STUDENT INTERACTION IN A TRADITIONAL COLLEGE CLASSROOM AND INTERACTIVE LEANING SPACE

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Abstract: This study examines the extent to which classroom structure helps create opportunity for discussion, interaction, engagement, and effective use of instructional technology. Prior research indicates that discussion and interaction are central elements in fostering meaningful exposure to coursework as well as helping students in the course access knowledge and contemplate issues. The research presented here compares a 'traditional classroom' with a designed 'instructional learning space'. Data was collected at the end of the semester through online scaled-questioner surveys and reveals significant differences among the two classrooms in students' reported interaction and engagement with more slight variation in the effectiveness of instructional technology.

INTRODUCTION

The study from which this paper developed is a broad examination of the classroom structures and factors that affect learning in meaningful ways. By creating a dynamic and interactive environment -allowing for connection among learners in the classroom as well as with content matter– instructors may enhance the learning process in significant ways. In examining classroom structure (physical environmental factors), this study highlights the ability of students to engage fully in learning activities, small group activities, guided discussion, etc. the efficacy of such activities in meaningful learning and contemplation/reflection.

Discussion and interaction are central to fostering meaningful exposure to college coursework and in assisting students in the course access knowledge about the multiple aspects underlying coursework – encouraging contemplation of the issues students are facing in their prospective fields. The basis for this paper is situated in current research on the effectiveness of content presentation (i.e. guided peer discussion, engagement with content) and classroom structure on perceived levels of interaction, engagement, and effectiveness of instructional technology. The study is based on the idea that this type of classroom structuring can help college students more effectively engage with content, other students, and the instructor. In addition, this study might encourage other college instructors to contemplate how their classroom structure affects learning and how it can help their pedagogic development.

BACKGROUND

The effects of classroom structure on teaching and learning is of interest to instructors and administrators. Over the past 25 years, a vast amount of research has addressed the influence of classroom environment on student learning (Ames, 1992). Although there is some research on classroom environment, this literature has been dominated by the effects of class-size, and much has been limited in the extent to which classroom learning is connected to motivation (Meece, Anderman, & Anderman, 2006). However, more recent research has begun to look at the impact of classroom environment on how students process information and their metacognitive associations regarding their performance (Guardino & Fullerton, 2010). Classroom environment and its relationship with student behavior and academic achievement has begun to pique the interest of researchers looking at motivation, engagement, and performance in the classroom. As Guardino and Fullerton (2010) note, "[a] well-organized classroom permits more positive interactions…" and "environmental modifications are a preventive, whole-class approach" to assist in reaching all learners (p. 9). Allowing for maximal interaction with content and among learners may be key factors to effectively increase students' motivation through modifying classroom environment to maximize such interactions.

Designing learning environments centered around student interaction can be a challenging task (Tanner, 2013). Accommodating multiple learning styles and individuals appears a daunting task; however, as Tanner finds, 'classroom equity' and structure may go hand-in-hand. This 'classroom equity' or "teaching *all* the students in one's classroom, not just those who are already engaged, participating, and ready to absorb what is being taught" entails engaging all students in opportunities for interaction with others as well as content (Tanner, 2013, p. 322). In modifying classroom environment, attention to details of environment – spatial structure – assists in the additive effects of creating a successful classroom.

The college instructor's approach to teaching requires arranging the classroom spatial structure in a way that maximizes student learning and encourages student involvement in the development of learning strategies (Tanner, 2013). Environments should be developed so that students consider personal connection to the content. Classroom environment should maximize student opportunities to work together and collaborate. Additionally, students need to have ample opportunities to work in cooperative learning situations; engaging with content as they engage with others and meaningfully connect with issues prevalent in practice (Ediger, 2009). As Helfrich (2014) suggests the 21st century learner may be attuned to flexible learning spaces, given current trends in collaborative learning and subject matter engagement. This type of learning environment supports various modes of learning and instruction such as collaboration, small-group discussion, guided inquiry, etc. in a way that easily and effectively alters as needed.

