

Examining Social Learning in an Active Learning Classroom through Pedagogy-Space-Technology Framework

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This case study examined students' and the instructor's perceptions of active learning classrooms (ALC) as well as their interactions in a class in a Midwestern university. Data were gathered from classroom observations and semi-structured interviews with faculty and students in a graduate-level course. Thematic analysis was used to analyze interview data; and inductive content analysis was used to analyze the weekly video recordings. The results showed that the active-learning classroom was perceived as more flexible environment for movement and communication in small groups than that in the traditional classroom. The implications for the active learning classroom design were provided.

Introduction

The interest in designing technology-enhanced Active Learning Classrooms (ALCs) to improve students' learning has increased (Kim & Hannafin, 2010). Typically, ALCs include movable round tables, whiteboards around the classroom, computers for instructors, and large screens (Beichner et al., 2007; Parsons, 2016; Walker, Brooks, & Baepler, 2011; Whiteside, Brooks, & Walker, 2010). The design of ALCs promotes an interactive learning environment for student-centered learning in which the instructor's role is changed from delivering information to facilitating classroom activities (Ge, Yang, Liao, & Wolfe, 2015).

Space design impacts students' learning and instructors' teaching. ALCs positively influence: learning outcomes (Brooks, 2011; McArthur, 2015; Walker et al., 2011; Whiteside et al., 2010), learning attitude (Baepler, Walker, & Driessen, 2014), satisfaction (Yang, Becerik-Gerber, & Mino, 2013), learners' motivation (Beichner et al., 2007; Dori et al., 2003), and use of innovative practices supported by the space design (Baepler & Walker, 2014; Walker et al., 2011; Whiteside et al., 2010). For example, Beichner (2014) and Freeman et al. (2014) found that learning from passive lecture settings was not as effective as learning in active learning environments.

Space enabled pedagogy also plays a critical role. For example, Walker et al. (2011) stated that using team-based learning in an ALC improves learning better than using lecture-based instruction in ALCs. In addition, technology in the classroom could engage learners and enhance their content learning (Brewer, Kramer, & O'Brien, 2009; Whiteside & Fitzgerald, 2005), increase both learning achievement (Educause, 2010), and information retainment (Barkley, 2010).

Literature Review

The pedagogy-space-technology (PST) framework

The PST framework is used in this study. It was used as guidance for the design and evaluation of new active learning spaces that could engage students and improve students' learning outcomes (Radcliffe, Wilson, Powell, & Tibbetts, 2008). The framework helps stakeholders consider three aspects of ALC design: learning objectives and pedagogies, space design and arrangement, and technology use to improve learning (Lee, Morrone, & Siering, 2018). The components of the PST framework are interrelated (see Figure 1). Lee et al. (2018) noted that pedagogy is enabled by space and enlarged by technology; space embeds the technology and encourages pedagogy, and technology enhances pedagogy and extends the existing space.

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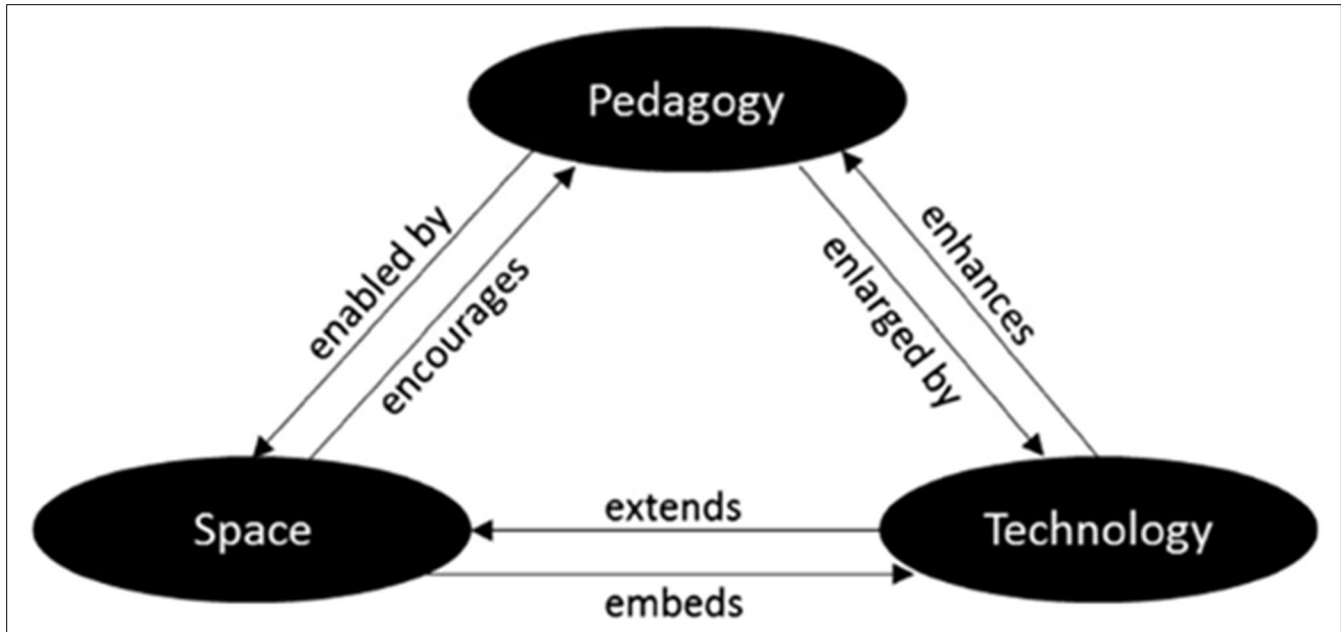


