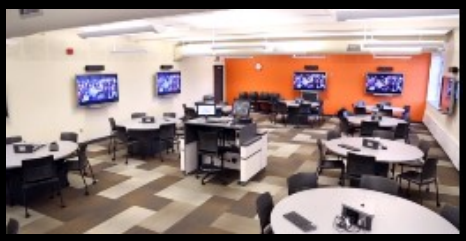
Ellis Hall Active Learning Classrooms

September 2013-August 2014

ACTIVE LEARNING CLASSROOMS IN ELLIS HALL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EXECUTIVE SUMMARY

Background

This report was written to document the development and evaluation of three innovative Active Learning Classrooms at Queen's University. The project was aimed to achieve Queen's goal to enhance the student learning experience by providing instructors with the space and resources needed to engage students actively in their learning. With generous donations to Queen's in 2012, a pilot project implementing three Active Learning Classrooms in Ellis Hall was developed to inform the University's future teaching space projects. On the first day of the Winter term of 2014, the classrooms were opened and students' and faculty's impressions and experiences in the room were investigated through several studies.

Research Questions

The main research questions were: what were students' and instructors' impressions about the new rooms? What were their expectations upon seeing these rooms? How did these expectations influence their teaching and learning strategies? And after using the rooms for one semester, how did their experiences compare to their initial expectations as well as traditional classrooms? What features of the room influenced this experience?

Methodology

Due to the timeline of construction instructors were not given any formal training on how to use the classrooms prior to the beginning of term. The support model in place consisted of an open-house for introducing the new spaces, research team visiting multiple sessions for each course throughout the term and offering support if asked, and IT support for technical issues. A pre-post design was used consisting of a series of surveys, questionnaires (e.g. CLASSE, SPQ, Actively Open-minded Thinking), interviews, focus groups with Instructors and students, informal observations, and videotaping individual sessions.

Main Findings

Overall, both student and instructors had overwhelmingly positive expectations and experiences in all three classrooms across disciplines and course levels. Initial impressions and expectations about the rooms were optimistic with students expecting "active" courses and no lecturing, and most instructors immediately changing their typical teaching approaches to adapt to the new environment. The data collected at the end of the term suggests most learning expectations were met, with students being highly engaged throughout the term as a consequence of instructors using more active teaching approaches. In cases where expectations were not met, the main concern was instructor training on how to utilize the new technology in the room or a continuation of traditional approaches to teaching in these rooms. Students suggested instructors become familiar with the classroom features before the course, and to incorporate all the features into the course to maximize their usage and to facilitate the achievement of learning outcomes. Lastly, both instructors and students strongly endorse further implementation of Active Learning Classrooms throughout campus.

Recommendations

Based on the findings from the first term of implementing Active Learning Classrooms, we recommend that training sessions need to be offered before and during the semester to allow for instructors to familiarize themselves with all the features of the classroom and to think about how these features may allow for changes within their course. In order to maximize the effectiveness of these rooms instructors will need to demonstrate how they envision using these classroom for active and collaborative learning. Support from an Educational Developer continues to be necessary to work with instructors to make these changes. Based upon the desire of instructors to teaching these rooms, the implementation and changes in approaches to teaching and learning that were demonstrated and the response of students to these rooms we strongly advocate further development of Active Learning Classrooms at Queen's.

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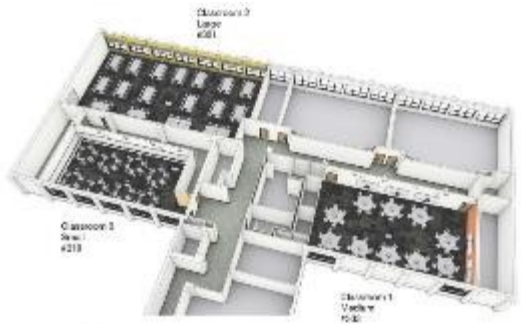
BACKGROUND AND CONTENT

INTRODUCTION



Three classrooms on the third floor of Ellis Hall were renovated to create new teaching and learning spaces designed for active and collaborative learning. Classes began using these rooms in the Winter term of 2014.

GOALS OF THE PROJECT

- Create flexible learning spaces to enable active and collaborative learning
- Encourage experimentation and innovation in course design and classroom activities
- Provide Instructors with integrated support for both pedagogy and technology
- Evaluate how the rooms are used in order to gain knowledge that can be applied to other teaching and learning contexts and spaces

BACKGROUND OF THE PROJECT

- Queen's goal of enhancing the student learning experience by engaging students actively in their learning has led the University to examine the spaces in which teaching and learning take place. Active learning is best supported by flat flexible classrooms with appropriate technology.
- In 2011 the University's Teaching Space Committee started reviewing how underutilized classrooms on the 3rd floor of Ellis Hall might be reconfigured into active learning spaces.
- Generous donations to Queen's in 2012 meant that planning could proceed for a pilot project in Ellis that would inform the University's future teaching space projects.
- Extensive consultation took place over 2012/13, with academic colleagues from across the University, the Centre for Teaching and Learning, IT Services, the Timetabling Office, Campus Planning and Physical Plant Services.
- By Spring 2013 local architects Shoalts & Zaback were engaged in the design, Jamie Thompson had been designated as the project manager, and the planned timeline for renovation meant the new active learning classrooms would be open for learning in January 2014.

ROOM 319 SMALL CLASSROOM WITH FLEXIBLE CONFIGURATION

CAPACITY: 48

The moveable chairs with tablet arms in this classroom allows for different group configurations and for immediate flexibility in class set-up. The ring of whiteboard facilitates sharing of ideas within and between groups.

- Chairs on wheels with a tablet arm (large enough for laptop and book)
- A podium with a room control panel, an ethernet jack and VGA with audio and HDMI connectivity for the Instructor's device
- A projector with an electric screen
- Floor of room has nothing fixed, just tablet-arm chairs on wheels.
- Walls of room are ringed with whiteboard

ROOM 333 ROUND TABLES AND INTERACTIVE DISPLAYS

CAPACITY: 70

This classroom allows for groups of six to work collaboratively on an interactive display and to be able to screen share to encourage student driven learning.

- Chairs on wheels with 6 students per round table
- Each table is close to a wall and on the wall is an interactive display with built-in amplified speakers.
- At the centre of the table are 6 power outlets, a VGA with audio and an HDMI cable, a USB cable connected to the interactive display and 2 buttons allowing students to select between VGA and HDMI.
- In "collaboration mode", each table will work independently (audio heard and video seen at each table corresponds to the device plugged in at each table)
- In "presentation mode", the same audio and video will be seen/heard at each table.
- A podium with an interactive display, an LCD touch screen controller, an ethernet jack and VGA with audio and HDMI connectivity for the Instructors device
- The Instructor can choose to display his/her own display/audio or any one table's display/audio to all tables.
- The microphones will probably be one hand-held wireless to be given to whichever table is presenting, and one wireless lavalier for the Instructor.

ROOM 321 LARGE CLASSROOM TABLES AND MONITORS

CAPACITY: 136

This classroom allows for multiple groups of different sizes opportunities to be actively engaged in their own learning and collaborating with one another with or without learning technology.

- Chairs on wheels with rectangle tables that seat 8 (potential for groups of 4)
- Each table has 1 monitor at the end not connected to the other table. These will probably be 22" 1080p 16/9 monitors to keep them from interfering with line-of-sight as much as possible (the top of the display will be around 14" from the table surface).
- Where the two tables connect, per table, there are 4 power outlets, a VGA with audio and an HDMI cable, an amplified speaker and 2 buttons allowing students to select between VGA and HDMI.
- A podium with an installed Windows PC with an interactive display, an LCD touch screen controller, an ethernet jack, a ceiling mounted document camera, a USB cable connected to the interactive display, and VGA with audio and HDMI connectivity for the Instructor's device
- In "collaboration mode", each table will work independently (audio heard and video seen at each table corresponds to the device plugged in at each table)
- In "presentation mode", the same audio and video will be seen/heard at each table.
- The Instructor can choose to display his/her own display/audio or any one table's display/audio to the monitor of all tables.
- The microphones will probably be one wireless lavalier for the Instructor and push-to-talk mics at each table.

Overview of Literature on Active Learning Spaces

If learning, in the broadest sense, is defined as change, then the campus site overall (including the individual buildings and the spaces within them) should be a place which enables the students (and teachers) to undergo experiences that are transformative. --- Jamieson (2003) p. 123.

In his article « History and Evolution of Active Learning Spaces », Robert J. Beichner (2014) takes us back to « the origins of classrooms designed to facilitate active learning » (p. 9). He explains that in the changing world, the facility to access information and that students change have led to changing spaces, which lead him to raise the question « Why are lecture halls so common » (p. 9)? He recalls us that one of the first space conceived to gather a large attendance was the Theatre of Dionysos, 2500 years ago (p. 11), then the romans to the construction of auditoria. In 1079, the pope Gregory VII, in order to educate the clergy, had them gather in the auditoria of the monasteries where they would script the words being read to them by a lecturer (p. 11). The auditoria inspired the creation of the most part of the learning spaces within universities, as Jamieson points out: « The traditional, teacher-centred and didactic instruction of universities has been embedded in the constructed environment of the campus, particularly the lecture theatres and other formal classrooms. » (Jamieson*, P. 2003, p. 119). Hence, the learning space promotes a certain vision of teaching.

Recently, there has been a paradigm shift from a traditional to an active approach of teaching and learning. At the foundations of active learning, instead of a lecturer, it is the students who are now placed at the centre of the teaching and learning relationship. The students are more likely to be actively participating in class because they are given tasks rather than being passively listening, and therefore are asked to interact more with their peers and the professor (Brooks & Solheim, 2014). It has been proven that students' involvement has a direct relation to their success (Steelcase, 2014) and that learning is a profoundly social experience (Oliver, B., & Nikoletatos, 2009).

However, active learning strategies may sometimes not be easily implemented due to the limitations of space and the culture that it promotes. In purely functional terms, the layout and design of the traditional lecture theatre is dedicated to a very specific form of teaching and learning. At the same time, the geographical layout and spatial form of the lecture theatre impose themselves on the teacher's and the student's expectations of their own and others' performance (i.e. how they see the role of the student and the teacher), as well as the attitude they bring to being in that space in that role (e.g. a teacher's fear of public presentation, or a student's boredom with taking notes). The space is experienced by those within it as authorizing and enabling certain behaviours over others. (Jamieson*, P. 2003, p. 122). For him, academic developers play a crucial role in the redefinition of learning spaces in postsecondary institutions an in the creation of new learning spaces that promote a more student-centered teaching.

In order to create a more student-centered learning environment, Oliver and Nikoletatos examined what do students want in a learning space. It appears that comfort and well-being is the primarily answer: « Drawing on the students survey results, these spaces need power, comfort, flexibility and effective heating and lighting. » (Oliver, B., & Nikoletatos, 2009). Oliver and Nikoletatos also found that « access to technology in and outside the classroom is fundamental » for students, which underlines the importance to create « physical and virtual learning spaces optimized for student engagement. » (Oliver, B., & Nikoletatos, 2009, p. 723). Temple's research lead to the hypothesis that « Physical space and intellectual space may […] be connected. » (Temple P. 2008, p. 232).

Consequently, there is an increased interest for developing active learning classrooms that are aligned with the new paradigm (Beichner, 2014, Jamieson*, P. 2003). In the usual active learning classroom, there is no front of the class, which contributes significantly to put the focus on students instead of the Instructor. Hence, the professor

becomes more of a facilitator than a lecturer, making the relationship between the learner and the Instructor more informal and thereby relieves stress of the traditional relationship (Baepler & Walker, 2014).

Beichner, R. J. (2014). History and Evolution of Active Learning Spaces. New Directions for Teaching and Learning, 2014(137), 9-16.

Brooks, D. C., & Solheim, C. A. (2014). Pedagogy matters, too: The impact of adapting teaching approaches to formal learning environments on student learning. New Directions for Teaching and Learning, 2014(137), 53-61.

Baepler, P., & Walker, J. D. (2014). Active Learning Classrooms and Educational Alliances: Changing Relationships to Improve Learning. New Directions for Teaching and Learning, 2014(137), 27-40.

Jamieson*, P. (2003). Designing more effective on-campus teaching and learning spaces: A role for academic developers. International Journal for Academic Development, 8(1-2), 119-133.

Oliver, B., & Nikoletatos, P. (2009). Building engaging physical and virtual learning spaces: A case study of a collaborative approach. Same places, different spaces. Proceedings ascilite Auckland 2009.

Steelcase Education, (2014). How Classroom Design Affects Student Engagement.360º Exploring workplace, research, insights and trends. White Paper, Planning for Education Journal, 6/2014.http://www.steelcase.com/en/products/Category/Educational/Documents/Post%20Occupancy%20Whitepaper.FINAL.pdf

Temple, P. (2008). Learning spaces in higher education: an under-researched topic. London Review of Education, 6(3), 229-241.

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SUPPORT MODEL

SUPPORT MODEL

An Educational Developer (ED) met with all instructors prior to the start of the term to discuss the function of each room and potential teaching strategies as well as discuss the expectations they had for the space. They were also invited to be part of the assessment of the space. An ED attended the first class of the semester as well as periodic visits during the term to answer questions, discuss teaching strategies and address issues. Due to the timeline of construction more effort was required to train and support instructors through the first term. As instructors become more familiar with the room support shifted from understanding the room features and function to discussing changes in a strategies and maximizing the effectiveness of the room. It was clear that as the term progressed instructors were continuing to make changes in the course in response to the room.

In addition to an ED, ITServices provided on-site technical support for the first month of the term. This support was essential given the lack of time available to test the technology with the rooms prior to the start of term.

COURSE IN EACH ROOM

319	6 courses plus two tutorials
	ENGL 100 – tutorial – Introduction to Literary Study (English) FREN 327/427 - Le Cinéma aujourd'hui: Études thématiques (French Studies) FREN 444 – Travaux pratiques: stylistique et traduction (French Studies) GPHY 401 – Honours Seminar in Human Geography I (Geography) IDIS 150 - Introduction to Anatomy and Physiology (School of Nursing) MECH 455 - Computer Integrated Manufacturing (Mechanical and Materials Engineering) POLS 310 - Principles of Canadian Constitution (Political Studies) POLS 419 – Political Communication (Political Studies)
333	9 courses plus two tutorials
	CISC 226 – Game Design (School of Computing) CIVIL 250 – Tutorial – Hydraulics I (Civil Engineering) DEVS 330 - Technology and Development (Global Development Studies) ECON391 – Topics in Environmental Economics (Economics) FREN 327/427 - Le Cinéma aujourd'hui: Études thématiques (French Studies) HIST 416 - Material History in Canada (History) KNPE 367 - Fitness, the Body and Culture (Kinesiology/Physical Education) NURS 802 - Qualitative Methodology and Methods (School of Nursing) POLS 310 - Principles of Canadian Constitution (Political Studies) PSYC 397 - History of Modern Psychology (Psychology)
321	4 courses plus two tutorials
	APSC 200 – Engineering Design and Practice II (Faculty of Engineering and Applied Science) CISC/CMPE 320 - Fundamentals of Software Development (School of Computing) CISC 221 - Computer Architecture (School of Computing) CIVL 331 - Structural Design I (Civil Engineering) NURS 324 - Nursing - Principles and Applications of Nursing Research (School of Nursing) RELS 235 - Religion and Environment (Religious Studies)

OPEN HOUSE

Monday, December 9, 2013, 2:30pm - 4:00pm Ellis Hall, Room 319

Three new active learning classrooms have been constructed in Ellis Hall. The new classrooms are designed to facilitate interaction between students, to enable small groups of students to work collaboratively, and to allow groups to communicate with the rest of the class and their faculty. This workshop will allow participants to tour the three new active learning classrooms, consider the configuration and the technology available in each room, and discuss the opportunities, advantages and challenges of the teaching strategies that can be used in these spaces.






What do you think students expect to happen in this learning space?

- Group work-easy to move desks
- Breakout groups
- Peer instruction and group work

What challenges do you foresee teaching in this learning space?

- Spacing students
- Holding their attention
- Moving chairs
- Having everyone focus on something specific
- Getting furniture out of the way

What features of this room stand out for you?

