely the ease and utility of low-tech ALCs, the need for supports to mitigate the risk of challenges using the spaces, and the consideration of a more coordinated and collective approach to the planning and management of the spaces. The next section discusses each of these themes in turn as lessons learned from a first year of ALC use.

Three Lessons Learned from Preliminary Findings

While data collection as part of the evaluation of the ALCs is still ongoing, early results illustrate three notable lessons to inform future programming decisions around ALCs. First, despite the growing market of technologies designed to facilitate learning experiences, both instructors and students continue to have an appetite for low-tech learning environments focused on group work, discussion, and student connection with the instructor(s). Second, feelings of vulnerability in the new ALCs present a barrier to instructor innovation; ensuring greater availability and awareness of training and support may facilitate instructor confidence. Third, because the new classrooms pose a new set of complex logistical challenges, instructors felt that a more comprehensive strategy among institutional partners—which we call the "whole-of-university" approach—may facilitate quick response times to pressing and difficult challenges.

Appetite for Low-Tech Learning

The three designs of ALCs that rolled out in the 2018-2019 academic year all incorporated flexible classroom designs with varying degrees of high-tech functionality. While there was consistently positive feedback on the design elements of the room (aside from reports of original awkwardness about having one's back to some students when lecturing from a central podium), the perception of technology in the

rooms was mixed. Some instructors had positive opinions of the technological features of the classroom, particularly the split-projection functionality (where one image or slide appears on large wall-mounted monitors and a secondary image appears on table-screens). This was found to be useful in a biochemistry course dealing with molecular structure where the completed molecule could be displayed on one screen while the other was used to show its construction.

Other instructors reported that the multitude of screens was distracting for students, particularly when screens mounted on circular group tables physically blocked students from being able to see their colleagues at the same table. Once a particular piece of technology failed, instructors were reluctant to reattempt its use. Though the classrooms had a large number of technological features (cited by students as examples of the modern feel of the rooms), some instructors did not see them as necessary for optimal use of the ALC. When instructors in the focus groups were asked what advice they would give a colleague assigned to teach in an ALC, instructors suggested that new users should not feel pressured into using all of the room's technological features, and instead to make the most out of the group tables (by allowing for discussion and group work). Of all the features of the classrooms, the one most commonly requested was the whiteboard. Both students and instructors complained about too few whiteboards in the classroom. Alongside the whiteboards, group tables and movable chairs consistently emerged as features commonly perceived as important.

The same split was present in student feedback. While students often described the rooms as "high-tech" and appreciated large screens for the visibility it afforded to PowerPoint presentations, students were not unanimous in support of high-tech elements. Student comments echoed those of their instructors in asking for more whiteboards, and students reported feeling more comfortable talking to peers during group discussions because they were already at tables. Not all reports were positive, however, with students reporting that having too

many screens in the classroom made it more difficult to focus in both "initial impressions" and end-of-term surveys. This feedback echoes prior research on active learning classrooms by Parsons (2016).

While instructors and students valued the high-tech functionality when it suited particular elements of their courses, they still see value in low-tech elements of flexible classroom design. The first lesson learned is that meeting instructors' and students' needs does not mean incorporating as much technology as possible into new classroom construction projects—whiteboards and groupwork tables are consistently valued more highly than high-tech elements. Indeed, these perceptions meet the growing body of educational research that pushes back on the claims that "digital natives" require a high-tech learning environment (Kirshner & De Bruyckere, 2017). As Jose Bowen's *teaching naked* movement has argued, the value of the classroom is the personal interaction that can happen there, and technology should only be used as a tool to support this rather than a complete educational strategy (Bowen & Watson, 2017; Bowen, 2012). Or, in the words of Cristine Smith and Katherine Hudson, "Technology should not drive teaching practice; instead, learning objectives and teaching techniques should drive the choice to use a particular technology" (Smith & Hudson 2016, p. 163). A healthy skepticism of advocacy for all classrooms to be high-tech environments will assist in meeting students and instructors where they are (e.g., Clement & Miles, 2018). Students and instructors see value in incorporating technology in particular circumstances, but there is a continuing appetite for low-tech learning and a danger of distraction in high-tech classrooms.

Institutional Support and Risk Mitigation

While instructors appeared enthused about using the active learning spaces because of their novelty and their pedagogical potential, many shared feelings of vulnerability. Instructors frequently spoke of fearing technological failures or trouble handling the perceived chaos of facilitating classes in spaces that openly encouraged more interactivity by virtue of their layout. For example, one instructor tried a case study activity where each pod in the ALC had a team of students actively using pod screens to resolve a problem set and eventually present back to the whole room. During the activity, the instructor had some difficulties with the control panel on the central podium, which necessitated a restart of the system. The instructor subsequently reported no longer structuring any activities that would necessitate the switching of screen sources out of fear of this happening again. Following accounts such as this, discussion around supports and strategies that would help mitigate the risk of technological glitches, confusion during classroom activities, or perceived failures of any kind emerged.