Figure 1. The PST framework (Lee et al., 2018; Radcliffe et al., 2008)

Social learning theory

ALCs are designed with the purpose of supporting active, collaborative, and student-centered learning based on social learning theory (Bandura, 1977) and social constructivism theories (Lee et al., 2018). Both place value on the importance of social interaction for knowledge construction (Dillenbourg, 1999; Palincsar, 1998). Learning is a social process with knowledge acquired through direct experience and observational learning from role models (Gong, Huang, & Farh, 2009). Students' interactions with instructors and peers are paramount (Moore, 1993). The instructional approaches for social learning include collaborative problem-based learning (Barrows & Tamblyn, 1980; Hmelo-Silver, 2004; Savery, 2006), collaborative project-based learning (Bell, 2010), and team-based learning (Michaelsen & Sweet, 2011).

Active learning classroom

ALCs refer to the classrooms with movable furniture, accessible whiteboard(s), and technology (Beichner et al., 2007; Dori & Belcher, 2005; Parsons, 2016; Whiteside et al., 2010). ALCs are designed to encourage collaboration, interaction among students and instructors, engagement of students' learning, and fostering problem-solving (Baepler, Walker, Brooks, Saichaie, & Petersen, 2016; Beichner, 2014; Parsons, 2016). SCALE-UP (Student-Centered Active Learning Environment with Upside-down Pedagogies) is one of the most widely known examples of an ALC model

(Beichner, 2014). It includes the flipped classroom model in which students learn basic knowledge before they come to the class in order to participate in collaborative learning activities (Beichner, 2014; Beichner et al., 2007). Another example of ALCs is TEAL (Technology-Enhanced Active Learning). Instructors used short lectures, simulations, and hands-on desktop experiments in which data was visualized (Dori et al., 2003). Building on the SCALE-UP and TEAL models, PAIR-UP (Pedagogy-rich; Assess learning impact; Integrate innovations; Revisit emerging technologies) designed ALCs to support collaborative learner-centered learning approaches (Whiteside, Jorn, Duin, & Fitzgerald, 2009). Similarly, TILE (transform, interact, learn, engage) initiative intended to innovate teaching through team-based learning and inquiry-based learning (Florman, 2014). ALCs have a positive influence on students' learning outcomes and attitudes (Beichner et al., 2007; Brooks, 2012; Dori & Belcher, 2005; Walker et al., 2011). Nevertheless, there is a paucity of research focused on learners' and instructors' perceptions of ALCs, and the interactions among instruction and students.

The purpose of this study is to examine the instructor's and students' perceptions of learning in ALCs and the interactions among instructor and students. The following research questions guided this study.

1. How do instructors and students perceive the benefits and challenges of using ALCs compared to the traditional classroom?
2. How does the interaction between students and their instructor manifest in ALCs?

Methods

A case study approach was employed to analyze events, persons, decisions, and projects in a rich information context (Yin, 1994). It permits a detailed examination of both the situation and contextual background, with regard to classroom activities.