- White boards
- Flexibility
- Movable desks
- Students could sit on floor
- Free movement

What teaching strategies can you see happening in this learning space?

- Spontaneous group formation
- Active learning activities
- Group projects
- Can form a circle
- Bell ringer type learning

If you were to build more active learning spaces, what should they look like?

- Different from standard types
- Integrate different types of technology
- 40-60 student group work room

Describe learning space in one word

- Bright, Open
- Relaxed, Free
- Well-lit
- Cheerful
- Chaotic, Cluttered
- Fun

3

RESEARCH AND METHODOLOGY

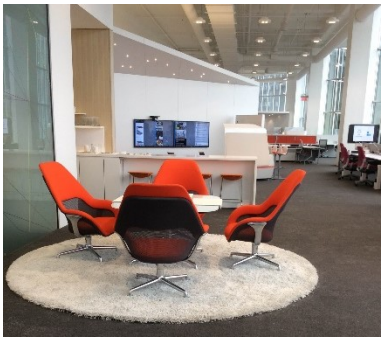
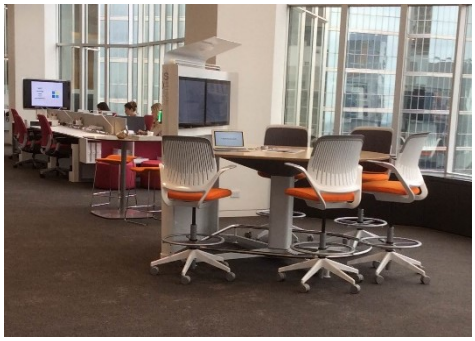
RESEARCH

One of the primary goals of redesigning classroom space in Ellis Hall is to evaluate how teaching spaces can facilitate changes in approaches to teaching and student learning. Over the course of the project Instructor and students that use the space will be asked to reflect on the use of the space and its functionality. Understanding how the design of these spaces and approaches to teaching affect the student experience and student learning will help inform decisions about future spaces here at Queen's.

The Centre for Teaching and Learning will, during the first year of the project, work with Instructors to determine an approach to evaluate the space and its influence on their approach to teaching and students learning. These may include focus groups, testimonials, teaching observations, questionnaires and surveys of students. All aspects of the research received ethical approval (see Appendix)



STEELSCASE VISIT (TORONTO)- MAY 14, 2014


Purpose: To view Steelscase facilitates to learn about active learning space designs and how other universities have implemented the similar designs as ones at Queen's University. During this visit, research on the success of active learning was emphasized and how the furniture and architecture of the room can change the dynamics of teaching and learning. Following the visit, the research team stayed in contact with Steelscase employees and gained resources for measures, classroom layout suggestions, and additional research other universities have conducted.

ASSESSMENT MODEL

- Midterm questionnaire about expectations and final survey for students about experience and comparison to traditional classroom
- Pre, midterm and final questionnaire for Instructors about experience and influence of space on teaching strategies
- Focus groups with students and Instructors
- CLASSE and SPQ for one course – comparison with the course taught in traditional classroom
- Study of group work and influence on actively open-mindedness.
- Comparison using videotaping analysis of individual sessions with the active learning classrooms and a traditional classroom to assess the activities of the students and instructor during class time.

STUDENT QUESTIONNAIRES

Midterm Survey

Instructors were sent a link on fluid survey to give to their students concerning their initial impressions of the space. The questions were:

1. What are you initial impressions of the space now that you have had the opportunity to take classes in this room?
2. Did the classroom configuration change you impressions or expectations of how learning was going to occur? Please explain.
3. Compared to other classrooms of similar size, how does this space compare.
4. Has this space enabled you to have unique learning experiences? Please explain.
5. Do you think you interact differently with your fellow classmates and professor because of this space? Please explain.
6. Does this classroom cause any obstacles to your learning? Please explain.
7. At this time do you have any other comments or suggestions?

End of the Term Survey

Two weeks before the end of the semester, students emailed directly from the research team a link for the end of the term survey. Closed ended quantitative questions were asked which were modified from other engagement surveys (e.g. CLASSE, Steelcase 2014, NSSE, Minnesota). See Appendix for full survey.

Open ended questions were:

1. What features of the Ellis Hall did you particularly like?
2. What could be improved?
3. Please describe one situation in which this room worked well for you.
4. Please describe one situation in which the room did not work well for you.
5. What are your overall thoughts about the Ellis Hall Active Learning Classrooms?

INSTRUCTOR QUESTIONNAIRES

Preterm Survey

Prior to the start of term each Instructor was sent a short questionnaire:

1. How did you hear about the Ellis Hall Active Learning Classrooms?
2. Why were you interested in this space? What features/technology/configuration were attractive to you?
3. What are your expectations for this space?
4. Do you expect the instructor and students interactions to be different in this space compared to other spaces?
5. Do you expect students' interactions to be different in this space compared to other spaces?
6. How do you plan on using the classroom? Will you be implementing any new teaching strategies because of this space? Which ones? Why have you chosen them?

Midterm Survey

Using Fluid Survey, Instructors were asked to answer the following questions:

1. What are you initial impressions of the space now that you have had the opportunity to teach in it? Did it meet your expectations? Please explain.
2. What, if anything, has surprised you about the space and how has it influenced your class. Please provide an example if possible.
3. Are there teaching/learning strategies that you have been able to use that you could not in other classrooms? Explain.
4. What has been the reaction of your students?
5. What challenges or concerns do you have?

End of the Term Survey

Similar to Fluid Survey given to students, instructors were asked a combination of quantitative and qualitative questions.

FOCUS GROUP FOR INSTRUCTOR AND STUDENTS

At the end of the winter semester, focus groups was conducted to obtain Instructor's experience of each of the rooms. The purpose of the focus groups were to determine the impact of the space on teaching and learning. Focus groups were videotaped and took place in each room 319, 333, and 321.

Questions focussed on the following aspects:

GENERAL EXPERIENCE

1. How would you describe your experience in the Ellis Hall room this semester? How would you compare it to teaching in a traditional room? What was it that made it different?
2. What were you able to do in these classrooms which you would have not been able in a traditional classroom?
3. Did you have any "aha" moments about teaching your course?
4. What do you take away from the experience of teaching in this room?

INFLUENCE ON TEACHING STRATEGIES BEFORE (as you planned) or DURING THE COURSE

1. How did the space in this room influence your teaching? Did you make any changes to your course that were inspired by this room, before or during class? What was it exactly that made you make these changes?

2. What features of the room did you find the most effective? How did you integrate them to your learning and teaching strategies? Could you give an example of an activity that worked particularly well?

STUDENT EXPERIENCE

1. How do you perceive the students' attitudes in this room? According to your experience, how would you compare their attitudes in this room compared to their attitudes in a traditional room? Could you give examples that come into mind that illustrate these attitudes? What was it exactly that made the students' attitude in this room different?

INFLUENCE BEYOND THESE ROOMS (on your approach or other courses)

1. If you were to go back in a traditional room, would you teach differently now that you had the experience of teaching in the room in Ellis Hall? What would you make different?
2. How has teaching in these rooms influenced your approach to teaching?

SUPPORT AND ADVICE TO OTHERS

1. When talking to colleagues about your experience in this room what do you tell them?
2. Imagine you are asked to coach an instructor as they were preparing to teach in this classroom. What advice would you give about a) course redesign b) teaching the course?
3. What do you know now that you wish you had known before teaching in this classroom?
4. How could we support you better initially and throughout the term?

STUDY PROCESS QUESTIONNAIRE (SPQ) AND CLASSE

The Study Process Questionnaire (R-SPQ-2F) (Biggs, 2001), which measures approaches to learning in higher education, was administered. The instrument included 20 items in two sub-scales evaluating the uses of a surface approach or deep approach to learning. A surface strategy would occur when a learner memorizes facts and accepts information for the purpose of an exam; long-term retention and understanding is unlikely. A deep approach occurs when the learner analyses new information and ideas and links these to previous knowledge with the goal of long-term retention. In this survey, students respond to questions about their approach and motivation for learning by rating their level of agreement with each item on a five-point scale. In order to determine the level of each approach to learning that a student uses, a cumulative score for each strategy can then be calculated.

CLASSE is a version of the National Survey of Student Engagement (NSSE) that is appropriate for course-specific studies. NSSE measures institutional practices and student behaviours across numerous dimensions of the student experience that are known to be associated with positive learning outcomes. CLASSE was developed to evaluate the effects of classroom-based interventions on student engagement by examining a complex mix of factors related to course content and delivery, curriculum structure, personal relationships and the integration of academic and social experiences (Smallwood & Ouimet, 2009). CLASSE as a measure of course-level effects has been shown to be an effective measurement tool for those interventions able to use it (Conway, 2010).

ACTIVELY OPEN-MINDED THINKING (AOT)

The AOT questionnaire by Stanovich and West (1997) is composed of multiple subcategories including: flexible thinking, openness to ideas, openness to values, absolutism, dogmatism, and categorical thinking, which together provide a measurement for open-minded thinking. Open-minded thinking means having the tendency to reflect on thinking rather than be impulsive, to actively look for and process information that contradicts one's belief, and be willing to change one's mind (Stanovich & West, 1997). Participants would rate their agreement with statements such as, "Right and wrong never change"; "I have a lot of intellectual curiosity". There are 41 questions, and students rate their responses on a scale from 1 (disagree strongly) -6 (agree strongly). Students were given the AOT Scale at the beginning and end of the semester.

VIDEOTAPING SESSIONS

Over the term, each course was videotaped at least two times to capture the dynamics of the lesson. The video footage was then analyzed using a modified version of the tool used in the CATI Active Learning Spaces Project at University of Minnesota. Such a video analysis tool allows researcher to document and measure the activity of students and instructors during a teaching session. The development and implementation of our research tool was initial done with analysis of three IDIS 150 tutorial sessions. See Appendix for a version of the tool used for video analysis.

4

RESULTS & MAIN FINDINGS

STUDENTS' RESULTS

Midterm Student Survey: Student Impressions

On February 6, 2014, Instructors were sent a link on fluid survey to give to their students concerning their initial impressions of the space. The questions were: **What are you initial impressions of the space now that you have had the opportunity to take classes in this room? Did the classroom configuration change you impressions or expectations of how learning was going to occur? Please explain. Compared to other classrooms of similar size, how does this space compare. Has this space enabled you to have unique learning experiences? Please explain. Do you think you interact differently with your fellow classmates and professor because of this space? Please explain. Does this classroom cause any obstacles to your learning? Please explain. At this time do you have any other comments or suggestions?**

The data was first sorted by question, however many of the answers were repetitive or fit more with another question, therefore a new categorization of the data was needed. Based on the literature, what other universities have done, focus groups and casual discussions with students, six themes were created to sort the data. Community-connections, ways of learning, participation-involvement, comfort-wellbeing, increasing confidence, and increase understanding on content. The quotes were compiled together by room, and three Research Assistants (RAs) coded the data for one room separately. The coded data was compared and discrepancies were discussed including combining and eliminating themes. The data was further organized by features of the room to allow for more consistent coding, for instance in 319 the categorized features were: chairs, whiteboards, chairs and whiteboards, room as a whole, and pedagogy (no mention of specific features, only teaching and learning practices). Responses that simply listed the features without further explanation were eliminated. Also responses commenting on the heating of the room were removed as well because the issue has been dealt with. The agreed upon themes were: community-connections, ways of learning, participation-involvement, and comfort-wellbeing, and for each theme the RAs agreed on key terms associated the respective theme.

1. **Community-connections:** use of the term "we", "eye contact", "sightlines", "community", "connections", "sharing"

2. **Ways of learning:** focus on *tasks*, "multiple ways of learning", talked about different activities that led to same goal of learning, teaching strategies, learning strategies, "group discussion", "group work", "presenting", "dynamic", idea of choice

3. **Participation-involvement:** anything led to them being active, reacting to others, "giving answers", "talking", "engagement"

4. **Comfort-wellbeing:** focus on *feelings*, "nice", " clean", "inviting", "distracting", "awkward", "ease of movement", "freedom of learning", "creative"

It was also suggested by one RA to flag responses containing students' perceptions of their Instructors's usage of the room in order to help with future training sessions. The data for 319 was recoded again using the new themes and format with over 90% reliability among coders. The rest of the rooms including the end of term surveys were distributed among the RAs to code separately. Following the coding, the RAs discussed any problems with coding and together came up with an agreed upon code.

ROOM 319



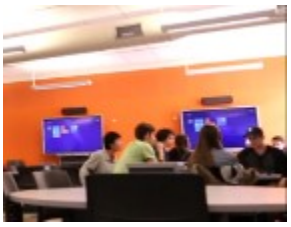
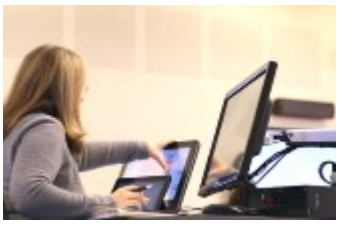
Comfort-wellbeing was the most frequently occurring theme with responses clearly divided on whether students liked or disliked the room and its features. The following quotes were representative of the sample's responses.

	THEME
	COMFORT- WELLBEING (31% of responses)
Positive	 • It is a pleasant environment to be in. I like the carpeted floor (especially the carpeted floor), the good lighting and the abundance of white boards. It is clear that the desk/chair apparatus is of good quality and comfortable. Excellent • It is just simply a nicer space to be in. It is a quieter room (carpets) with few distractions that make it nicer to learn in. Even though we do not take full advantage of it, the learning is still improved. • Definitely an improvement over the regular classroom with just tables and chairs! Thank you! • It's great that you're trying to develop better spaces for learning at university ... it doesn't happen enough. Keep up the good work!
Negative	 • The desks are a little difficult to use (bit small), but I like the way they move. Seems like the class is a bit large for the purpose it should be being used for. Would be nice if it was a bit more cozy • Sometimes the desks can be difficult to move around and then I bump into one of my classmates while they are trying to focus. I think it's just a matter of getting used to them! It can be hot in the room at times, making it uncomfortable. • Sometimes I find there are almost too many desks in there and it is difficult to navigate around but for the most part it doesn't have an impact on my learning.
	WAYS OF LEARNING (21% of responses)
Positive	 • There is lots of natural light from the windows, and the whiteboards that circle the room give lots of space to write and are easily seen by everyone because of the swivel chairs. It's easier to move the seats around the room than it is to move tables and chairs, which makes it easier for tutorial group work. • The room set up nice for larger group discussions as well as smaller group discussions. The use of the white-boards around the classroom was also use full.

	• We do more group work and writing down ideas now, which I like. • Compared to lectures especially, it is nice to have more of an integrated learning experience that is more engaging. • Lots of whiteboard space which is nice to be able to use and keep ideas up around the room rather than having to constantly erase. Also nice to be able to move around with the desks and form groups, circles, etc... rather quickly. • It definitely allows for more variety in the classroom. It's easier to see the boards and everyone else with swivel chairs.
Negative	N.A
	COMMUNITY –CONNECTIONS (8% of responses)
Positive	 • I just like how our class feels more together, versus sitting in seats that are immobile and facing the professor. It gives us the opportunity to engage with our peers more with what we are learning. • I think I ask more questions and am more focused in class because I feel more connected to everyone • The room has not fundamentally altered the way the content is delivered, that requires a professor who is willing to make dramatic change. The room has however made the professor feel closer to the class (same floor level, not rows of desks, less defined 'front').
Negative	N.A
	Participation- involvement (19% of responses)
Positive	 • I have had better discussions within smaller groups of people because we can all see each other and each have our own space to display our ideas. • I think it's easier to have your voice heard when everyone can see who has their hand raised and people are reacting to what others are saying. We've been doing a lot of working in small groups and answering specific questions and then sharing those answers on the whiteboards with the rest of the class. • It makes it easier to have discussions and share thoughts on the whiteboards.
Negative	N.A
	Students suggestion for Instructors (12% of responses)
	• Host training sessions for the professors so that they can make use of the space. It is a great place to be, with lots of potential. • Perhaps a tutorial on how our T.A. can use the mic at a very low volume. She is difficult to hear when she is trying to cut off a discussion and every time she goes to use the mic there is a lot of feedback. • My prof had difficulty closing the door the other day when people were being loud in the hallway. Not sure if that was a problem with the door or us just not knowing how to close it. • In the classroom I can see the opportunity to change the learning style, perhaps to one of more discussion and interaction, but the professor is not used to that style.