Meece, Anderman, and Anderman (2006) emphasized the "influence of classroom environments not only on students' academic engagement and achievement, but also on their motivation and their self-perceptions" (p. 488). Classroom environment includes aspects of the physical environment as well as structured practices, and these factors can create "different goal structures in the classroom and influence student outcome measures" (Meece, Anderman, & Anderman, 2006, p. 489). Classroom environment is also shown to influence cognitive strategies. Classroom environments that are structured toward different goals allow students to adjust cognitive strategies to match their perceptions of what the environment requires (Church, Elliot, & Gable, 2001; Lyke & Kelaher Young, 2006; Meece, anderman, & Anderman, 2006).

Students' perceptions of a classroom environment can affect student cognitive strategies and influence their goal orientations. Goal orientations, perceived classroom structure, and cognitive strategies are interrelated, creating a dynamic framework. Furthermore, student motivation and performance has shown to be the result of multiple influences, including contextual factors such as classroom environment (Lyke & Kelaher Young, 2006).

CLASSROOM STRUCTURE AND STUDENT INTERACTION

Classroom environment can also have an impact on behavior (Guardino & Fullerton, 2010). It's important to know, for example, that the physical environment of the classroom can improve learning, and prevent problem behaviors (Ediger, 2009; Guardino & Fullerton, 2010). Problem behaviors are minimized in classrooms where students are more fully engaged. In addition, classroom ethos as well as student achievement is enhanced through well-structured and organized environments that allow for interaction. In addition to behavior and academic performance, recent research indicates the positive effects of classroom structure on effective and meaningful collaborative learning and student interaction.

Over the last 20 years, with the increasing emphasis on collaborative learning, problem-solving, guided (and independent) inquiry, and critical analysis of content, classroom structure and environment have become issues of import to educational researchers (Ames, 1992; Church, Elliot, & Gable, 2001; Tanner, 2013). Research has shown that classroom environment affects not only achievement and academic engagement, but also student motivation and self-perception. This has led certain researchers to claim that classroom environment plays a critical role in all aspects of academic development (Ediger, 2009; Helfrich, 2014). The extent to which the environment plays a role in learning is not fully known. However, we now have enough research to know that the environment does impact learning in a variety of ways. For example, the more positive and productive environments emphasize learning, understanding, skill development, and knowledge. In addition, a more positive classroom environment is focused on providing opportunities for the demonstration of collaborative ability and experiences that foster self-efficacy and academic performance (Helfrich, 2014).

Students in different environments will have a different experience in class, and different learning outcomes depending upon the emphasis of the course. For example, the memorization of course content provides a different experience for students than the use of graphic organizers, or activities that seek to make connections between new information and prior knowledge (Lyke & Kellehar Young, 2006). Interaction and meaningful connection with content may enhance the strategies employed by students of differing learning styles within a dynamic environment that encourages collaborative activities and structure (Helfrich, 2014). Such structures allow students to develop effective strategies of learning that are deep, meaningful, and personally relevant.

Researchers define deep strategies as those which help with the organization of knowledge. These strategies can be helpful when integrating new information with prior knowledge. These are also known as elaboration strategies and include activities such as paraphrasing, identifying important points, analogies, generalizations, connections, and expanding on material already presented (Lyke & Kellehar Young, 2006). Organizational strategies can include conceptual maps, projects, papers, and authentic assessment strategies. Although these types of activities

play a role in knowledge development, this paper is based on the idea that classroom seating and structure plays a role in fostering deep strategies and elaboration strategies and can enhance organizational strategies. Finally, the classroom environment can also influence students' goal orientations (Lyke & Kelaher Young, 2006). Classroom environment can impact achievement goals, enhance engagement with content, and lead to effective strategy development for students with varied learning styles and goal orientations (Church, Elliot, & Gable, 2001; Ediger, 2009; Guardino & Fullerton, 2010; Tanner, 2013).