Context

The context of this study is a graduate-level face-to-face course in a College of Education at a Midwestern university during the 2018 Spring and Fall semesters. The purpose of the course was to introduce the critical qualitative inquiry method. The Spring curriculum covers the basic concepts; the Fall pertains to the application of the theories and development of practical skills. The Fall semester focuses on using interview as a data collection method. The instructor, a Caucasian male, was a faculty member with over 30 years of experience. He was an expert in the critical qualitative method field.

The 13 students enrolled in the class were doctoral students from diverse programs in the College of Education. Students who enrolled in the Spring semester were required to take the follow-up course during the Fall semester. However, the classroom changed from traditional to active learning for Fall semester. The structure of the course included weekly readings, classroom discussions, and practices.

Data collection

Three data sources in this study were: (1) classroom observation, (2) semi-structured interview with students, and (3) semi-structured interview with the instructor. The first author of this study observed the course for two semesters and video recorded the active learning classroom activities in Fall 2018. The researchers analyzed classroom recordings from Week 4 to Week 10, after obtaining consent from the students. Each classroom recording lasted from 1 hour to 2.5 hours.

Face-to-face 20-40-minute semi-structured interviews were conducted with five students. They were audio-recorded and transcribed automatically in Kaltura. The accuracy of the transcriptions was manually checked and revised as needed. To ensure the trustworthiness of the study, first-level member checking was conducted with the five interviewees. They were sent verbatim interview transcripts to confirm the transcripts matched what they intended to convey. A semi-structured interview was also conducted with the instructor following the same procedure as the student interviews.

Data analysis

Interview analysis. The interview data was analyzed using thematic analysis (Braun & Clarke, 2006; Braun, Clarke, & Rance, 2014).

Table 1. Coding Scheme for the Interviews

Category Name	Sub-categories
Instructor Interview	
Emotional and social aspects of the ALC (Instructor’s perceptions of the social and emotional ambiance of the ALC)	1- Equal relationship 2- Community 3- Accessibility
Physical aspects of the ALC (Instructor’s perceptions of the physical structure of the ALC)	1- Classroom size 2- Color 3- Lights 4- Technology 5- Tables 6- Windows 7- Whiteboard
Challenges (Instructor’s opinions regarding the issues with the ALC)	1- Fixed group 2- Eye contact
Student Interviews	
Instructional Activities (Students’ perception of effective and useful instructional activities at the ALC)	1- Effective instruction 2- Favorite class activities
Advantages of the ALC (Students’ perceptions of powerful aspects of the ALC)	1- Comfortable furniture 2- Flexibility 3- Easy communication 4- Power outlets
Disadvantages of the ALC (Students’ perceptions of weak aspects of the ALC)	1- Difficulty to hear classmates’ discussion 2- No window

To increase trustworthiness, two researchers coded the six interview transcripts individually. Next, they discussed any discrepancies in order to reach consensus on categories and themes.

In the data coding process, an inductive approach was used where the codes and themes were derived from the content of the students’ and instructor’s interviews. Six main

conceptual themes were identified: (1) emotional and social aspects of the ALC, (2) physical aspects of the ALC, (3) challenges, (4) instructional activities, (5) advantages and disadvantages of the ALC, and (6) advantages and disadvantages of the traditional classroom. Displayed in Table 1 are the coding scheme with category names, values, and examples.

Video analysis. A content analysis method was used to inductively code classroom recordings to assist in determining the emerging themes (Elo & Kyngäs, 2008). Video recordings were reviewed, and the key events in the videos were individually openly coded using Microsoft Excel 2016. In pursuit of the trustworthiness of the codes, there were four face-to-face researcher meetings to discuss the discrepancies in the coding until consensus was reached. The total length of each video recordings is presented in Table 2 by week number.

Week Number	Video Length
Week 4	2:48:04
Week 5	2:52:00
Week 6	1:20:41
Week 7	2:44:00
Week 8	2:35:00
Week 9	2:42:00
Week 10	1:37:17
Total Hours	16 hours, 39 minutes, 2 seconds

The categories of video analysis codebook are: (1) time, (2) interaction, (3) visuals, (4) location, (5) duration, and (6) instructional activities. Figure 2 presents an example from the Excel codebook.