Summary: High expectations for lots of group work, dynamic course full of movement, high interaction with peers, using whiteboard to share ideas, and not lecturing.

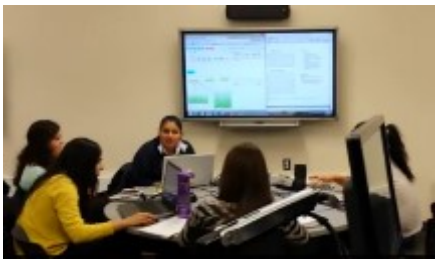
ROOM 333


Comfort –wellbeing was the most frequently occurring theme. The following quotes were representative of the sample's responses.

	THEME
	COMFORT- WELLBEING (30% of responses)
Positive	 • It's really nice makes classes more interactive and good for presentations. • Very modern, technology-friendly, flexible for group work. • The class seems very large, allowing space for each group. Most classes of roughly that size would have jammed more seats into the space, however the crowding would be less conducive to active learning. • Fancy and high-tech • I mostly like the class because it offers comforts that other classes don't. That is, it is always warm and sunny, there is carpet and decent lighting, and there is fresh paint. • The classroom is just overall more comfortable to be in over other rooms. There is lots of space, the room is clean, new and free of odd smells that other classrooms sometimes have like dirty carpet etc. The lighting is nice. The tables and chairs are comfortable. The technology that is available to us is also very great. • It seemed quite complicated and confusing at first, but after having a class to navigate and learn about the technology and how to use it, it seems much less intimidating. • I feel more comfortable in this setting because of the collaboration aspect. • The room is a similar size to a lot of the learning space in the ILC for engineers, but this room is more spread out and feels more open. I like the layout of the circular desks together vs. being in rows facing the centre. You just feel more free in this classroom.
Negative	• Seems to be useful. However most people have Mac's in the class so we haven't been able to take full advantage of the technology of the smart boards. • I think that all of the technical problems and testing on our class to see if it is a good educational tool has hindered my studies. I wish we could just focus on the material we were learning. • Too many "T.V.'s", unnecessary, and I don't like that the teacher's podium is in the center of the room. • Have not used the technology that much.

	WAYS OF LEARNING (30% of responses)
Positive	 • I like being able to use the technology, it makes our group work easier than it would be crowding all around one person's laptop • I like all of the technology, windows 8 is also quite cool. The table layout of the room allows for better group work than a lecture hall would. • I think if we took advantage of the technology more, it would have had a greater impact on my learning experience. I really enjoy how each group is able to work on their own project then display it to the rest of the groups. This is something I have never experienced before. • I knew this class was going to be mostly group work, the configuration simply made it easier to interact with my group. • It has allowed the professor to do more hands on teaching rather than just having lectures • As a class, we were able to do much more effective group work, which is not something we typically get to take advantage of, despite how necessary it is in a language course. Individual presentations were made easier. It was easier to engage in class discussions 1 activities because each table had a screen at their table - proximity to the prof was not necessary. It was an inclusive environment and conducive to sharing and collaborating ideas- definitely enhanced our learning experience. • The circular seating arrangement (both within groups and around the classroom) is conducive of independent work. There is less "what are we supposed to be doing" moments because we are not staring at the front of a classroom which should be holding an authority figure who dictates the work.
Negative	• I have a hard time seeing the screens if I'm sitting in the chair closest to it. I really crane my neck. The technology is not flawless and we spend a fair amount of time trying to figure it out. When we do presentations from the prof (more lecture style) I find the multiple screens distracting.
	COMMUNITY –CONNECTIONS (18% of responses)
Positive	 • I believe that the interactions with classmates and the professor is different in this type of classroom. More interactions occur with classmates and this encourages more of a cooperative approach. This contrasts the typical interaction that can often be more competitive with other classmates. Interactions with the professor are quite different in that this setting has the professor as more of a facilitator of discussions and students' active learning. • It has helped me engage more with the material I'm learning because it allows for a closer interaction with the prof and other students. There is also lots of space to work and I feel much less cramped. • I am a very shy person and find that sometimes a whole semester could go by and I wouldn't make any friends in a class. I made friends easily on the first day. This helped me to be more comfortable and outgoing. This in turn helped my work and I am doing better in this seminar then I have ever done in my 3 years at Queens. • Having the teacher in the middle eliminates the power dynamic that is present in most other classrooms. • As a Con-Ed student I really appreciate and support classrooms like this. The space and organization of the room is fit perfectly for better learning opportunities. I like how the teacher teaches from the middle of the room...giving the atmosphere of collective learning. The software is amazing for group projects and collective assignments. It made the

	experience of group work a little less "hellish." Everyone in the group could see the project and add in their comments...no one had the chance to "be left out" and therefore EVERYONE had to participate. • I did my first year at the castle, and while they don't have technologies like this in those classrooms. The professors there have the same mentality that these classrooms have been designed with. That year at the castle was the best learning experience I've ever had but when I came to Queens in second year I was disheartened by the mentality of some classrooms I was in. It makes me happy to see changes like this. Learning should be fun, collective and meaningful
Negative	N.A
	Participation- involvement (18% of responses)
Positive	 • The pod tables encourage interaction between small groups, and the ease with which you can present from your laptop or mobile device means you can make presentations on the fly. • Yes, the space lets me present group work easily. Because each group has their own screen and can interact with the screen, it keeps you focused for longer and as a result we can interact more in class. • I interact more with my fellow classmates because of the space and the structure of the course. • The circle tables made it easier to talk as a group about class topics • Being able to discuss course material in smaller groups was better personally, because I have difficulty speaking in front of a large class. • We are all facing each other and communication is open between us. • My reports have improved due to discussion with other classmates - I feel as though I work better in a group than I ever have! • The setting is much more relaxed and less intimidating. I feel comfortable asking questions to both the Professor and other students.
Negative	• I cannot interact at all with my professor as he is predominately only speaking to half of the class due to the nature of the classroom setup.
	Students suggestion for Instructors (4% of responses)
Technology	• More training needed in regards to how to use the technology and better tutorials on how to use and what they are capable of. • Teachers in these classrooms should have prior training on how to work the electronic features well instead of just not using them • Once everyone knows how to use the technology, it will be helpful. Until then, the classroom actually hinders learning. • The technological abilities of the room are interesting, though I don't believe we have used them to their full capacity yet. The group orientation of the desks does seem to allow for more discussion on topics than is typical for university courses. • These classrooms have the potential to do that if professors are trained how to use them properly. • The space is interesting-it could be helpful for certain classes, however for classes that do not use technology on a regular basis, it was a waste of time and resources. The majority of our class was spent trying to figure out the technology and in the end we did not use it very often or for good reasons. Classes that require document sharing etc. could utilize the room much better. The setup is nice and the idea is great.

Summary: High expectation on using technology in the room and having lots of collaborative activities. The biggest issues were technology glitches and having no focal point in the room causing the Instructors back to be facing some students at all times.

ROOM 321



	THEME
	COMFORT- WELLBEING (36% of responses)
Positive	 • For the tuition we pay everyone should get to use rooms like these more often. • I generally liked the room and I hope I will have opportunities to use more of its facilities in the future. • Beautiful room, nice new screens, chords that worked with computers. • It is nice and new. There are lots of cool technological advantages, with easy to view monitors. • It fits a lot of people very comfortably. • An outstanding space to work in. The learning pods have an excellent set up. • Comfortable face-to-face configuration allowed easy communication. Also, everyone had their own comfortable space to spread out in. • It is just very modern and successful at linking all the parties in the room. • Space is not cramped and everything in space is new and functional. Lots of natural light and plenty of space to work with group.
Negative	• I like the TV screens, but I am worried that it detracts from the actual content of the course--I feel like I am not absorbing as much information because of all of the distractions. • Initially the space looked very interesting, however we were unable to use most of it and the Instructors didn't appear to be completely knowledgeable of it. • The only awkward thing is you can't fully push in your chair due to the table support.
	WAYS OF LEARNING (26% of responses)
Positive	 • It's good for group work and posting material for all groups to see. • Wow, this is a great room for interactive style classes. • Very effective for presentations and working with groups. • Very nice and well designed. It has a lot of features that enhance the learning in this room such as the microphones on the desk. • It gave me the impression that there would be more technology used when teaching and getting points across.

Negative	• The space is well set up for team-based learning but absolutely awful for lectures. Half the class is not facing the lecturer, which makes it very difficult to stay engaged with the material. • The classroom itself isn't the cause of my learning obstacles, it is the format of the class and how the professor believes that group work and individual studying is an appropriate substitute for formal teaching and lectures. It isn't. • Sometimes it was hard to present or listen to a presenter because there was no "front" of the class.
	COMMUNITY –CONNECTIONS (23% of responses)
Positive	• Team wise we are able to communicate and see everyone better.  • Interaction is mostly with team members in each pod instead of with the Instructors, which makes sense for this course. • More personal and interactive than a normal classroom. • It creates a more intimate atmosphere for inter- group discussions • It made learning a lot more integrated with the entire class. You could discuss a lot more with other people. It was also helpful for the entire team to be able to look at the same screen. • I felt the open space would be better for learning as it is comfortable and bright with professors on the same level
Negative	• Lack of flat table inhibits group collaboration. • Generally a room of this size would host a lot more people which take away from one on one interactions with the prof and TA's
	PARTICIPATION- INVOLVEMENT (13% of responses)
Positive	• I felt that the room had a better interaction system with the microphones at each table. It was easy to talk as a group at the group tables. Info on the screens was useful because it was easy to see and we didn't all have to look at a general screen in the middle of the room. • The class is smaller than a lecture hall, but larger than a tutorial room, so it is the perfect size and everyone can hear when someone is speaking. • The microphones built into the desks and speakers make it easier to communicate across a large room.
Negative	• It is also hard to pay attention to the professor if you are sitting in a position where your back is facing them.
	STUDENTS SUGGESTION FOR INSTRUCTORS (2% of responses)
	• Encourage Instructors to plan their courses such that activities take advantage of the technology in the room. I would also suggest that Instructors consider not having activities that are marked because they make people lose sight of the creative and collaborative potential that the room has. • More rooms built like this but if the class requires the student to look at the Instructors for periods of time, then do not make lecture classes in rooms like this. But for group work and the tutorial sessions, this room works great. • The only issue there seems to be is the teacher (and a guest lecturer) where in need of a chalk board or something.

Summary: Students expected to use the technology and to have lots of team based learning activities. Again, having a single focal point for lecturing was an issue in this room, as well as Instructors limited knowledge of using the technology to its full potential.

END OF TERM STUDENT SURVEY: QUALITATIVE ANALYSIS

Two weeks before the end of the semester, students emailed directly from the research team a link for the end of the term survey. The questions included: **What features of the Ellis Hall did you particularly like? What could be improved? Please describe one situation in which this room worked well for you. Please describe one situation in which the room did not work well for you. What are your overall thoughts about the Ellis Hall Active Learning Classrooms?** The end of the term results were coded the same way the midterm results were coded. See midterm results for details on coding process.

ROOM 319



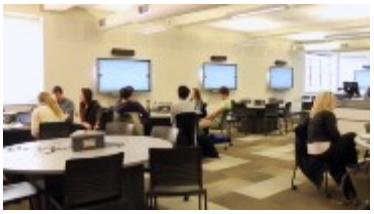
	THEME
	COMFORT- WELLBEING (36% of responses)
Positive	 • It's nice to be able to move into a circle but then be able to turn back to the board without straining your neck • It was a nice room and a nice change from a regular classroom. • Comfortable, open space, modern classroom • Comfortable environment. encourages group discussion • It is a nice learning environment, and great view out of the window at campus when you need a break from focusing! • Using the movable desks to move into small groups for discussion worked well. Rather than having to get up and collect all your belongings, you could slide together, keeping your work in front of you. Having a permanent table space is much more convenient than trying to write on your lap (which sometimes happens when the long table orientation doesn't fit with the number of groups in traditional classrooms)
Negative	• The rolling chairs are the worst idea ever. They are uncomfortable, awkward, and squeaky. They always get pushed into one corner, then the first students to arrive sit on the ones around the edges, which means you have shove/squeeze your way to a seat, which then may be a pain to get facing the right way. • I didn't really enjoy the chair-desk combos. I prefer regular detached chairs and desks in general. • There were many more chairs than people in our seminar and this got in the way of sitting in large group settings. There were often many extra chairs that became awkward to gather around and move around the room. • Organization of the chairs throughout the classroom very disorganized and distracting

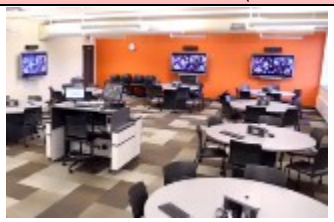
	WAYS OF LEARNING (30% of responses)
Positive	 • When discussing different topics and writing our ideas all over the class room on the white boards was very helpful. They TA wrote questions down around the class room and we split up into groups and wrote our ideas own at each "station" • More active participation, variety of activities kept class exciting and fresh, I got to work with more people because of desks • I really liked it. I thought it was a great new design and made it easier to work with our groups. • Discussing in groups in a circle worked well • Group work in small groups - it was really easy to focus on only our project without getting distracted by others. • I would take another seminar in this style of room because there are many opportunities for small group presentations and discussion. There were few enough people that it did not become overwhelming and suited the course topic, which was communication. • It was definitely more flexible than a traditional room allowing for different teaching styles to be implemented.
Negative	• I prefer traditional style • It was not good for lectures. If there was a PowerPoint there was nowhere to focus. The Instructors stood in the middle but we were all looking in different directions to see PowerPoints. One central focus area for this type of learning would have been better. • We really only had lectures in the room. No group work or activities. • I hate group work
	COMMUNITY –CONNECTIONS (11% of responses)
Positive	 • The movable desks were also great since they reduced the feeling of having a barrier between you and the Instructors or other students (ie. the traditional long table) • The no desk between the students and prof created a more personal discussion • The desks that swivel helped me see everyone • It's a great environment! Allowed us to make new friends, and I always worked with different people on different days.
Negative	N.A.
	Participation- involvement (12% of responses)
Positive	 • Make it easier for the prof to see if your hand is up. • It made class more interactive and more fun to be in. • The white boards allowed us to put our answers on the board and then compare with others. The prof walked around so we could ask him questions while he was at our board rather than asking them in front of everyone. • The ability to do group work easily and be more engaged in discussion by bringing all of our chairs/desks together to form a large group or smaller groups. • The room worked well when we were asked to translate paragraphs from English to French on the white boards. We did this in groups and could bounce ideas back and forth, then put them on the board, then compare to other groups ideas.

	• The large amount of whiteboard space made it much more likely for people to discuss and communicate their point on the board for all to see. There was more freedom in learning from this perspective. It was also nice to have so many windows in the room that did not make it feel like you were trapped in a small box.
Negative	• When asking questions or presenting it is hard to look at the people presenting in some areas of the classroom. • If the groups are too big then you can't get close to one another because you are creating a weird shape.
	Multiple themes
	 • During activities, I was able to engage with classmates more since we could easily move around the classroom depending if we were using the whiteboards, sitting in groups, presenting to each other, etc. Where as in a traditional lecture hall/classroom, working in groups are not as accessible. • The room worked well for encouraging presentations and small group activities. The high amount of whiteboard space allowed for some people to more clearly communicate their thoughts in more forms than just traditional writing. • I really enjoyed my learning experience in that classroom! My faculty knew exactly how to use the classroom to its full potential so we could all learn together. More of these classrooms need to become evident, as it encourages group discussion and helps you to become comfortable in presenting and sharing your thoughts. • I have spent the last 4 years with the majority of my courses in the kinesiology building (which was new when I arrived), and the Ellis classroom definitely facilitates more discussion and participation, making the learning environment more welcoming. • I think they offer a very energizing and fresh take on class rooms, but they are not helpful for traditional styles of teaching. When there were whole group discussions it became difficult to find a focal point in the room to gather around and often it became difficult for everyone to have a chance to participate. Sometimes the professor lost control of the discussion due to not holding a single space in the room. This is not bad in all cases, but sometimes the room felt too unstructured.
	Students suggestion for Instructors (11% of responses)
	• I feel as though being a RELS major there is a limited number of courses in which this classroom setup would be beneficial. Perhaps a methods class in which class discussion was the sole goal. • I think they are great for certain types of classes where you are working with other students on a regular basis. Not great for traditional classroom style learning • The sound system could be improved, or maybe our faculty just didn't use it properly? There was a lot of feedback with the microphone. • It's a good concept but the professors/faculty need to use the resources to their full potential for it to truly be effective.