The principal support to help mitigate risk in these spaces was listed as the availability of immediate in-person technical assistance. Should a problem arise in the room, the comfort of knowing that a specialist was within a few minutes of being able to drop in and resolve any issue was seen by some as a precondition to trying any form of novel technology. Similarly, the existence of brief "how-to" guides about the room as well as dedicated practice time were other risk-mitigating strategies mentioned.

Stemming from student data, it was evident that an instructor's level of confidence in the new space was often palpable. Instances where an instructor presented the introduction of structured pedagogical activities in the new spaces as collective trial and error experiences were seen as constructive by students. However, they made more critical mention of experiences where the instructor seemed ill-prepared to use the room or simply lectured during the majority of class time. Frustration around the misuse or "loss of potential" of the ALCs was noted in several student accounts.

When discussing the nature of innovation and how instructors would use the active learning classrooms, categories of user types began to emerge. Categories include innovators, early adopters, early majority, late majority and non-adopters reminiscent of Rogers' (2003) work on the diffusion of innovation

and Abrahams' (2010) research on the adoption of instructional technology in higher education. Instructors that brought up notions of vulnerability and risk were those that were most frequently categorised as early and late majority adopters. These instructors were aware of the pedagogical potential of the ALCs, but often required the support of training sessions and consultations in order to progressively integrate classroom features relevant to their course contexts. Most instructors also saw value in an opportunity to practice using different features of the ALC to build confidence. Perhaps "meeting instructors where they are at" when transitioning to teaching in ALCs means simply starting with making meaningful use of the physical features and basic technologies in these spaces. In time, when feelings of vulnerability and risk are reduced, more advanced technologies and pedagogical approaches can be increasingly integrated.

Whole-of-University Approach

The third lesson drawn from the initial analysis of student and instructor perceptions of new active learning classrooms is that institutional coordination is desired. Borrowing from organizational theory in the field of public administration, we call this recommendation a whole-of-university approach to active learning classrooms. Ensuring that lines of communication bridge gaps between different institutional bodies involved in making active learning classrooms work may help alleviate roadblocks encountered in the use of these spaces.

Through instructor interviews and focus groups, student surveys and other student feedback channels, several perceived problems of coordination were raised where institutional disjuncture created a barrier to optimal use of space. Delays in garbage collection as the new building became part of the caretaking staff rotations were mentioned in both focus group and student comments. Complaints regarding the cleanliness of rooms, particularly following food and drink spills, were also shared. Broad agreement was shared by students and instructors that room assignment should be executed purposefully, prioritizing courses and instructors pedagogically well-suited to the active learning classrooms. Instructor interviews and focus groups, as well as student survey comments, all pointed toward the desirability of redeveloping the room assignment method for the active learning classrooms.

The idea of a whole-of-university approach assumes that collaboration in managing the difficulties of incorporating new classrooms will help to mitigate and respond rapidly to issues. The name comes from the "whole of government" approach in public administration, which emerged as a movement in response to earlier trends towards privatization of services and stricter departmentalization (Christensen & Laegreid, 2007). This new approach called for a collaborative strategy that looked to solve enduring problems from across the breadth of a government's structure. If the active learning classrooms are to be maximally useful, then building management, caretaking staff, educational developers, technological support, and officials in the registrar's office responsible for classroom assignment must ensure consistent cooperation and collaboration.

A possible model of what we are calling the whole-of-university approach was adopted and further refined (over the years of experience with ALCs) at Queen's University to manage their active learning classrooms. Indeed, leaders of the project there have stated that one key to the success of the active learning classrooms there was the close collaboration of different stakeholders through a joint committee (Leger, 2018). In addition to following an example of institutional best practice for ensuring the optimal function of active learning classrooms, the grassroots feedback indicates that when this kind of coordination is not present, gaps in service become apparent to the end users of the rooms.

Conclusion and Next Steps

While this summary of perceptions following a first year of teaching and learning in ALCs highlights three lessons learned from an initial analysis of findings,

many more will undoubtedly emerge as use and evaluation of ALCs continues. At this stage, early feedback has already begun to influence planning, practice, and the consideration of future ALCs. For instance, there are now plans to add more whiteboards to existing rooms (a highly requested low-tech learning feature) and to open a training space next to the four ALCs. This dedicated space will allow instructors to practice using the technology and features found in each of the ALCs in advance of their class time. Lastly, the importance of a whole-of-university approach is recognised by senior administrators and steps to formally develop this kind of collaborative strategy have begun.

As experiences mature and ALC expectations, usage, and impact data continues to be collected, it will be interesting to note any evolution in user perceptions and experiences over time. Whatever findings emerge, the importance of a sustained evaluative process has become central to the success and enhancement of these learning spaces.

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