Time	Interaction	Visuals	Location	Duration (in seconds)	Instructional Activity
13:09	Instructor starts class by distributing activity handout		Low Table 1 (L1)	64	Distributing handouts
14:13	Instructor stands and lectures in the middle of the room.		Middle Point	141	Lecturing

Figure 2. An example from the MS Excel video analysis codebook

Time refers to the first occurrence of a particular event in the classroom. It is stated in the hour: minute: second format.

Interaction is the written description of the activities taking place at a particular time. These descriptions are the qualitative depictions of the scene as seen by the researchers.

Visuals are the screenshots that best describe the indicated interaction. The purpose of this category is to provide researchers direct visual presentations of the activities.

Location points to the instructor’s location during the class. This variable has 17 fixed values based on the layout of the classroom: (1) Whiteboard, (2) Display Screen, (3) Whiteboard and Display Screen, (4) High Table 1 (H1), (5) High Table 2 (H2), (6) High Table 3 (H3), (7) Between H1 and H2, (8) Between H2 and H3, (9) Low Table 1 (L1), (10) Low Table 2 (L2) (11), Low Table 3 (L3), (12) Between L1 and L2, (13) Between L2 and L3, (14) Door, (15) PC, (16) Middle Point, and (17) N/A. These values were selected from a drop-down list by the researchers. Figure 3 displays the layout of the classroom.

Duration is the time spent between the two-consecutive interactions. It was calculated by seconds.

Instructional activity refers to class activities that were implemented by the instructor. Similar to the location variable, the instructional activity variable has 12 fixed values that are selected from a drop-down list. These values are: (1) Writing on the board, (2) Interactive lecturing, (3) Writing and lecturing, (4) Individual work, (5) Group activity, (6) Class discussion, (7) Role playing, (8) Responding student questions, (9) Distributing handouts, (10) Using digital resources (e.g., PPT, handout, video), (11) Checking prior knowledge, and (12) N/A.

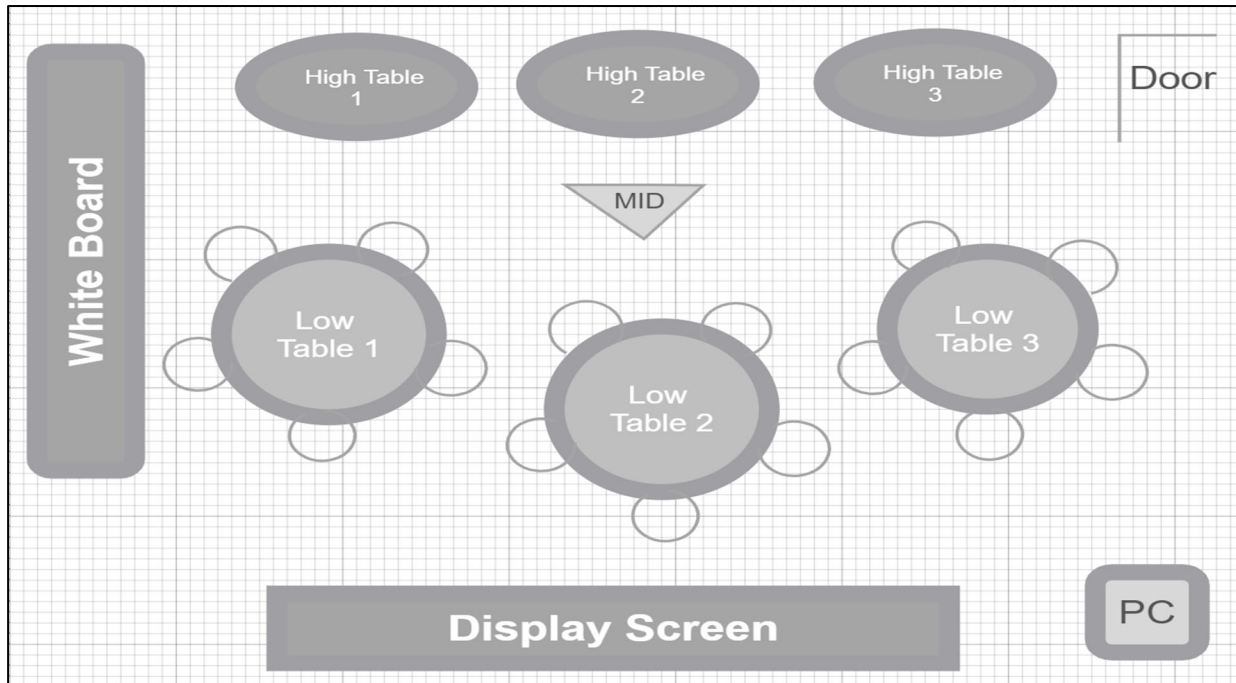


Figure 3. Classroom Layout (i.e., variables in the location category)

Findings

RQ1. How do instructors and students perceive the benefits and challenges of using ALCs compared to the traditional classroom?