ROOM 333





	THEME
	COMFORT- WELLBEING (40% of responses)
Positive	 • Classroom of the future! Classrooms should already be like this. • The technology was awesome • The computers attached to the tables helped when I didn't bring my laptop. • I like the circular tables and the individual monitors for each table. The electrical outlets at the middle of each table are extremely convenient as well. • The orange wall! It really energized the space. • The classroom is very welcoming, so I like working there. • By far the best classroom experience I've had at Queen's • It is a great thing that should be made permanent here at Queen's! • It's AMAZING!! Keep me in that room and I will always be in class • Very good addition to the Queen's classroom options. A step towards modernization. • Best. Idea. Ever. Seriously this is how everything (eng, computer science, not arts) should be taught. • This is a new way of teaching and for once, students like it
Negative	• I did not feel comfortable using the technology myself. Sometimes when we were presenting to other groups, it was hard to know where to look because of the layout of the classroom. • HVAC is hit and miss, chairs are kind of uncomfortable • Smoother transition between collaboration and presentation mode • Had to bend my head back uncomfortably to see the tv
	WAYS OF LEARNING (28% of responses)
Positive	 • Presentations worked well with big screen and mics worked great! • It's a good opportunity for students to take more group work oriented classes in an environment which facilitates that style of learning. • With small group presentation it was easy to go from group to group, and to work on the presentation • It allows students to build presentations in the environment they will present in • The rooms are so cool, I learn well with a group, and the Ellis Rooms really encourage/help facilitate group discussions • The atmosphere and set up was perfect for group projects and collaborations. The atmosphere energized me and helped me find the drive to study • I like the room, it's nice/clean/new and the technology enables options for professors to deliver the material differently

	• I attend a tutorial in this classroom and the setup is fantastic for tutorials. You are able to work in groups for in-class assignments and take-home problem sets a lot easier than in a regular classroom.
Negative	• It was too technological Kind of distracted from the learning process. More room for technical difficulties to occur.
	COMMUNITY –CONNECTIONS (7% of responses)
Positive	 • Round table set up allowed me to actually make friends in class. It removes the sense of competition, we're already all under enough pressure as it is and this set up makes other students your partners rather than a competitor • I liked the pod style learning. It was nice that we had the same seating arrangement with our group every week. It also made it easy for TAs to walk around and speak with every group. It was also easy for us to share our ideas on the big screen. • Everyone is right there for the entire course so you get quite comfortable with one another.
Negative	N.A.
	PARTICIPATION- INVOLVEMENT (19% of responses)
Positive	 • Showing the video game our group programmed to the class - everyone could see it on their screens • It is a comfy and enjoyable class environment great for tutorials because it is so easy to move around and ask questions as opposed to standard classroom where a TA cannot get to some of the seats • It forced us to pay attention because I didn't feel like I was at the back of the room • TVs displayed each groups work so I understood better • For tutorials, this classroom is very helpful because it is easier to converse with group members.
Negative	N.A.
	STUDENTS SUGGESTION FOR INSTRUCTORS (6% of responses)
	 • I think it is an awesome space. But if the professor is not tech savvy it will be awful again. • The atmosphere is incredible. If the prof understands how to use the room to engage students only good things can happen • Not having courses there with professors that do not have the technical ability to use the room. Professor did not use the room for its intended use. The classroom seems great for science courses and engineering/computing. However, it is important that the faculty knows how to do it. • Awkward to stand in middle since you always have your back to someone • Worked fine for my class, wasn't necessarily needed for the class though. Probably would have been better if I was in a more hands on, technical class. • A nice concept if used to greater extent. Do faculty have the capacity/desire to utilize the technology?

ROOM 321



	THEME
	COMFORT- WELLBEING (33% of responses)
Positive	 • I love them, it's too bad I only got them for one semester. • It was easier to see the display screen at my table than if it's projected at the front of a lecture hall. • The monitors at the tables were very useful. As a student that wears glasses it made it a lot easier to see the Prof's PowerPoints. • The dual screens with the compatibility of attaching your HDMI cord to it is amazing. • Being able to face my team members when discussing our project. Very comfortable chairs. • Great. Study rooms and work rooms around campus should have similar designs and resources available. Working out of class in these rooms proved to be my most productive work sessions.
Negative	• If technology continued to crash then it would just be frustrating having to work in the classroom. • I did not like the seating arrangement. • Backpack hooks or places for bags. Straps were getting twisted around chairs.
	WAYS OF LEARNING (28% of responses)
Positive	 •It was great to use it during design projects to be able to show other group members what I was working on. •I thought the circular tables were great and conductive to teamwork. •Able to have group discussion with ease, no shuffling around or people going to the hall. •The group oriented design was great. I learn much better in an interactive environment and struggle not to zone out in regular lectures.
Negative	• Allow for an individual's computer to override the faculty's screen. There were a number of times when it wasn't necessary to have both screens at a table in 321 display the faculty's content and being able to use a larger screen than a laptop would have been useful. • The room is bad for theoretical courses. Would only take it in the classroom if there was considerable group work during the class time! Or the need to break out into small groups.

	COMMUNITY –CONNECTIONS (20% of responses)
Positive	 • I love the small group tables, you definitely get to actually talk to people and make friends more easily, it's funny how often you take huge classes with hundreds of students and never talk to anyone when you're in large lecture halls. • It made me feel like a part of the class, rather than sitting in a room and watching my professor speak. I felt that I was part of the class. • I enjoyed the community based learning it evoked. • Meeting as a group to organize our coding project was greatly facilitated by being able to connect our computers to the monitors at each island.
Negative	N.A.
	PARTICIPATION- INVOLVEMENT (15% of responses)
Positive	 • Especially for smaller group discussions the Ellis classroom was nice because we were separated into small groups by table. Since everyone pretty much stayed in the same seats the entire semester you really got to know the people at your table, making the atmosphere more comfortable and easy to participate in discussions. • Increases collaboration between students and allows help from peers for struggling students. • I definitely got a lot more out of the class than I would have in a lecture hall, and I went to class more often and stayed awake/paid more attention. • I learned a lot in this class and I felt accountable to my teammates to learn the material so I worked a lot harder on my own time. • During group projects, it was nice to be able to have enough workspace where we were seated. Everyone could see each other and talk to one another without any communication barriers.
Negative	N.A.
	STUDENTS SUGGESTION FOR INSTRUCTORS (4% of responses)
	• Maybe if you fix the technological issues, however I don't think this one helps anyone when a prof is lecturing and walking around the room. • Lectures are horrible in this room. I would suggest having one of the three classes a week in an actual lecture hall (to learn the material), and the other two in an Ellis room (to practice/engage with the material). • I don't know if you met with the prof, but that could have been helpful to explain what types of activities would enhance the experience (prior to the course starting). • Make a projector at the front of the room also, because if you are at the ends of the table the screens are hard to see. I could not follow the Professor because my back was always to him, so it made me less interested in the course • Training the TAs to be able to effectively use the equipment if wanted (such as the speaker system, etc.).

END OF TERM STUDENT SURVEY: QUANTATITIVE RESULTS

The following is a summary of the main findings from the qualitative elements of our end of term survey. The number in brackets following the room represent the number of respondents. This represents response rates of 30%, 31% and 20% respectively.

This Ellis classroom:	319 (55)	333 (84)	321 (72)
	% that agree or strongly agree		
Promotes discussion	79.3	86.9	88.2
Facilitates multiple types of learning	71.7	80.1	80.9
Helps me develop confidence in working in small groups	69.8	78.6	85.3
Offers a physically comfortable learning environment	71.7	82.1	72
Helps me develop connections with my classmates	81.1	79.7	91.2
Helps develop a sense of community	74	76.6	80.4

Compared to traditional classrooms of similar size:	319 (55)	333 (84)	321 (72)
	% more than traditional		
Allowed the work of a group of students to be displayed or projected to the whole	76	93.6	78.2
Allowed for in-class activities which required students to explain course ideas or concepts to other students	58	82.3	77.8
Offered a physically comfortable learning environment	66	77.2	69.1
Helped me work with other students on projects during class	72	83.5	89.1

Overall:	319 (55)	333 (84)	321 (72)
	% that agree or strongly agree		
Taking a course in Ellis Hall was better than in a traditional classroom	63.2	75.9	76.4
My learning was enhanced by being in Ellis Hall	53.1	72.2	67.3
The in-class learning activities for the course were enhances by features of the classroom	71.4	84.8	81.4
Would you want to take another course in this Ellis Hall classroom (% yes)	80.4	93.3	84.9

INSTRUCTORS RESULTS

INITIAL MEETING

The research team met with each Instructor for 20-30 minutes in the Fall term (October- November) introducing them to the Active Learning Classrooms via website images because the classrooms were still under construction at this point, and discussed whether the Instructors and their course layout would be suitable for setting. Instructors talked about their needs and wants in the ideal classroom, and in most cases the ALC offered these features that traditional classrooms could not. Through this meeting, 4 categories of Instructors were identified:

1) New Instructors who are teaching courses for the first time
GPHY 401; CISC 226

2) Experienced Faculty who have taught course before that had active learning but now are able to do it in more appropriate space
CISC320; CISC 221; CIVL 331; HIST 416; ENG 100; APSC 200/293; DEV 330

3) Experienced faculty who are designing a new course with the space in mind
PSYC 397; FREN 444; FREN 327/427; POLS 310; KNPE 367

4) Experienced faculty who did not change design, taught in traditional approach (lecturing)

MECH 455; RELS 235

INITIAL IMPRESSIONS QUESTIONNAIRE

Three weeks into the Winter term (January 21, 2014), Instructors were asked about their experiences in using the new rooms.

Compared to other classrooms of similar size, how does this space compare?

	319	333	321
The same	0	1	0
Better	5	4	5

Did any learning or teaching/learning opportunities just naturally occur that you did not plan?

	319	333	321
No	3	4	2
Yes	2	1	3

Open ended responses: The following are representative quotes from Instructors in the classrooms.

1)New Instructors
"The amount of whiteboard space I expected, flexibility in configuring chairs in the room, first-rate, easy to use technology - I'm so pleased to have ZERO problems so far"; "Time management is always a challenge for me (getting the whiteboards erased for the next class, finishing no time), but that's nothing to do with the classroom. I need to look into my own remote control for switching my PowerPoint presentations. At the moment, I have to

sit in the same spot in our circle each class because I need to be close to the desk to switch slides frequently. So even in our circle configuration I am creating a 'head' of the circle. I need a remote so I can sit in different areas and not reinforce conventional student-faculty relationship."--- Faculty in 319

"I generally like it. Layout seems to foster more discussion than traditional lecture room"; "[A challenge has been to] to address all students when in faculty mode."—Faculty in 333

2)Experienced faculty who have taught using Active Learning strategies

"Exceeded my expectations. My students have responded quite positively to the space and how I have encouraged them to use it/be in it"; "Personally, being in this classroom has encouraged me to think more critically about what active learning is, how I can use to increase my students' level of engagement and attention, and also just how important physical space is when it comes to promoting certain activities and ways of learning." *—Faculty in 319*

"Very good. It is what I was hoping for in terms of room arrangement"; "Perfect for my class"; "The students are even more engaged that I hoped. I have to make sure they are listening to me, because they are so engaged in group discussions."*—Faculty in 333*

"This exceeded [my expectations]"; "Nice open space making it much more convenient and pleasant to run tutorials"; "The room is great, but until increasing class time to 90 minutes from 50, activity time is too short." *— Faculty in 321*

3) Experienced faculty who designed course with new space in mind

"Way better [than traditional lecture halls]! It is way more adapted to group work"; "For the most part the rooms met my expectations. 319 is a bit tougher to work with and set up due to the lack of time between my class and other classes. It also has a tendency to get a bit cluttered with the extra seats. Beyond this, things are good"; "319 has allowed for flexible and changing group work within a single session while also allowing for the room to be oriented appropriate for presentations. Room 333 has allowed for a group project focus and an ability for students to exchange and critique each other's work that would not be possible in other rooms." – *Faculty in both 319 and 333*

"The class reconfigures itself very smoothly. The writing on the large whiteboard space is even more useful than I expected, and we're using smartphones to capture materials, mail them to me and then discuss them next time with my comments on them."*—Faculty in 319*

"In terms of facilitating discussion – yes [it exceeded my expectations]. And there are certainly things we can do with the screens -- mark up text, edit together, etc." – *Faculty in 333*

4) Experienced faculty who did not change design, taught in traditional approach (lecturing)

"It feels new & creates a better environment for the students"; "My first lecture was with PowerPoint & I was not happy with the podium being aimed at the adjacent wall, not at the students. I still think this is not ideal arrangement. Subsequent lectures have been with the overhead transparency projector. This worked fine. There were a few times when the chairs were arranged in a circle but the students dealt with that easily. One issue is that the students are not as tightly packed as they would be in a regular classroom and so while my class size is on the smaller side (28), many are far away from the screen" – *Faculty in 319*

"It exceeded my expectations. I've been able to bring in more visual and audio material into the lectures because the technology and space are conducive to such an approach"; "I'm surprised how well the space facilitates group work and group discussion. The space has enhanced how both I and my students approach the material." *— Faculty in 321*

END OF TERM SURVEYAND FOCUS GROUPS - INSTRUCTORS

Methodology

At the end of the winter semester, focus groups was conducted to obtain Instructor's experience of each of the rooms. The purpose of the focus groups were to determine the impact of the space on teaching and learning. Focus groups took place in each room 319 (5 instructors), 333 (5 instructors), 321 (3 instructors) and were videotaped. The videotapes were transcribed, and analyzed using a thematic analysis approach

Results

From the focus group five themes emerged: participation/involvement; community, comfort/well-being, and ways of learning.

319 RESULTS

Participation/involvement

"I was seeing students sit at the computer and then run over and write (on the whiteboard). Or one was reading and feeding answers and the other person is writing and then circulating around the room and sharing answers. "

The instructors discussed how this space increased participation. The space enabled students to share their ideas within the group and between groups. There was a desire shown by the students to be a part of that participation. It was also easy for the instructor to move between the groups and to monitor their activities. Instructors did comment that they had primed the students that learning would be different in this classroom. Over time there was also an increase in peer learning. The groups also collaborated and worked as a team during activities. Feedback from students indicated that they felt that they had a more in depth understanding, because of their interactions.

Ways of Learning

"There was never anything that I was not able to do in this room to fit the material and the students' needs"

The instructors discussed how the space facilitated multiple modes of learning. Most felt that they were able to large group, small group and individual work easily. The whiteboards greatly facilitated the sharing of ideas between students within the groups and also between groups. These ideas were often captured electronically using a cell phone. This offered visual reminders and enable connects to be made. One instructor described it as visual journaling or info-graphic Students were quite artistic and often spent time ensuring their visual accurately represented what they were trying to communicate. Instructors also commented that the standing and moving involved seemed to help students stay on task. Instructors were often adjusting what they normally did in a class to encourage students to stretch their minds. One instructor commented that they seemed to go through more content and deeper into the content. Content was also more student driven then in other classrooms. Students were vocal in asking for content to be examined a particular way. The group discussions also facilitated deeper learning, but instructors did highlight that you had to adjust your enactment of the curriculum to enable that. Instructors also discussed that within this space they could use active learning and act more as the facilitator who could jump in when needed. Students were not being passive in the learning in this room, but participating during class and more committed to preparing for

each class. One professor felt they were also developing learning skills. Another emphasized that learning that students don't remember content as well as when they develop the realization about the content.