THE STUDY

The study examined two identical courses (two sections of the same course) taught by the same instructor in two different classrooms. One of the classrooms was a modified environment referred to in this research as the 'interactive learning space,' the other is referred to as a 'traditional classroom.' The traditional classroom has linear seating arrangements with stationary chairs. The interactive learning space has mobile Node™ chairs – a self-contained student 'desk' with built-in storage in the base, personal work surface, swivel seats, and casters. Ideally, the Node™ chair makes maximum use of the classroom space and allows for flexible grouping and seating arrangements. According to the manufacturer, *"a classroom can flex from lecture mode to groups, and back again, without interruption. Node™ can take passive space and make it active, supporting active and team-based learning, even when student density is important*" (Steelcase, Inc., 2015).

A number of schools have started using flexible instructional spaces including this with shares that provide the option of developing collective work spaces. (Helfrich, 2014). As Helfrich notes, "[i]f working at a project table seems too confining, students may opt for a more mobile option. With a swivel work surface to support books or devices and casters to move freely, Node chairs allow for instantaneous collaboration" (p. 77). These dynamic formations allow students to transfer easily between group work and individual work. The belief is that these educational environments influence students' learning and attitudes (Park & Choi, 2014). As posited by many researchers, spatial environments that offer ease of transition between tasks and encourage interaction help students connect with content and develop effective learning strategies (Church, Elliot, & Gable, 2001; Ediger, 2009; Guardino & Fullerton, 2010; Tanner, 2013).

In additional to seating arrangement, the interactive learning space seeks to foster learner engagement through the use of interactive whiteboards and smaller, portable whiteboards placed throughout the spaces to be used for notation of ideas as well as projection from various sources (i.e. instructor and student laptops) for viewing by the entire class. In addition, the interactive learning space is equipped with Apple TV allowing instructors and students to project from their iPads and/or iPhones. Replacing the traditional rows of desks with a variety of configuration possibilities in seating allows students to see each other, augmenting peer-to-peer interaction. The instructor podium is placed within the space and reduced in size to support a facilitator, rather than lecturer, role. Both spaces support a maximum enrollment of 24 students to allow for extended personal interaction.

The aim of the research presented here is a comparison of the modified classroom with a traditional classroom to see if the adapted space creates a more positive experience for students, thus improving learning and student retention in college-level courses. With the body of literature pointing toward the positive effects of interactive learning environments, with their dynamic seating arrangement and extended interaction, the study provided data that appears to show the beneficial effects of a dynamic interactive learning space with physical characteristics conducive to engagement with others and meaningful connection with content.

METHODOLOGY

A total of 98 students participated in the study. The students, enrolled in a Foundations of Education course, attended a face-to-face class in one of two types of classrooms – traditional and interactive learning space. In the program, classes are conducted in lecture format, but are supported by weekly discussion groups. Each section of the course allows for approximately 25 students, meaning 50 participants per semester for two semesters for a total of 100 students eligible for participation. Of this 100 eligible, 98 participants completed the surveys.

Data was collected at the end of each of the two semesters through online scaled-questioner surveys. Announced by an email distributed after final grades were entered, participants voluntarily completed questions on a 4-point Likert scale and included personal responses on open-ended questions, if they desired. The study utilized Qualtrics™ survey software to assure anonymity of participants and integrity of data.

Data was analyzed with a simple frequency analysis and comparisons/contrasts made between the different sections of the course. Histograms were made detailing the responses to each of the questions, broken up by section.