The instructor reported the benefits of the ALCs from two perspectives: (1) emotional and social aspects and (2) physical aspects of the active learning classroom, as well as the challenges that discouraged him to reach the instructional goals.

The emotional and social aspects included: (1) equal relationship, (2) a sense of community, and (3) accessibility. Given that the ALC does not have an instructor table or podium similar to the traditional classroom, the instructor was flexible with using different places in a classroom. The instructor said "the first classroom [traditional classroom] had a real front. And [in] the second classroom [ALC] you could use different places if you want." The instructor felt an equal relationship with the students by saying "I think it made it easier to be just informal, and not feel like there's a big difference between me and the students." In addition, the ALC gave the instructor a sense of community: "I liked that [ALC] because that made it feel more like a community." The third benefit is accessibility as the instructor said "it felt like it had enough room. So, we could walk around. And I get to the tables easily for small group work."

The instructor emphasized the importance of the physical space regarding: (1) classroom size, (2) color, (3) round tables, (4) whiteboard, (5) technology, (6) windows, and (7) lights. The instructor was very satisfied with the size of the ALC, and indicated "it is not too big. It was about the right size for the group of students I had." Regarding the color of the ALC: "I can't even remember what the color [of the ALC] is, which indicates that they didn't bother me." In addition, the instructor noted the round tables were very helpful for the instructional activities: "I like having small group activities using circular tables, which made that easier and better." The large whiteboard was appreciated: "It had a very large whiteboard. Yeah. That was different from the screen. And I liked that." Apart from the traditional physical space, the classroom was equipped with one computer and one large screen. The instructor enjoyed using the technology in the classroom and said, "I use PowerPoints sometimes and I liked it. I thought it was perfectly fine. Sometimes I show little video clips. So, it was enough technology for me." Although the instructor was comfortable with the classroom size, color, technology, round tables, and whiteboard, that was not the case with florescent lights and lack of windows: "I don't like that there are no windows in that room."

The instructor reported two instructional challenges existing in the ALC: (1) students' tendency to sit at the same

Table 3. Frequency and Percentage of the Locations Used by the Instructor (Note: *indicated the highest frequencies in each week)

Instructor's Locations	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Between H1 and H2	6.2%	7.0%	--	3.9%	--	6.9%	11.7%
	4	4	--	1	--	2	2
Between H2 and H3	--	--	9.7%	--	--	--	5.8%
	--	--	3	--	--	--	1
Between L1 and L2	--	--	--	--	12.5%	--	5.8%
	--	--	--	--	4	--	1
Between L2 and L3	--	1.8%	--	--	--	--	--
	--	1	--	--	--	--	--
Display Screen	--	--	6.5%	--	--	--	--
	--	--	2	--	--	--	--
Door	--	--	--	3.9%	--	--	--
	--	--	--	1	--	--	--
High Table 1 (H1)	*21.5%	14.0%	*25.8%	*19.2%	*28.1%	6.9%	*29.4%
	*14	*8	*8	*5	*9	2	*5
High Table 2 (H2)	*21.5%	*26.3%	*25.8%	--	--	17.2%	--
	*14	*15	*8	--	--	5	--
High Table 3 (H3)	3.1%	--	3.2%	--	--	--	--
	2	--	1	--	--	--	--
Low Table 1 (L1)	12.3%	7.0%	6.5%	15.4%	3.1%	3.4%	11.7%
	8	4	2	4	1	1	2
Low Table 2 (L2)	6.2%	1.8%	3.2%	7.7%	3.1%	3.4%	5.8%
	4	1	1	2	1	1	1
Low Table 3 (L3)	12.3%	7.0%	9.7%	3.9%	3.1%	10.3%	5.8%
	8	4	3	1	1	3	1
Middle Point	1.5%	8.8%	--	19.2%	12.5%	17.2%	5.8%
	1	5	--	5	4	5	1
PC	--	--	--	11.5%	--	10.3%	5.8%
	--	--	--	3	--	3	1
Whiteboard	13.9%	15.8%	3.2%	11.5%	25.0%	*20.7%	5.8%
	9	9	1	3	8	*6	1
Whiteboard and Display Screen	1.5%	1.6%	3.2%	--	--	--	--
	1	1	1	--	--	--	--
N/A	--	8.8%	3.2%	3.9%	12.5%	3.4%	5.8%
	--	5	1	1	4	1	1
TOTAL:	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	65	57	31	26	32	29	17