Community/Comfort

"We had fun but also learned some serious stuff and walked out of here with the course goals in mind"

Instructors felt that this space helped built a community among the students. They felt they saw students in a different context because the interacted more often and actually sat down with the students during class and interjected themselves in the student conversations. Students also shared that they felt better because they interacted so much with others. Students also extended that community to outside the classroom and interacted outside of class. Students were more willing to help one another. One professor described the classroom as being an almost grad free zone. The opportunity to collaborate and cooperate in the learning created a sense of community for the instructors and students.

333 RESULTS

Participation/involvement

"I was able to move from group to group and check in and see how everyone was doing. Answer questions and push them a bit further on concepts they were talking about. "

From the study instructors identified that participation during class increased. This occurred not only within the group but between groups. The room enabled the work of groups to be shared easily as each was displayed at the same time, which also facilitated comparisons and discussions as to the different approaches groups took. This was facilitated as well through applications such as google docs or Facebook. When given the opportunity to use the classroom before or after class, students often did.

One professor compared participation on the part of student, that in a traditional space you'd have one or two hands up, but within this classroom students wanted to contribute more to the group discussion because there were more hands ups. It was also identified that students seemed more motivated because it was their responsibility to make the learning worthwhile.

The room enabled that group activity to begin with minimal effort. It also meant that students could not hide, they had to participate. As one professor highlighted "they couldn't just be receptors". Another professor commented that the room helped keep students focused on the task at hand and you could easily see that from across the room.

The instructors also discussed how the layout enabled them to move around and spend time with individual groups. When students asked questions, instructors comment that they were accessible to give feedback. One commented how, the students themselves would offer feedback to each other. The instructors discussed how interactions enabled students worked with the content.

Ways of Learning

"So they might look at each other's work and go, wow how are you going in that direction?"

The instructors discussed how the openness of the space enabled for different ways of learning by allowing for multiple ways of interaction. Students were using Google Docs and Facebook and sharing their products on their group screens. They would also on their own find new tools to help them brainstorm ideas. As one professor commented, how without prompting they started using the whiteboard function. Instructors also commented that it was easier to move them to new levels of knowledge, by interacting with the students to see what they knew and by exploring concepts they were struggling with. The multiple ways of interfacing enabled the professor to facilitate the exploration of knowledge because students were given the opportunity to work with the content in class. One professor comment how in the future they would allow the project to be more of the course to allow for more group work.

Community

"I was able to go from group to group and say "what don't you know and what are you struggling with?"

The instructors discussed how the space created a better sense of community within the class. One professor discussed how the traditional classroom placed the focus on the professor. In this classroom it felt more like the professor and students were on the same level. Another professor described how they felt more engaged with the students. It also enable the professor to interact with the students in a smaller group so had a closer connection. When the instructors did interact with students they were able to determine what they did know or were struggling with. One professor commented how they felt they were able to offer more to their students. There were also opportunities where students were more useful to each other as well. The room therefore felt more like a learning environment. Students would interact with the same group each week and offered stability. The instructors also discussed how a sense of safety developed within the groups and that students within groups seemed to develop a greater connection than in other rooms.

Comfort

"Even if you don't make best friends in your class you have people to talk to and feel comfortable with and that makes a difference."

The instructors also discussed that the space enabled provided a comfortable space for students to interact. Though students may not have been keen on group work in the beginning, by the end of the course almost all were. Students also expressed how much they looked forward to coming to class. Students who were nervous talking in front of a large group would interact more in small groups. One professor commented on how students develop confidence in themselves.

321 RESULTS

Participation/involvement

"We are doing more and trying to get around to as many groups individually rather than addressing the entire group"

From the study, instructors identified that participation during class increased. In the past, the group work was often completed outside of class time but this room enabled it to occur during the class. Instructors also comment on the ease of establishing groups. The instructors also felt that they were given more freedom to teach how they wanted because space did not limit the activities they could do.

Instructors also noticed that talking was a focal point of their activity. Though they did express how students are still transitioning from instruction that involved lecture to one that involved active learning, they commented on how the space seemed to aid with that transition. Other features also supported this endeavor; acoustics, microphone, monitors, whiteboards, tables and chair, room layout, table arrangement. Students were able to connect their computers, they were also able to remotely access other computer capabilities as part of the class activity.

Instructors also found that the space facilitated the sense making of ideas by the students. Through the whiteboards and monitors they were able to visually share, capture, analyse and evolve their ideas. This enabled not only the students to better understand the ideas of fellow students, but the professor was also able to better appreciate the students' understanding of ideas. As a result instructors were able to provide more effective and timely feedback to the students, that they could use during class. Because student group was being completed during class, interactions between with the professor improved as well as the interaction between the different groups. They were now able to compare their work and collaborate when desired.

The acoustics of the room also enabled individual voices to be heard and groups to work without disturbing one another. This was also assisted with the use of the microphones, which instructors said they used to play learning games like jeopardy, answer questions or review before a quiz. Typically, presentations of group work were given from the group's table and did not require moving to the front of the class.

Community

"There are always a few students who struggle to get into a group or when a discussion starts they are on the periphery or they come into the lecture hall and sit by themselves over on the side. And in this space I noticed that did not happen"

Instructors also felt that the room built a better community. Students no longer had to negotiate the joining of a group. They simply had to join a table. This seemed to decrease student stress regarding group activity. The tables also seemed to equalize involvement, giving everyone equal opportunity to contributed. With other rooms and table configurations, where you were physically positioned in the group would increase or decrease you contribution potential. Instructors also felt that students became more focused on the group performance, not just their own. One professor commented how the students were upset that on a peer assessment because they could not give everyone a 10/10. Professor commented that the students felt so strongly that the groups and individuals within it had performed really well.

Comfort and Well-being

"Students (were) talking positively about the space and they appreciated being somewhere that was bright and light and they could see outside. That made a big difference"

Instructors also discussed the impact of comfort. They commented that the well-organized space, acoustics, and ability to move around within the classroom seemed to energize their students. One professor who was using this classroom and a traditional classroom commented how over time, students would start to fade in the traditional classroom, but not in room 321. One professor commented that after a 90 minute class, you would have trouble getting students out of the classroom. Class had finished about 20 minutes previously but the students kept working. This was difficult at times because another class was coming into the room.

Ways of learning

"You have more options that you can access. You are not as tightly bound into this is what I'm doing right now"

The instructors also discussed teaching and learning. The space did allow them to attempt different activities that another space would not. They also found they were able to adjust their learning plan on the fly. The fact that work within the group was easily shared and that they were able to offer feedback during class, meant that they could also teach differently. Logistics were also less of an obstacle, saving time and effort. Instructors shared how previously they had to book different spaces for different activities or book an over large room to enable the class to break into group. The follow-on challenge was trying to send that information to students. The room instead, enables you to complete everything in one space. Professor described it as being 10 times easier. One professor did discuss how the room was so big that to facilitate learning they started having a TA attend class and assist with providing feedback during the class, but this was not seen as a negative requirement. They all agreed that the room was not space for pure lecture formats.

Conclusions

Instructors did feel that Ellis Hall did improve the teaching and learning experiences. Space facilitated learning by offering an organized classroom that focused group activity. Overall instructors felt there was increased interaction between themselves and the students and between the students. The space also facilitated sense making of ideas that resulted in ideas evolving within the class, largely because those ideas were visually shared. There was a development of community as group performance became more important. There was also a decrease in student stress and increased cohesion as negotiating the joining of groups was easier and necessary. Room features such as acoustics, microphones, whiteboards, monitors, and tables effectively supported the learning experience. Space also facilitated teaching in that it decreased logical obstacles, which saved time and effort. Often courses involved moving from one classroom to another to ensure the space enabled planned activities occur or requesting a space twice the size to have room to accommodate group space. Essentially, learning could occur in one space. This gave instructors greater freedom to use activities they could not in a traditional space. They also felt they could adapt more readily. The instructors did agree that the room is not designed for a lecture type class and one professor did start to utilize a Teaching Assistant during class. Even with those issues, the professors preferred this room for teaching. One instructor's comments sums it up best, "the room is the easy part that you don't have to worry about you just have to enjoy".

CLASSE AND SPQ – DEVS 330

Student Engagement and Approaches to Learning in DEVS 330

DEV330 is a team-based course that has been taught in this format in a Traditional Classroom in 2013 and then in Ellis Hall 333 during winter term 2014. During the first iteration of this newly designed course measures of student engagement and approaches to learning were collected. To understand if teaching the same team-based approach in one of the new active learning classrooms (Ellis 333) further enhanced these scores we administered the same measures at the completion of the course.

Approaches to Learning

The Study Process Questionnaire (R-SPQ-2F) (Biggs, 2001), which measures approaches to learning in higher education, was administered. The instrument included 20 items in two sub-scales evaluating the uses of a surface approach or deep approach to learning. A surface strategy would occur when a learner memorizes facts and accepts information for the purpose of an exam; long-term retention and understanding is unlikely. A deep approach occurs when the learner analyses new information and ideas and links these to previous knowledge with the goal of long-term retention. In this survey, students respond to questions about their approach and motivation for learning by rating their level of agreement with each item on a five-point scale. In order to determine the level of each approach to learning that a student uses, a cumulative score for each strategy can then be calculated.

Responses for the 20 SPQ questions were collected and converted to ordinal data. The individual responses to ten of the questions were then summed to form a cumulative score for the surface approach category, and the remaining ten summed to form a score for the deep approach category (Biggs, 2001). The means and standard deviations for each of the three course models were determined for the two scales.

Approach	Traditional Classroom	Ellis Hall	Typical Large First Year Class
Surface	22.6 (5.2)	25.1 (5.3)	26.7 (6.0)
Deep	26.5 (5.4)	25.2 (5.4)	22.6 (5.6)

Student Engagement in the Classroom

In order to evaluate student engagement, all students in the class were asked to complete the Classroom Survey of Student Engagement (CLASSE). CLASSE is comprised of 38 questions, which ask students to reflect upon their experience, their learning and their level of engagement in an individual course. Questions focus on how frequently they engage in various educational practices. Students are asked to self-report how often they engaged in an activity or behavior using an ordinal scale ranging from “never” to “more than 5 times” or “very often.”

Q#	Question	Traditional Classroom (TBL)	Ellis Hall (TBL)	Typical Large First Year Class (Lectures)
1	Asked a question in class	3.09	2.35	1.15
2	Contributed to a class discussion that occurred in class	3.09	2.47	1.08
3	Prepared two or more drafts of a paper or assignment before turning it in	2.13	1.75	1.57
4	Worked on a paper or project that required integrating ideas or information from various sources	3.34	3.47	2.02
5	Included diverse perspectives in class discussions or writing assignment	3.38	3.09	1.78
6	Came to class without having completed readings or assignments	2.41	2.56	3.48
7	Worked with other students on projects during class	3.69	3.92	1.24
8	Worked with a classmate outside of class to prepare class assignments	2.75	2.27	1.47
9	Put together ideas or concepts from different courses when completing assignments or during class discussions	3.16	2.91	1.82
10	Tutored or taught other students in your class	1.97	1.85	1.28
11	Used electronic medium to discuss or complete an assignment	3.94	3.86	1.96
12	Used email to communicate with the instructor	1.91	1.75	1.74
13	Discussed grades or assignments with the instructor	2.48	2.04	1.41
14	Discussed ideas from your course with others outside of class	2.75	2.85	2.46
15	Made a class presentation	2.44	1.85	1.04
16	Participated in a community-based project as part of your class	1.34	1.13	1.09
17	Discussed ideas from your readings or classes with the instructor outside of class	1.38	1.30	1.24
18	Received prompt written or oral feedback on your academic performance from your instructor	2.72	2.94	1.28
19	Worked harder than you thought you could to meet your instructor's standards or expectations	1.72	1.46	1.81
20	Memorizing	1.41	1.51	2.78
21	Analyzing	2.88	3.17	2.44

22	Synthesizing	3.28	3.40	1.99
23	Making Judgments	3.13	2.98	2.02
24	Applying	3.16	2.91	1.82
25	How often in your class have you been required to prepare written papers or reports of more than 5 pages in length	2.47	1.93	1.54
26	To what extent do examinations in your class challenge you to do your best work	2.19	2.18	2.43
27	In a typical week, how many homework assignments take you more than one hour each to complete	1.97	2.04	1.92
28	In a typical week, how often do you spend more than 3 hours preparing for your class	1.53	2.00	1.76
29	How often have you been absent so far this semester	1.66	1.70	2.43
30	How often do you take notes	1.81	1.80	3.51
31	How often do you review your notes prior to your next scheduled meeting of you class	1.63	1.55	1.37
32	How often have you participated in a study partnership with a classmate in your class to prepare for a quiz or test	1.88	2.39	1.68
33	How often have you attended a review session or help session to enhance your understanding of the content of your class	1.32	1.16	1.27
34	How interested are you in learning the course material	3.34	3.15	2.71
35	How comfortable are you talking with your instructor	3.41	3.40	2.59
36	How much do you enjoy group work with your classmates in your class	3.38	3.45	2.0
37	How difficult is the course material in your class	1.88	1.84	2.0
38	How easy is it to follow the lectures in your class	3.16	3.15	2.14

Conclusions

Teaching a course that was designed for active and team-based learning results in higher scores for deep approaches to learning and improves student engagement compared to a typical large first year lecture-based course. However, teaching DEVS330 in a classroom designed for active learning does not necessarily improve these scores.

ACTIVELY OPEN-MINDED THINKING (AOT) RESULTS

Active Learning Classrooms (ALC) have become the latest solution in transforming traditional teaching styles (e.g. lecturing) into active learning approaches (e.g. group discussions) in university classrooms. Although on a group level, students perform better in active learning classrooms compared to students in traditional classrooms, the individual cognitive processes that occur in these classrooms have yet to be the focus in this line of research. Are all students improving? Or are students with certain cognitive tendencies benefiting more than others? Similarly, studies on individual cognitive disposition (e.g. actively open-minded thinking, AOT) have yet to explore the implications of their research in the classrooms. Typically these studies provide students with scripted arguments and perspectives on a topic rather than an actual interaction among students in the classroom.

The current study investigated whether the active learning approach of group discussions affects individual cognitive dispositions such as AOT. A 4th year psychology course was chosen to be studied because the instructor expressed interest in re-designing her course in order to implement active learning techniques she could not otherwise do in a traditional lecture hall. Students were given the AOT scale at the start and end of the course. Group discussions took place throughout the course requiring students to research and form a position on a given controversial topic in psychology. The discussions took 40 minutes and occurred several times over the course.

The results showed post- AOT was *higher* than the pre- AOT, and students with low pre-AOT had a *greater increase* in AOT over the course of one term than students with high pre-AOT. Furthermore, as a consequence of the configuration of the room and the pedagogy, students were learning from various sources (especially students outside of their group), which likely contributed to the increase in AOT. Together, the findings demonstrates that AOT could be changed and students can be transformed over the course of one term, especially in a classroom that involves various collaborative and group learning opportunities.

VIDEO ANALYSIS OF STUDENT AND INSTRUCTOR ACTIVITY

Three IDIS 150 tutorials were videotaped simultaneously in three different classrooms. One tutorial was in 319, one in 333 and one in a Kingston Hall (a traditional classroom). A video cameras placed in each classroom during the tutorial such that the activity and conversation of the students and tutorial leader could be captured.

The CATI Learning Spaces classroom observation tool was selected to analyze the activity during each tutorial. At 5 minute intervals the activity within the classroom was evaluated and documented according to the categories provided by the tool. To accurately comprehend the context, the video was viewed 15 seconds before and after each five minute mark. Two researcher used the tool independently to initially to evaluate the classroom activity. As the intent was primarily to determine the viability of the tool and video data, the two researchers score the data as a team. If the between researcher measure differed, the researchers would pause and discuss how they were determining their score. The two researchers would then come to an agreement on what the score should be. Comments were also gathered and it was felt that additional categories for both the instructor and students could be developed. For example there student group work was not specifically identified nor was the specific task of the group work. As well due

to the increased instructor interaction, the tool did not differentiate the nature of this intersection. Clarifying, providing feedback, posing questions, prompting questions could be additional measures.

It was very clear from the video that instructors within the Ellis Hall classroom interacted more than the traditional classroom. Though some of this could be due to instructor difference, it was also an accessibility issue. The traditional classroom due to desk configuration, prevented the instructor in that class room to even move between the groups due to the desks which operated as a barrier.