seat and match with the same people in the group activities and (2) difficulty to see everybody's faces. Students tended to sit at the same table throughout the semester which could be better if they could exchange seats: "most of the time they'd have the same partners, but I could have mixed them up more." Another challenge of using round tables was not seeing every student's face: "So, if I do want to address to the whole class, some students, they're not facing in my

direction at all because of this circular tables or I have their back."

Students reported three aspects regarding learning in the ALC and traditional classroom: (1) instructional activities, (2) the advantages of the ALC, and (3) the disadvantages of the ALC. Students considered that working collaboratively with peers is very effective. As an example, a student said "everyone should collaborate to make the learning

successful.” Moreover, students also enjoy group work and role-play in the class: “I like group work. It helps a lot. And I like role-playing.” Similarly, another student interviewee said “seeing other people role-play is very good.”

Regarding the physical advantages of the ALC, students indicated four aspects: (1) comfortable furniture, (2) flexibility to move around, (3) easy communication in small group discussions, and (4) power outlets. A majority of the students reported they were very satisfied with the comfortable and movable chairs and with having plenty of space to move around. One student said: “The chairs with casters are much easier to maneuver and move around.” On the contrary, students thought that the traditional classroom lacks flexibility. As one interviewee said: “The disadvantage of the other classroom [traditional classroom] was that it was too constricted, and it was too small. It was hard to maneuver around.” Similarly, another interviewee complained about the traditional classroom: “There was hardly [a] place for anyone to move. If someone had to walk out to drink water, at least four people had to move, or else you had to push people.”

In addition, the diverse round tables provided students opportunities to work collaboratively with peers and to discuss in groups. Specifically, for the students who were uncomfortable talking in front of the large classroom, the round tables offered a comfortable environment for them to express their thoughts in small groups. One student said: “I

feel more comfortable to attend a small group.” Given that the ALC has higher tables and lower tables, some students used the higher table for private group discussion. For example, one interviewee mentioned that: “when I practiced doing the interview with Lauren, I used the high table because we can talk very privately even though we are in the same classroom. It makes me more comfortable.” Another important feature of the ALCs is the power outlets on each round table. All the students brought their laptops to the class for note-taking or other learning activities. The power outlets are very important for students. One student expressed her thoughts on the power outlets and said: “It was really convenient for me to charge my laptop during the class.”

Despite many positive aspects of ALC, the students also noticed some disadvantages of using ALCs: (1) difficulty to hear other people’s discussion during the small group activities and (2) lack of windows. As one student stated: “When he [the instructor] sits with a group, we miss the ideas of their discussion. And when they reported it to us, it was just a summary. So, I missed a lot [of information].” Another disadvantage of this ALC is the lack of windows. This concurs with the instructor’s thoughts. One student said, “I’ve heard one instructor complain about that, that there was no windows and I’ve heard a number of students complain [about the window issue].”

Instructor’s Locations	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Total
Between H1 and H2	179	445	--	64	--	46	1733	2,467
Between H2 and H3	--	--	715	--	--	--	43	758
Between L1 and L2	--	--	--	--	2571	--	484	3,055
Between L2 and L3	--	120	--	--	--	--	--	120
Display Screen	--	--	867	--	--	--	--	867
Door	--	--	--	10	--	--	--	10
High Table 1 (H1)	427	600	292	227	329	50	354	2,279
High Table 2 (H2)	1590	1479	648	--	--	1172	--	4,889
High Table 3 (H3)	575	--	30	--	--	--	--	605
Low Table 1 (L1)	858	1098	677	542	355	1466	758	*5,754
Low Table 2 (L2)	1901	44	628	771	2427	13	553	*6,337
Low Table 3 (L3)	1320	337	83	436	258	1439	449	4,322
Middle Point	42	723	--	520	214	321	42	1,862
PC	--	--	--	1508	--	866	323	2,697
Whiteboard	1314	1133	203	791	1332	2325	89	*7,187
Whiteboard and Display Screen	406	27	34	--	--	--	--	467
N/A	--	2805	--	84	128	149	--	3,166
TOTAL:	8612	8811	4177	4953	7614	7847	4828	