It was also clear that Instructors in the Ellis Hall were not confined to the podium as they were in the traditional classroom. The measure did easily differentiate this. The measure also differentiated the student activity of Low (L), Medium (M) or High (H). It was clear that the students in the traditional classroom were on-task less than in the Ellis Hall classrooms.

Overall the video and measuring tool provided a different insight into the classroom and considering the student and instructor comments, seemed to add to the examination of what is happening in the classroom. It is therefore recommended to continue using the measurement tool, but some changes to the tool should be made.

See poster presentation at STLHE for further details.

5

DISSEMINATION OF FINDINGS

SOCIETY FOR TEACHING AND LEARNING IN HIGHER EDUCATION (STLHE) 2014

TRANSFORMING CLASSROOM SPACES FOR ACTIVE AND COLLABORATIVE LEARNING

Moderated By Andy Leger

There is large and growing body of evidence that shows active learning can have a positive impact upon students learning outcomes such as increased content knowledge, critical thinking and problem-solving abilities, and positive attitudes towards learning in comparison to traditional lecture-based delivery (Anderson et al., 2005). Active learning facilitates greater enthusiasm for learning, in both students and faculty (Thaman et al., 2013), and the development of graduate capabilities, such as critical and creative thinking, problem-solving, adaptability, communication and interpersonal skills (Kember & Leung 2005). There is also literature which suggests that teaching spaces can have a large impact on the ability to incorporate active learning teaching strategies (Chism & Bickford, 2002; Oblinger, 2006; Walker et al., 2011). In the winter of 2014, three recently renovated classrooms at Queen's University designed for active and collaborative learning were used for the first time. One of the primary goals of redesigning classroom space was to evaluate how teaching spaces can facilitate changes in approaches to teaching and transform student learning experiences. The purpose of this panel is to learn about the design considerations, configurations and technology available in each of the three new active learning classrooms and to hear from faculty members who have chosen to teach in them.

This session will begin with an overview of the three classrooms by the Moderator and Educational Developer responsible for the support and assessment of the new active learning classrooms. Next, each of the panelists will discuss how the classroom design and features influenced their approach to teaching and comment on the effect it had on their students' experience. The panelists chosen for this session each used one of the new classrooms and are characterized as follows: experienced faculty members teaching a familiar course normally taught in traditional classrooms, an experienced faculty member teaching a newly designed course, and a new faculty teaching for the first time. Questions to each of the panelists will include: What influence did the space have on how your course was designed and taught? Can you give an example of what worked particularly well? What aspects of the space do you believe contributed the most to enhancing student experience and student learning? What surprised you about the space and how it influenced your class? What are some of the teaching and learning strategies that you used that you could not in other traditional classrooms? What was the reaction of your students to the space and the strategies that you used? What do you wish you had known before teaching in the active learning classrooms? What advice would you give other faculty teaching in these rooms for the first time? If you were to build another classroom for active learning to help you transform your course, what would it look like?

This panel will allow participants to hear about and ask questions regarding the design aspects of three new active learning classrooms, consider the configuration and the technology available in each room, and discuss the opportunities, advantages and challenges of the teaching strategies that were used in these spaces.

EFFECTS OF GROUP DISCUSSION ON ACTIVELY OPEN-MINDED THINKING IN ACTIVE LEARNING CLASSROOMS By Victoria Chen

Active Learning Classrooms (ALC) have become the latest solution in transforming traditional teaching styles (e.g. lecturing) into active learning approaches (e.g. group discussions) in university classrooms [i]. Although on a group level, students perform better in active learning classrooms compared to students in traditional classrooms [ii], the individual cognitive processes that occur in these classrooms have yet to be the focus in this line of research. Are all students improving? Or are students with certain cognitive tendencies benefiting more than others? Similarly, studies on individual cognitive disposition (e.g. actively open-minded thinking, AOT) [iii] have yet to explore the implications of their research in the classrooms. Typically these studies provide students with scripted arguments and perspectives on a topic rather than an actual interaction among students in the classroom.

The current study investigated whether the active learning approach of group discussions affects individual cognitive dispositions such as AOT. A 4th year psychology course was chosen to be studied because the faculty expressed interest in re-designing her course in order to implement active learning techniques she could not otherwise do in a traditional lecture hall. Students were given the AOT scale [iv] at the start and end of the course. Group discussions took place throughout the course requiring students to research and form a position on a given controversial topic in psychology. The discussions took 40 minutes and occurred several times over the course.

The results showed post- AOT was *higher* than the pre- AOT, and students with low pre-AOT had a *greater increase* in AOT over the course of one term than students with high pre-AOT. Furthermore, as a consequence of the configuration of the room and the pedagogy, students were learning from various sources (especially students outside of their group), which likely contributed to the increase in AOT. Together, the findings demonstrates that AOT could be changed and students can be transformed over the course of one term, especially in a classroom that involves various collaborative and group learning opportunities. [v]

[i] University of Tennessee Teaching and Learning Center (2012). HSS Flexible Classroom Training. Retrieved from http://tenntlc.utk.edu/past-workshops/hss-flexible-classroom-training/

[ii] University of Minnesota ALC Pilot Evaluation Team (2008). Active learning classrooms pilot evaluation: Fall 2007 findings and recommendations. Retrieved from http://dmc.umn.edu/activelearningclassrooms/alc2007.pdf

[iii] Stanovich, K. E., & West, R. F. (2007). Natural myside bias is independent of cognitive ability. Thinking & Reasoning, 13(3), 225-247.

[iv] Stanovich & West (1997). Reasoning independently of prior belief and individual differences in actively open-minded thinking. Journal of Educational Psychology 89:342–57.

Background

Active learning classrooms have become the latest solution in assisting the transition from traditional teaching styles towards active learning techniques in university classrooms (University of Minnesota ALC Pilot Evaluation Team, 2008; University of Tennessee Teaching and Learning Center, 2012).

Although on a group level, students perform better in active learning classrooms compared to students in traditional classrooms, the individual cognitive processes that occur in these classrooms have yet to be the focus in this line of research. Are all students improving? Or are students with certain cognitive tendencies benefiting more than others?

Similarly, studies on individual cognitive disposition (e.g. Actively Open-minded Thinking, Stanovich & West, 2007) have yet to explore the implications of their research in the classrooms.

Typically these studies provide students with scripted arguments and perspectives on a topic rather than an actual interaction among students in the classroom (e.g., Toplak, West, & Stanovich, 2013).

Research Question

The current study investigates whether the active learning activity of **group discussions** affects individual cognitive dispositions (specifically **Actively Open- minded Thinking**) over the course of one term.

Effects of Group Discussions on Actively Open-Minded Thinking in Active Learning Classroom

Victoria Chen <victoria.chen@queensu.ca>

Methods

Actively Open-minded Thinking (AOT) Scale (Stanovich and West, 1997)

The scale contains 41 statements and is composed of multiple sub-categories: absolutism, dogmatism, openness to ideas, openness to values, flexible thinking, and categorical thinking. Statements are rated on a 6 point scale:

1- Disagree Strongly
2- Disagree Moderately
3- Disagree Slightly
4- Agree Slightly
5- Agree Moderately
6- Agree Strongly

Previous samples that used AOT:
N = 168-179
SD = 18.2-18.3

Actively Open-minded Thinking: Students were given the AOT Scale at the beginning and end of the semester. Although 28 students completed the pre-test, only 9 of these students completed the post-tests.

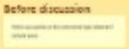
Group discussions: took place 5 times throughout the course. It required students to research on a given controversial topic in modern psychology to form a position, and come to the discussion with convincing arguments to support their position. In groups of 5-6, students engaged in discussion for 20-40 minutes during class.

The instructor walked around and sat with half the groups listening to their discussion, and spent time at the instructor's seat with students coming up to her to ask questions.

Reflection: During the 5th discussion, students were asked to fill out a reflection on the group discussion by comparing their initial position to their position after the discussion and listing evidence that led to their new stance.

Reflection

Before discussion



After discussion

Results

AOT Results

This sample vs previous samples: The pre-test AOT (*N* = 28) was normally distributed, and the mean AOT scores of this sample (*M* = 184.96, *SD* = 26.28) was *higher* than previous samples (*M* = 168-170, *SD* = 18.2-18.3).

Group of 9 vs rest of sample: A Mann- Whitney U test showed the group of 9 were *not significantly* different from the rest of the sample.

Pre-Post AOT (*N* = 9): A paired samples t-test demonstrated post-test AOT scores (*M* = 190.44, *SD* = 22.13) were *significantly higher* than pre-test AOT scores (*M* = 184.44, *SD* = 25.97), *t*(8) = 2.67, *p* = .03.

High vs Low AOT (*N* = 9): Using the sample's mean as a cut off point, two groups were compared high AOT (*N* =5) and low AOT (*N* = 4) on their pre to post test difference.

Independent t-test showed students with low AOT scores (*M* = 12.25, *SD* = 6.29) had *higher increases* in AOT than students with high AOT (*M* = 1.80, *SD* = 3.56), *t*(7) = 2.24, *p* = .01.

Reflection Results

The "after discussion" reflections (*N*= 28) were sorted into categories based on whether students changed their position on the topic. The frequencies demonstrated that regardless of whether students changed their position, students were gaining information from a number of sources.

Most notably, nearly a third of the evidence came from students outside of the group, suggesting the importance of having whole class discussions in addition to typical group discussions. The frequencies provide support for students being open-minded as they were using various sources of information.

Position after discussion	Source			
	Yourself	Within the group	Instructor	Outside of the group
Changed	22%	50%	0	28%
Unchanged	35%	37%	9%	24%
More complex	26%	41%	0	33%

Discussion

Future Directions

This study showed that AOT could be changed over the course of one term, especially in a classroom that involves various collaborative and group learning opportunities.

However, the findings from this study may be limited to this particular sample or course. therefore, future studies would need to be conducted across multiple courses in different fields.

Furthermore, in future studies, data from each discussion session should be collected in order to control for participant specific confounds, such students' interest in the particular topic that week which may affect their willingness to listen to other perspectives.

This was the first time the AOT scale has been used to measure pre-post differences in Actively Open-Minded Thinking in a classroom setting. The sample as a whole started off with higher mean AOT than in previous samples which could have lead to a ceiling effect.

However, even with the small sample, the predicted trends did occur:

- Post-test AOT were higher than the pre-test AOT
- Students with low pre-AOT had *greater increase* in AOT over the course of one term than students with high pre-AOT
- As a result of the configuration of the room and the pedagogy, students were learning from various sources (especially students outside of their group), which likely contributed to the increase in AOT

THE IMPACT OF PHYSICAL SPACE ON TEACHING AND LEARNING

By Vicki Woodside-Duggins

This poster presentation will share the results of a study that examined the effects of physical space on the teaching and learning environment. The literature suggests that physical space affects student privacy, performance and participation. Research also suggests that the physical environment affects how teachers view the possibilities available to them for their teaching (Jamieson, Fisher, Gilding, Taylor & Trevitt, 2000; Higgins, Hall, Wall, Woolner & McCaughney, 2005). Literature shows that space can dictate how students will interact (Jamieson et all, 2000). Studies indicate that physical space that saves time, provides comfort, and facilitates communication supports successful learning (Higgins et al, 2005). Further research in physical space and its impact on teaching and learning is needed (Temple, 2008). This research can advise universities on how best to enable collaboration, communication and interactions between students, teachers and content (Jamieson, 2003).

In this study, the enactment of three tutorials conducted simultaneously was compared. Each tutorial followed the same format and plan, but was implemented in a different classroom. The format involved a case study analysis of human physiology and a planned sequence of events. Each classroom had a separate physical configuration and different degree of technology available. This study examined how students and faculty experienced the physical space in order to provide context to how physical space affects teaching and learning. Through observation, surveys and focus groups, data was compared using qualitative analysis to understand how physical space effected the formulation of the experiences of the students and faculty involved. The results of this study contribute to the overall discussion regarding physical learning space and how it shapes one's experience in a learning environment. This poster presentation contributes to discussions of physical aspects of learning spaces in the integrated learning environment.

The Impact of Physical Space on Teaching and Learning: A Comparison of Three Undergraduate Nursing Tutorials

by Vicki Woodside-Duggins, 12vwd@queensu.ca

Purpose

This study is to compare the teaching and learning of a tutorial in a traditional classroom to a tutorial in an active learning classroom.

Literature Influencing Study

Physical space impacts both teaching and learning. It can affect student privacy, performance, participation and interactions. It also affects what teachers feel is logistically possible in the learning environment (Jamieson, Fisher, Gilding, Taylor & Trevitt, 2000; Higgins, Hall, Wall, Woolner & McCaughney, 2005). Physical space that saves time, provides comfort, and facilitates communication will enable successful learning (Higgins et al, 2005). It is therefore an important operational issue for universities (Jamieson, 2003).

Research Questions

How does physical space differ between a traditional and two active learning classrooms in its impact on student interaction with peers, the instructor and content?

Participants

The participants included second year nursing students who were attending tutorials as part of an introductory anatomy and physiology course. On enrolment, students were assigned one of three tutorials. One of the tutorials was given in a traditional classroom, room 108 in Kingston Hall. The other two tutorials were in one of the active learning classrooms of Ellis Hall; room 319 or 333. Class sizes were as follows: 108: n=27; 319: n=24; 333: n=29 . Each tutorial was scheduled at the same date and time. The three teaching assistants (TAs) were assigned a specific curriculum to follow.

There were a total of four tutorials during the semester. Before each tutorial, each student was required to answer case study lead questions. During the tutorial, students were allocated to a group and given a set of questions based on the before tutorial assignment. Each group was required to discuss the questions and prepare a presentation of their answers to share with the rest of the class. After each presentation, the class and TA were then given an opportunity to ask follow-on clarifying questions. The TA facilitated the student learning and provided a brief review of the anatomy and physiology concepts being discussed. The tutorial ended with a short quiz.

Room Descriptions

Kingston Hall Room 108 - Traditional Classroom
This classroom with rows of student chairs and a podium at the front, represents a traditional classroom configuration.

Ellis Hall Room 333 - Round Tables and Interactive Displays
This classroom with dedicated round tables allows for groups of six to work collaboratively on an interactive display and to be able to screen share to encourage student driven learning.

Ellis Hall Room 319 - Small Classroom with Flexible Configuration
This classrooms with moveable chairs with tablet arms for immediate flexibility in class set-up and different group configurations. The ring of whiteboard facilitates sharing of ideas within and between groups.

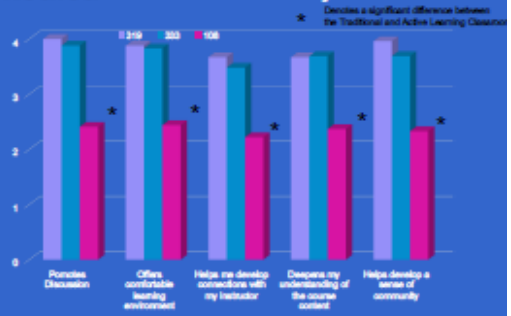
Data Collection and Analysis

Data was collected using an end term survey and video observation for each of the three classrooms. The end term survey collected both qualitative and quantitative data in paper based survey, adapted from the Research Evaluation Team, OIT, University of Minnesota. The qualitative data captured student perceptions using a five point Likert scale. The qualitative data included open-ended questions. The video observation provided a indication of what was happening in the classroom during each tutorial using the CATI measurement tool. Statistical comparisons of the three classrooms were analyzed using a one-way ANOVA of the survey results. The qualitative survey data and video observation data provided additional descriptive information that provided a better picture of what was occurring in the active learning classrooms compared to the traditional classroom.

Limitations

Each Tutorial had a different TA. This is a reality of using actual courses as they occur. To overcome this limitation, multiple sources of the data were collected. The impact of individual TA was also mitigated by the assigned curriculum each was to follow.

End Term Survey



Open-ended student responses substantiated the quantitative data. Many students commented that the classroom configuration and associated whiteboards/monitors, chairs and tables enabled students to "clearly see presentations" and "make eye-contact with everyone". They also helped TAs to share ideas, particularly the whiteboard that "enabled the instructor to draw a large diagram relating topics". Students in the active learning classrooms impacted on their group discussions, improving collaboration because it "allowed to easily breakdown and share ideas" and enabled the "use of technology we could control". Most importantly it "made the environment extremely interactive" and a student commented that it was "enjoyable and enhanced learning".