Table 5. Frequency and Percentage of the Instructional Activities (Note: *indicated the highest frequencies in each week)

Instructional Activity	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Checking prior knowledge	--	--	--	--	3.1%	--	-
	--	--	--	--	1	--	-
Class discussion	22.9%	27.7%	6.6%	12.5%	9.3%	6.6%	11.7%
	14	15	2	3	3	2	2
Distributing handouts	--	--	--	4.1%	3.1%	3.3%	5.8%
	--	--	--	1	1	1	1
Group activity	*32.7%	3.7%	13.3%	16.6%	12.5%	10.0%	17.6%
	*20	2	4	4	4	3	3
Individual work	--	3.7%	23.3%	4.1%	6.2%	13.3%	--
	--	2	7	1	2	4	--
Interactive Lecturing	16.3%	*27.7%	*36.6%	*25.0%	*40.6%	*26.6%	*41.1%
	10	*15	*11	*6	*13	*8	*7
Responding student questions	3.2%	16.6%	--	12.5%	3.1%	10.0%	5.8%
	2	9	--	3	1	3	1
Role playing	11.4%	5.5%	16.6%	--	--	3.3%	--
	7	3	5	--	--	1	--
Using digital resources (PPT, handout, video)	--	--	--	12.5%	--	10.0%	5.8%
	--	--	--	3	--	3	1
Writing & Lecturing	--	3.7%	3.3%	--	6.2%	--	--
	--	2	1	--	2	--	--
Writing on the board	13.1%	11.1%	--	12.5%	12.5%	13.3%	5.8%
	8	6	--	3	4	4	1
N/A	--	--	--	--	3.1%	3.3%	5.8%
	--	--	--	--	1	1	1
TOTAL:	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	61	54	30	24	32	30	17

RQ2. How does the interaction between students and the instructor manifest in ALCs?

There was considerable active instructor-student interaction in class, even though the instructor often used the table and whiteboard. The interaction was manifested through the frequency of locations visited by the instructor, time spent at each location, and instructional activities across the seven weeks of the semester observed for our study.

Compiled in Table 3 are the frequency (percentage) of locations used by the instructor by weeks. The High Table 1 was used most frequently in Week 4 (21.5%), Week 6 (25.8%), Week 7 (19.2%), Week 8 (28.1%), and Week 10 (29.4%). High Table 2, on the other hand, was the most prevalently used location in Week 4 (21.5%), Week 5 (26.3%), and Week 6 (25.8%). The primary reason for the high-frequency use of High Tables 1 and 2 might be that the instructor considered them the more useable tables as the front tables were very close to the whiteboard. Finally, Whiteboard was the most

visited location in Week 9 (20.7%), which may have resulted in the instructor informally designating the front side of the ALCs, as the place where instruction was performed.

The total time, in seconds, that the instructor spent at specific locations is compiled in Table 4. The instructor spent most of class time near the whiteboard (7,187 seconds), followed by Low Table 2 (6,337 seconds) and Low Table 1 (5,754 seconds). The instructor typically used the whiteboard for interactive lectures.

The reason that more time was spent by Low Table 2 and Low Table 1 might be because the instructor sat by one table to listen to students' conversation and provide feedback when students worked on group activities.

The frequency (percentage) of the instructional activities in the classroom are depicted in Table 5. A group activity, discussion activities in each small group, has the highest percentage in Week 4 (32.7%). Interactive lecturing activity in which the instructor lectures and sometimes asks questions of students is the most frequently used strategy in

all weeks, with the exception of Week 4. The instructor used small group discussions and interactive lectures often in the class, which concurs with student interview data. However, the technology use was less in this class due to its qualitative research nature.

Discussion

The aim of this study was to explore instructor's and students' perceptions of learning in ALCs and the interactions among an instructor and students using space, pedagogy, and technology framework (Lee et al., 2018; Radcliffe et al., 2008). The instructor and students had positive attitudes toward the ALC, which encouraged the small group discussion and interactive activities.

Students in the ALC perceived the learning space as better suited for flexibility in terms of moving around and communicating in small groups than the traditional space their class was held in during the previous semester. They reported a higher level of comfort with movable chairs and felt relaxed with the large space of ALC. The physical space provided the affordance of using group discussion and role-play as instructional activities. These findings support previous research indicating that the physical space wherein students and instructors interact is a significant element for both learning attitudes and teaching practices (Baepler et al., 2014; Harvey & Kenyon, 2013).

However, challenges exist with the spatial configuration of the room that made it difficult to hear other students' discussion during the small group activities. Large active learning spaces pose a disadvantage, because they increase the distance between instructor-students and students-students (Lee et al., 2018). To possibly mitigate this, the instructor used the center of the classroom as a lecture spot to minimize the distance from students and to overcome the proximity challenge. Therefore, the two spots in the center were used more frequently and effectively.

Another interesting finding is that differing heights of tables and chairs provide various functions in class activities. Parsons (2016) found circular table discussions encourage dialogue and support the sense of community among students. Similarly, McArthur (2015) suggested classrooms equipped with movable chairs and tables significantly impact student learning. The results of this study indicate low circular tables and chairs were mostly used by students while listening to the lecture, but high circular tables and chairs were used as a podium for the role-playing activities such as mock interviews or debates.

The pedagogic approaches implemented in the ALC were examined from the perceptions of students and teachers as well as video recordings. Baepler and Walker (2014) theorized ALCs "can alter in-class dynamics in two basic ways: first, by breaking down the hierarchies that divide

teachers and learners in traditional learning spaces, and second, by fostering greater affinity among students" (p.27). Drawing from Tiberius and Billson's (1991) conception of the educational alliance, Baepler and Walker (2014) listed several key features of the educational alliance such as (1) mutual respect and (2) shared responsibility for learning. Similarly, our findings showed alignment with the educational alliance framework (Baepler & Walker, 2014). For instance, the instructor stated ALC contributes mutual respect and equal relationship among the teacher-students by removing the "front side" and increasing accessibility to the teacher. Video recordings also echoed this argument, in which it was noted that the instructor was observed sitting by students and joining the small group activities at low circular tables.

Interactive lecturing, in which instructor and students had frequent conversations, was the most prevalent activity during all weeks. The instructor and students shared responsibility for learning. The instructor provides the opportunity for students to decide the flow of the lecture. This manifests that learning is a social process and students' interactions with the instructor and peers are important (Moore, 1993).

The use of technology in the ALC was another significant component. As indicated by previous research, technology in the classroom could engage learners and enhance their content learning (Brewer, Kramer, & O'Brien, 2009; Whiteside & Fitzgerald, 2005), increase learning achievement (Educause, 2010), and information retention (Barkley, 2010). The findings of this study revealed that the instructor did not often utilize the projector or computer. In both ALC and traditional classroom, printed handouts were most frequently used to share content. This might be due to the nature of this qualitative research course. However, most of the students used their laptops to take notes and to research during class. The power outlets available in each low circular table seemed to increase students' satisfaction with the ALCs.

Limitations

The subject of this study was a graduate level course on critical qualitative inquiry method. The data sources were 16 hours of video recordings of a highly philosophical research method course in an active learning classroom and six individual interviews with students and the instructor. Therefore, the use of space, technology, and pedagogy in active learning classrooms might differ in different classroom design and subject areas. In addition, the interactions between the instructor and students in the traditional classroom were not video-recorded.

Conclusions

A qualitative perspective of graduate students and an instructor was obtained regarding the room usage and instructional activities in an active learning classroom. We conclude that the physical space in ALC influences the social and emotional states of both the students and the instructor positively compared to the traditional classroom. The ALCs provide affordances for small group activities, equal relationship, learning community, accessibility, and flexibility to move around. In addition, the physical space also influences the pedagogy used within the classroom, and the height of the table and chairs appeared to influence the types of instructional activities. The small group discussion and interactive lectures were used often in the class in the ALC. Technology usage of instructor and students did not have obvious differences in the active and traditional learning classroom. Therefore, ALCs could promote interaction among the instructor and learners for social learning and enable diverse pedagogies in higher education.

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