Video

The Teaching Assistants in the active learning classrooms consulted with the students more often than in the traditional classroom. Throughout the tutorial, the TAs in the active learning classrooms would physically move to each group to ascertain their progress and answer any questions they had, but the TA in the traditional classroom remained at the podium. Video analysis also revealed that students in the Ellis Hall classrooms participated with a greater frequency in assigned tasks.

Conclusion

From this study, the active learning classrooms provided a more engaging learning experience for the students. Students felt that the space offered a comfortable learning environment that promoted discussions and helped them connect with their instructor, build a sense of community and deepen their understanding of the course. The qualitative data highlighted that the ability to have eye contact with their peers and share ideas were important features of the active learning classrooms. The video data corroborated the students' perception for it was obvious that the students participated more in the assigned activities and the TAs interacted more often with the students. Finally, students significantly recommended others to take classes in the active learning classroom vice the traditional classroom.

DYNAMIC LITERATURE!/ LA LITTERATURE ACTIVE! By Annie Riel and Catherine Dhavernas

In the field of literary studies, students are traditionally evaluated through oral presentations, essays and exams. Although all three forms of evaluation have demonstrated their effectiveness in terms of measuring a student's capacity for analysis and mastering concepts, our objective here was to integrate new and alternative forms of evaluation that are specifically adapted to the study of literature and which offer a more participative approach to learning. In this case we decided to place students in a simulated teaching situation, an evaluation strategy which was inspired by the Three minute thesis contest at Queen's University, in which the goal is for students to present the most important elements of their thesis in three minutes. This evaluation strategy was introduced into two different courses offered to students in 3rd and 4th year in the Department of French studies in the Winter semester of 2014, namely FREN 325/ 425 Tendances avant-gardistes et post-modernes au XXe siècle et à l'ère actuelle and FREN 327/427 Le cinéma aujourd'hui: études thématiques.

A key factor worth noting is that the two courses took place in different locations: FREN 325/425 was taught in a traditional classroom, whereas FREN 327/427 was alternatively held, twice a week, in two different active learning classrooms – one of them equipped with round tables and an interactive display, and the other with whiteboards covering three of the room's four walls, which proved to be an interesting basis for the comparison of how the configuration of a classroom impacts the learning and teaching strategies we chose to adopt.

If, on the one hand, the more traditional evaluation tools offered by oral presentations and essays are designed to call up analytical and explanatory skills, the simulated situation scenarios that we proposed allowed us to evaluate students' capacity to synthesize information through active learning. In our presentation, we sought to detail the results of the new approach as it was experienced in the two above-mentioned courses. As such, we shared our thoughts on the process of implementing the approach and our assessment of its effectiveness during and after having taught the courses. We discussed its impact on our teaching practices as well as its potential to transform students into teachers ; teachers into students ; teachers into mentors who teach students how to be leaders ; and passive students into active learners.

Dans le domaine des études littéraires, les situations d'évaluation sont généralement ancrées dans une tradition dont les outils se résument la plupart du temps à l'exposé oral, la dissertation et l'examen sur table. Bien que ces trois situations d'évaluation aient démontré leur efficacité à mesurer la maitrise des concepts à l'étude et la capacité d'analyse de l'étudiant, nous souhaitions intégrer de nouvelles situations d'évaluation autrement adaptées à notre objet d'étude et rattachées à une approche davantage participative. Nous avons décidé de tenter l'expérience d'une mise en situation, à savoir une stratégie d'évaluation inspirée du concours « Votre soutenance en 180 secondes », dont le principe consiste à présenter les éléments les plus importants de sa thèse en trois minutes. Cette stratégie a été introduite dans deux cours différents offerts aux étudiants de troisième et quatrième année au premier cycle en études françaises au semestre d'hiver 2014, soit Fren 325/425 Tendances avant-gardistes et post-modernes au XXe siècle et à l'ère actuelle, ainsi que Fren 327/427 Le cinéma aujourd'hui: études thématiques.

Du point de vue de l'espace, il est important de mentionner que ces deux cours se tenaient dans des classes différentes: FREN 325/425 se déroulait dans une classe traditionnelle, alors que FREN 327/427 avait lieu deux fois par semaine, en alternance, dans deux classes d'apprentissage actif — la première étant équipée de tables rondes et d'une console interactive; la seconde étant munie de tableaux blancs sur 3 des 4 murs. Le fait d'enseigner dans de ces trois classes nous a permis de constater l'impact de la configuration de l'espace sur les stratégies d'enseignement que nous avions choisi d'adopter.

Si l'exposé traditionnel et la dissertation mobilisent principalement des compétences analytiques et explicatives, la mise en situation que nous avons introduite ici nous a permis d'évaluer des compétences de synthèse dans un contexte d'apprentissage actif. Cette communication proposait ainsi de rendre compte de l'expérience de cette nouvelle approche dans les deux cours en question et de partager nos réflexions avant, pendant et après l'enseignement, de même que son impact sur notre pratique d'enseignement en les rattachant entre autres plus spécifiquement aux questions portant sur la transformation d'élèves en professeurs et de professeurs en élèves ; de professeurs en mentors qui enseignent comment être leader et d'étudiants passifs en étudiants actifs.

ONATRIO UNIVERSITY COMPUTING CONFERENCE (OUCC) 2014

ACTIVE LEARNING CLASSROOMS @ QUEEN'S

OUCC 2014, University of Windsor, April 27 – 29, 2014

In January 2014, Queen's launched 3 new active learning classrooms. This presentation will include an overview of the rooms, why they were built, and reasons for technology decisions. A summary will be given of how the rooms have been received so far by students and professors, how we are supporting the rooms, and issues we have experienced. The focus will be on the IT side of things, rather than pedagogical value.

Lead Presenter: Don Harmsen
Lead Presenter Department: Queen's University / Information Technology Services
Lead Presenter Title: Educational Technology Analyst
Other Presenters:
Dave Smith, Production Director, Information Technology Services
Presenter(s) Biography:
Both Dave and Don have been involved in the classroom design since the beginning of the project in 2012. Both were either on-site or on-call to support the classrooms during the launch of the classrooms this January.

http://webapps.uwindsor.ca/conferences/oucc/call-for-papers/program-description.php?category=concurrent&id=30

CANADA'S PREMIER HIGHER EDUCATION IT CONFERENCE (CANHEIT) 2014

DEVELOPING AND SUPPORTING ACTIVE AND COLLABORATIVE LEARNING SPACES

There is large and growing body of evidence that shows active learning can have a positive impact upon students learning outcomes such as increased content knowledge, critical thinking and problem-solving abilities, and positive attitudes towards learning in comparison to traditional lecture-based delivery (Anderson et al, 2005); increased enthusiasm for learning in both students and faculty (Thaman et al. 2013); and the development of graduate capabilities such as critical and creative thinking, problem-solving, adaptability, communication and interpersonal skills (Kember & Leung 2005). There is also literature which

suggests that teaching spaces can have large impact on the ability to incorporate active learning teaching strategies (Chism and Bickford 2002; Oblinger 2006; Walker et al. 2011). In the winter of 2014 three recently renovated classrooms at Queen's University designed for active and collaborative learning were used for the first time. One of the primary goals of redesigning classroom space was to evaluate how teaching spaces can facilitate changes in approaches to teaching and transform student learning experiences. The purpose of this session is to learn about the design considerations, configurations and technology available in each of the three new active learning classrooms and to hear about the support and assessment model that has been implemented.

This session will begin with an overview of the three classrooms by an Educational Developer responsible for the support and assessment of the new active learning classrooms. This will be followed by a description of the chosen technology and functionality for each of the three rooms. Finally a summary will be given of how we are collaboratively supporting the rooms, issues we have experienced, and how the rooms have been received so far by students and professors. There will be an opportunity for session participants to hear about and ask questions regarding the design aspects of three new active learning classrooms, consider the configuration and the technology available in each room, and discuss the opportunities, advantages and challenges of the teaching strategies that were used in these spaces.

Then each of the panelists will in turn discuss how the classroom design and features influenced their approach to teaching and comment on the effect it had on their students' experience. The panelists chosen for this session each used one of the new classrooms and include experienced faculty members teaching a familiar course normally taught in traditional classrooms, an experienced faculty member teaching a newly designed course, and a new faculty teaching for the first time. Questions to each of the panelists will include: What influence did the space have on how your course was designed and taught? Can you give an example of what worked particularly well? What aspects of the space do you believe contributed the most to enhancing student experience and student learning? What surprised you about the space and how it influenced your class? What are some of the teaching and learning strategies that you used that you could not in other traditional classrooms? What was the reaction of your students to the space and the strategies that you used? What do you wish you had known before teaching in the active learning classrooms? What advice would you give other faculty teaching in these rooms for the first time? If you were to build another classroom for active learning and to help you transform your course what would it look like?

This panel will allow participants to hear about and ask questions regarding the design aspects of three new active learning classrooms, consider the configuration and the technology available in each room, and discuss the opportunities, advantages and challenges of the teaching strategies that were used in these spaces.

6

IMPLICATIONS AND FUTURE DIRECTION

EVENTS AND WORKSHOPS HELD IN ACTIVE LEARNING CLASSROOMS JAN.-JUNE 2014


Open house – Dec. 9th and Feb 18th

ITS Faculty Advisory and Student Advisory Committee

Shad Valley Queen's

MCAT Preparation Course

Authentic Task Workshop

School of Music Faculty Retreat

Queen's Library Public Services Renewal Project Staff Meeting

Global Development Studies Summer Institute

Library All Staff Meeting

Enrichment Studies – Aboriginal Access to Engineering Outreach Program

Interactive Anatomy Primer – School of Rehabilitation Therapy

Provost, Deans and Management Group Meeting

Mitacs – Presentation Skills workshop

Centre for Teaching and Learning Workshop Series – Teaching Dossiers, Active Learning Strategies

Project Management Skills Workshop – Faculty of Applied Science

School of Graduate Studies Media workshop

Annual Board of Trustees/ Senate Meeting

APPLICATION PROTOCOL

For the 2014 – 15 academic year it was decided that an application process should be employed to determine which courses should be given priority selection to use the Ellis Hall active leaning classrooms. An application form that accompanied each request was developed. The purpose of this application for is to ensure that instructor is aware of the features of the classroom they are requesting and provide an opportunity for them to articulate how they plan on using the room for active and collaborative learning. These applications were reviewed by an ED to determine which courses would be best suited for the rooms. The application form is below.

Queen's University / 14-15 Timetable Cycle

Ellis Hall Active Learning Classrooms: Booking Request Form

Thank you for your interest in booking one of the new Ellis Hall Active Learning Classrooms. As these are newly designed classrooms for active and collaborative learning we are asking all instructors who are interested in booking these classrooms to fill out the following form in order for us to understand how you intend to use the classrooms. This information will be used by the Ellis Hall Project Committee to choose which courses are most appropriate for these classrooms. For more information about the Ellis Hall Active Learning Classrooms please visit http://www.queensu.ca/activelearningspaces/ or contact Andy Leger PhD, Educational Developer in the Centre for Teaching and Learning, at AL7@queensu.ca .

1. *Course name:*
2. *Component type (LEC/TUT/etc):*
3. *Instructor name:*
4. *Instructor email:*
5. *Term of offering:*
6. *Enrolment:*
7. *Room Requested (Ellis 319/321/333):*
8. *Departmental Timetabling contact:*

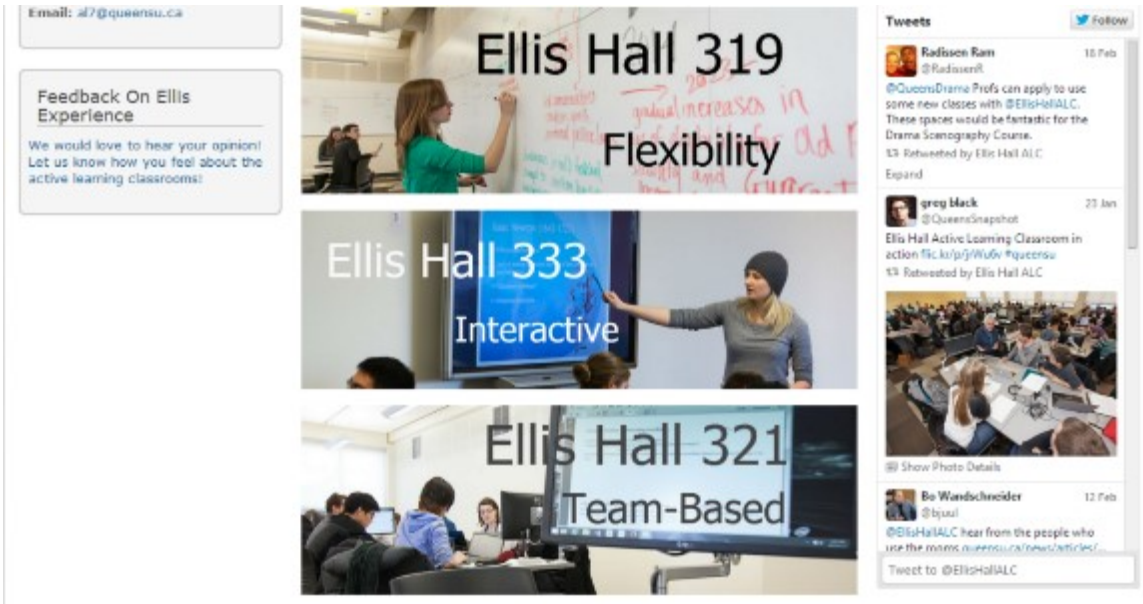
9. *Describe the features of the Ellis Hall classroom you are requesting that are of interest to you.*
10. *Provide examples about how you intend to use the classroom for active and collaborative learning?*
11. *Describe what changes you intend to make to your course to take advantage of the new classroom.*
12. *Would you like to meet with an Educational Developer to discuss your course and teaching strategies to support active and collaborative learning?*

DEVELOPMENT OF ACTIVE LEARNING CLASSROOM WEBSITE

Based on the findings from the study, feedback from faculty and students, and from investigating other universities that have active learning spaces websites, our website was updated accordingly. This website includes our Video which highlights the active learning classrooms and includes instructors and students' perspectives.

http://queensu.ca/activelearningspaces/

One significant addition to the website is the emphasis on the three distinct classrooms in Ellis Hall, with each classroom as a separate icon that leads to further information on the respective classroom.



TRAINING WORKSHOP FOR FALL 2014 FACULTY – "INTRODUCTION AND PLANNING"

Date/ Time: July 23 (Ellis 319), July 24 (Ellis 333), July 25 (Ellis 321) from 9:00-11:00am

Purpose: Sessions were meant to be a general overview of each room's capabilities, an opportunity for faculty to try out the features of the room, and for faculty to begin thinking about how they could incorporate these features and suggestions for specific teaching and learning strategies into their course design (e.g. active learning strategies such as collaborative learning, team based learning, case studies, debates, etc.). Faculty were not expected to be experts after this session, but instead were given a brief introduction to the potential use of these rooms. Follow-up sessions with more time spent on specific features of the room are expected to occur over the next month leading into the new school year.

Format:

1) Introduction of support and research team.

2) Introduction of faculty members using the room.

3) Activity: using the features of the room, faculty answered 4 questions: What are your first impressions? What do you expect will happen here? Describe the room in one word. What are the challenge to teach the room? The answers were then discussed as a group.

4) Each feature of the room was discussed, and faculty had the opportunity to ask questions and to try out the features themselves.

5) Findings from the research in the previous year were shared with the faculty, and representative quotes from students and faculty were used to solidify the data.

6) A handout of active learning strategies were given to faculty (see below).

7) Wrap up and discussion on what faculty felt they needed at this point in time (e.g., more training, more resources on active learning strategies, and suggestions for improving the function of the room)

SUGGESTIONS FOR 319

- Adding whiteboards closer to the floor for students with disabilities

SUGGESTIONS FOR 333

- Having a buzzer noise or audio to allow faculty to get everyone's attention when they are engaged in group work
- Supporting didactic moments: some type of focal point in the classroom so faculty's back is not facing students, and a place for instructions to be permanent so students can refer to it
- Having basic instructions on how to turn on mic, use the control display, how to save individual's works on computers or moodle.

SUGGESTIONS FOR 321

- Bring hand held mics into this room and try it out
- Labels per table with number corresponding to pod—maybe from dollar store like at weddings/ restaurants – maybe stickers on back of monitors or table cards
- Having a coloured index card on the screen so students can say when they are done their work
- Take picture of the control panel with arrows with functions of each button
- Can use the screens as a mini white board and students can walk around and see the different things everyone is working on
- Sending out email to remind faculty about opportunity to make appointments with Andy to come into the classroom before class or to go over their course design

ADDITIONAL RESOURCES FOR INSTRUCTORS

In response to Instructors request for additional instructions on the use and features of each classroom a user manual has been developed with illustrations and descriptions of particular functions. Copies of the manula have been placed in each room, has be sent to instructors at their request and will reside on the Ellis Hall Website. An example of the manual is below:

1. To display the podium PC/other source screen on all of the pod screens:

a. Select **Presentation Mode**

b. Select **Podium PC/VGA/HDMI**

NEXT STEPS AND FUTURE DIRECTION

At this moment, we possess evidence from instructor and students that tell us that the space influences teaching and learning positively. For the Fall semester 2014, we need to move from the question: *What* is the impact of space on teaching and learning? to *How* does the space impacts specific teaching strategies and learning outcomes.

Our next phase of research now will explore some of these topics:

- Faculty attitudes—those who chose to work in this space. Pre and Post use of the space.
- Support model for these types of rooms (generally)
- Compare those who came to training vs those who did not. Does training have an impact on teaching outcomes? (support/ attitudes)
- Influences of these classrooms on mental health, stress
- How space drives professional development and innovation
- Kinesthetic learning within space
- Faculty transferring their teaching to other classrooms
- Viral educational development – how telling one person has led to other people to want to use the classroom
- Development of specific learning outcomes: i.e. team work and dynamics of cooperation
- Shift of instructor driven to student driven (ownership)
- Examine 2nd time ALC Faculty
- Use of space on specific teaching strategies: case based learning
- Cross over design for Devs 100 – 4 in Ellis, 4 not in Ellis, and then they swap classes—first year tutorial, they are their own controls
- Joined room experiment- two classes taught in different rooms at the same time (APSC 100)
- Geography 101 blended learning approach in room 321– she has 5 years of data—lecture, online learning, and come to tutorial learning
- Authentic learning – the use of space to facilitate authentic learning practices
- Is learning improved by using ALC?
- Continuation of video analysis: Time on task; Frequency of interactions with students/ faculty

APPENDIX

LOI and Informed consent

End of Term Survey for Students – data for Ellis 319

Modified CATI tool for classroom activity analysis.

Active Learning Handout from Summer Training Sessions

INFORMED CONSENT FOR PARTICIATION IN THE STUDY OF ACTIVE LEARNING CLASSROOMS

Three classrooms on the third floor of Ellis Hall have been renovated to create new teaching and learning spaces designed for active and collaborative learning. One of the primary goals of redesigning classroom space in Ellis Hall is to evaluate how teaching spaces can facilitate changes in approaches to teaching and the influence on student experience and learning. Over the course of the project instructors and students that use these classrooms will be asked to reflect on the use of the rooms, the environment and their functionality. Understanding how the design of these spaces affects instructors and students will help inform decisions about future spaces here at Queen's.

As a member of this class you have the opportunity to use one of the new active learning classrooms at Queen's. As part of this research we would invited you to participate and provide us with your impressions of these classrooms. Your participation may include an on-line survey and focus group at the end of term and/or being videotaped during in-class activities. For the videotaped sessions, after course completion researchers will use a modified classroom observation protocol which quantifies time spent by students on certain activities related to teaching and learning. This data will be used to help understand how the classrooms are used, the interaction between students and with the instructor. Your identity will be protected to every extent possible and you will not be directly identified in any element of this research.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies. Only the research team will have access to the collected data and it will only be looked at after the course grades have been submitted. The course instructor will not have access to any data related to your name, student number and your answers will in no way affect your mark during the term. If for some reason you wish your individual responses to be removed from the data you can contact the researcher Dr. Andy Leger (Educational Developer in the Centre for Teaching and Learning) at AL7@queensu.ca or 613 533 6000 extension 75303.

There are no known risks involved in this study and the only benefit is the potential to assist us with evaluating these new classrooms. You are free to participate or not as you choose and, of course, you may discontinue at any time should you wish to do so. Although we are interested in aggregate information we will be collecting your individual responses. Every precaution will be taken for your responses to remain anonymous. For questions concerns or complaints about the research ethics of this study, please contact the Queen's General Ethic Review Board at (613)533-6081 or Chair.GREB@queensu.ca

Study participation will not affect your marks and your course personnel (instructors, TA's, markers) will not know if you participated. Your identity will be rigorously protected, as researchers will create a unique code for every participant recruited for the study. Assigned codes will be used in any and all publications. The only research personnel who will know who is participating in the study will be the research coordinator Andy Leger and interviewing personnel who will have signed confidentiality agreements.

Your participation and the participation of other students will provide invaluable insight into how we can improve the teaching and learning spaces at Queen's.

If you would like to participate then please check the appropriate boxes on the other side of this page, and sign and date the form.

Consent to participate in the study

Assessment of Active Learning Spaces

Please check the appropriate box or boxes to indicate your participation choices as described in the attached letter:

☐ I do not wish to participate in the study.

☐ I consent to responding to a short on-line survey at the end of the term.

☐ I consent to allow the use of audio/ video recording of class/ group based activities, undertaken as part of my course. I understand that all data will be anonymized and this will in no way affect my grades or standing in the course.

☐ I consent to be contacted about participating in focus group interview sessions at the end of term.

Student name: _____

Student ID number: _____

Student signature: _____

Preferred email address: _____

Date: _____

End of Term Survey for Students – full data for Ellis 319

The ELLIS HALL CLASSROOM in which I am taking this course…

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Promotes Discussion	1 (1.9%)	1 (1.9%)	9 (17.0%)	31 (58.5%)	11 (20.8%)
Facilitates multiple types of learning activities.	2 (3.8%)	1 (1.9%)	12 (22.6%)	24 (45.3%)	14 (26.4%)
Encourages my active participation	3 (5.7%)	2 (3.8%)	15 (28.3%)	25 (47.2%)	8 (15.1%)
Enriches my learning experience.	2 (3.8%)	4 (7.5%)	17 (32.1%)	17 (32.1%)	13 (24.5%)
Helps me develop confidence in working in small groups.	4 (7.5%)	1 (1.9%)	11 (20.8%)	25 (47.2%)	12 (22.6%)
Increases my excitement to learn.	4 (7.7%)	8 (15.4%)	19 (36.5%)	13 (25.0%)	8 (15.4%)
Helps me develop professional skills that can be transferred	5 (9.4%)	9 (17.0%)	22 (41.5%)	8 (15.1%)	9 (17.0%)
Offers a physically comfortable learning environment.	2 (3.8%)	5 (9.4%)	8 (15.1%)	22 (41.5%)	16 (30.2%)
Makes me want to attend class regularly.	4 (7.5%)	7 (13.2%)	16 (30.2%)	19 (35.8%)	7 (13.2%)
Helps me develop connections with my classmates.	2 (3.8%)	1 (1.9%)	7 (13.2%)	31 (58.5%)	12 (22.6%)
Enables me to communicate effectively.	2 (3.8%)	5 (9.4%)	11 (20.8%)	25 (47.2%)	10 (18.9%)
Helps me develop confidence in presenting.	4 (7.5%)	3 (5.7%)	20 (37.7%)	20 (37.7%)	6 (11.3%)
Engages me in the learning process.	3 (5.9%)	2 (3.9%)	9 (17.6%)	29 (56.9%)	8 (15.7%)
Nurtures a variety of learning styles.	2 (4.0%)	4 (8.0%)	10 (20.0%)	27 (54.0%)	7 (14.0%)
Helps me develop connections with my instructor.	1 (2.0%)	2 (4.0%)	20 (40.0%)	23 (46.0%)	4 (8.0%)
Deepens my understanding of the course content.	4 (8.0%)	3 (6.0%)	19 (38.0%)	22 (44.0%)	2 (4.0%)
Assists me in understanding someone else's views.	3 (6.0%)	1 (2.0%)	19 (38.0%)	25 (50.0%)	2 (4.0%)

Encourages me to create or generate new ideas, products, or ways of understanding.	3 (6.0%)	3 (6.0%)	19 (38.0%)	22 (44.0%)	3 (6.0%)
Is an appropriate space in which to hold this particular course.	2 (4.0%)	7 (14.0%)	6 (12.0%)	23 (46.0%)	12 (24.0%)
Helps me get excited about the subject matter.	3 (6.0%)	6 (12.0%)	25 (50.0%)	13 (26.0%)	3 (6.0%)
Assists me in maintaining focus and attention.	3 (6.0%)	8 (16.0%)	16 (32.0%)	16 (32.0%)	7 (14.0%)
Helps develop a sense of community.	1 (2.0%)	2 (4.0%)	10 (20.0%)	26 (52.0%)	11 (22.0%)

Compared to other traditional classrooms of a similar size, the ELLIS CLASSROOM ....

	More than in a traditional classroom	Same as a traditional classroom	Less than a traditional classroom
Enabled the instructor to make intentional connections between theory and practice in this course.	17 (34.0%)	29 (58.0%)	4 (8.0%)
Allowed the work of a group of students to be displayed or projected to the whole class.	38 (76.0%)	11 (22.0%)	1 (2.0%)
Allowed the instructor to consult with individual students during an in-class learning activity	25 (50.0%)	20 (40.0%)	5 (10.0%)
Allowed for in-class learning activities which required students to explain course ideas or concepts to other students.	29 (58.0%)	21 (42.0%)	0 (0.0%)
Offered a physically comfortable and welcoming learning environment.	33 (66.0%)	14 (28.0%)	3 (6.0%)
Engaged me in the learning process.	25 (50.0%)	22 (44.0%)	3 (6.0%)
Nurtured a variety of learning styles.	26 (53.1%)	19 (38.8%)	4 (8.2%)
Helped me develop connections with my instructor.	16 (32.0%)	30 (60.0%)	4 (8.0%)
Deepened my understanding of course content	15 (30.0%)	32 (64.0%)	3 (6.0%)
Energized me.	19 (38.0%)	30 (60.0%)	1 (2.0%)
Helped me explain course ideas or concepts to other students.	26 (52.0%)	23 (46.0%)	1 (2.0%)
Helped me work with other students on projects during class.	36 (72.0%)	13 (26.0%)	1 (2.0%)
Allowed me to ask questions during the class.	19 (38.8%)	27 (55.1%)	3 (6.1%)

Allowed me to contribute to the class discussions that occurred during class.	18 (36.7%)	29 (59.2%)	2 (4.1%)
Helped me to follow the instructor lecturing	21 (42.9%)	20 (40.8%)	8 (16.3%)

OVERALL

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Taking a course in this ELLIS HALL CLASSROOM was better than a traditional classroom.	1 (2.0%)	7 (14.3%)	10 (20.4%)	18 (36.7%)	13 (26.5%)
My learning was enhanced by being in this ELLIS HALL CLASSROOM.	1 (2.0%)	5 (10.2%)	17 (34.7%)	16 (32.7%)	10 (20.4%)
The in-class learning activities for the course were enhanced by features of the classroom.	1 (2.0%)	2 (4.1%)	11 (22.4%)	24 (49.0%)	11 (22.4%)
The instructor was effective in using the classroom for instructional purposes.	2 (4.2%)	2 (4.2%)	9 (18.8%)	24 (50.0%)	11 (22.9%)

Would you want to take another course in this ELLIS HALL CLASSROOM?

Response	Chart	Percentage	Count
Yes		80.4%	37
No		19.6%	9
		Total Responses	46

Strategies for Active Learning Handout

Jigsaw

In a Jigsaw, each member of a group is asked to complete some discrete part of an assignment, or collect some piece of information so that when every member of the group has completed his/her assigned task, the pieces can be joined together to form a finished product. This might involve each student becoming an "expert" in one particular area in order to share that expertise with the other members of the group.

Readiness Assurance Tests (RATs)

This is a multi-step instructional sequence repeated several times per term to focus the majority of class time on helping students use the concepts from assigned readings. The strategy helps insure that students do the assigned readings before coming to class.

After setting a reading assignment, begin class time by having students take a short test (either SAQ or MCQ) that they must complete on their own. While the individual tests are being graded, students work in teams to either re-take the test as a group or to discuss it. The group discussion and peer input can help correct misinformation and deepen all students' understanding of the material. Group tests may also be scored. The rest of class time is used in ways that require students to apply the learning gained through the readings.

Note Sharing

After a particularly important or complex part of a lecture, invite students to compare the notes they took with those of a neighbor. Allow a few minutes for students to explain their thinking to one another and perhaps to supplement their own notes.

Calling on the next speaker

During class discussions, hand over the responsibility of calling on the next speaker to the students. After one student expresses his/her contribution/question, he/she calls on the next speaker.

Convince your neighbor

Pose a problem to the class, asking students to solve it on their own. After a set time, ask students to share and defend their answer with their neighbor. Debrief.

Poster Presentations/Tours

Having to produce a poster of the outcomes of a discussion or assignment multiplies the potential learning of all course members.

Truths and Truisms

Invite students to contribute to a posted list of things they have heard, or assume to be true, about the subject matter at hand. Then invite them, either individually or in small groups, to scour the available literature, websites, and other reliable resources to find, and reference, material that either supports or debunks each of the items on the list.

Take a Poll

In introducing a new topic, pose a yes-no question. Ask students to take 5 minutes to get up, walk around and pose that question to as many class members as possible, keeping tally as the go. Debrief by inviting students to share their results and reasons for their own responses. Use the results as the lead-in to the session.

Bell ringer

Adapt the classic lab exam format to deliver new material, practice skill development or present issues for discussion. Prepare activities, questions or new information for each station being sure that the demands of all stations will take approximately the same amount of time to complete. Divide the students into groups and have each group begin at a different station. Groups rotate through each station at timed intervals until all groups have gone through all stations.

Carousel

Less formalized than a bell ringer, this strategy involves students walking freely through the class to contribute responses to questions that have been posted around the room. The flexibility of the activity enables students to build upon others' contributions and revisit stations multiple times.

Think-Pair-Share

Pose a question to the class – one that requires some analysis, hypothesis or evaluation. Give students a minute to think and write down some thoughts on the question. Then invite them to share their thoughts with one or more others. Debrief as a class afterward.

Forced Debate

a. Ask all students who agree with a particular proposition to sit on one side of the room and all opposed to sit on the other side. It's helpful to post signs indicating the position taken. After groups have sorted themselves out, switch the signs and ask students to argue for the position with which they disagree. This is a great activity to get students to consider alternative perspectives. Leave plenty of time to debrief.
b. Assign students to one of 3 groups: pro, con or moderator. Each of the pro and con groups prepare to argue their position while the moderator group devises questions for each group. Pro and con groups each get a set amount of time to present their positions before the moderator group begins to pose their questions. Pro and con groups each get 3 more minutes to summarize and rebut. The moderator group determines which group proposed the most reasoned argument.

Buzz Groups

Give one or two prepared questions to groups of three to five students. Each group is asked to record their discussions or solutions to report to the class as a whole either orally or in a poster-session walk-about. Debrief to help synthesize the groups' answers.

Take a Stand

Pose a question (or a series of questions) that require(s) students to take a stand, on an imaginary Likert scale, to indicate the degree to which they agree or disagree. Ask students then to match up with someone who holds a different opinion from their own to consider alternative viewpoints. Debrief.

Question of the day

At the end of the session pose or post a question that is based on the day's topic. It can be a question similar to one that might appear on the final exam, one that requires students to synthesize the day's material or one that provokes an opinion. Discuss the answer to the question to start the next session or post the answer to a website or listserv a few days after the class.

Learning Tasks

Described by Jane Vella, learning tasks are faculty-devised activities that invite students to immediately apply their learning. They usually take the form of an open-ended question that can be answered using the immediately available resources of the course to date.

Case Studies

Using written descriptions of a problem situation, complete with background and context, students are required to analyze and propose solutions.