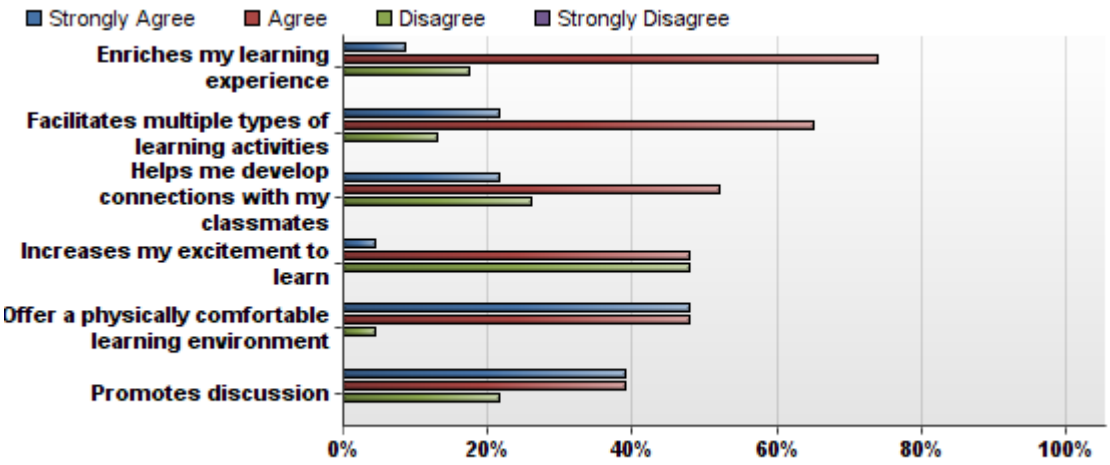
DISCUSSION OF RESULTS

Although there was some similarities in the reactions to the interactive learning space and the traditional learning environment, in many areas there are significant differences. Participants reported specific feelings or impressions about the classroom structure and the ways in which they believed it affected the learning environment and/or learners. First, I discuss the interactive learning space results and then move on to the traditional classroom reports; finally, discussion of differences in the two classrooms is offered and future directions suggested.

INTERACTIVE LEARNING SPACE

Because the interactive learning classroom in question is utilized for a variety of specialty courses, it is possible that a few students had prior experience of such a space. In fact, 5% of students indicated they had taken a course in a similar classroom – leaving 95% reporting no familiarity with this particular classroom environment before taking this course.

The following table depicts the surveyed results of the interactive learning space classroom students. For brevity in reporting results, the categories ‘Agree’ and ‘Strongly Agree’ (and conversely, ‘Disagree’ and ‘Strongly Disagree’) are aggregated and reported as total statistics.

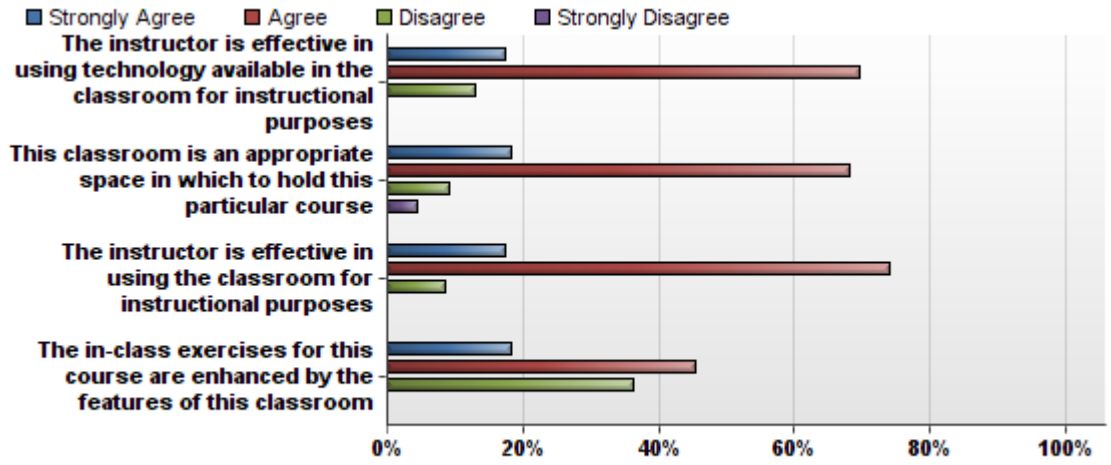


In the interactive learning space, a slight majority of students felt that the classroom increased their excitement and interest in learning. Specifically, 52% of students agreed or strongly agreed the classroom increased their

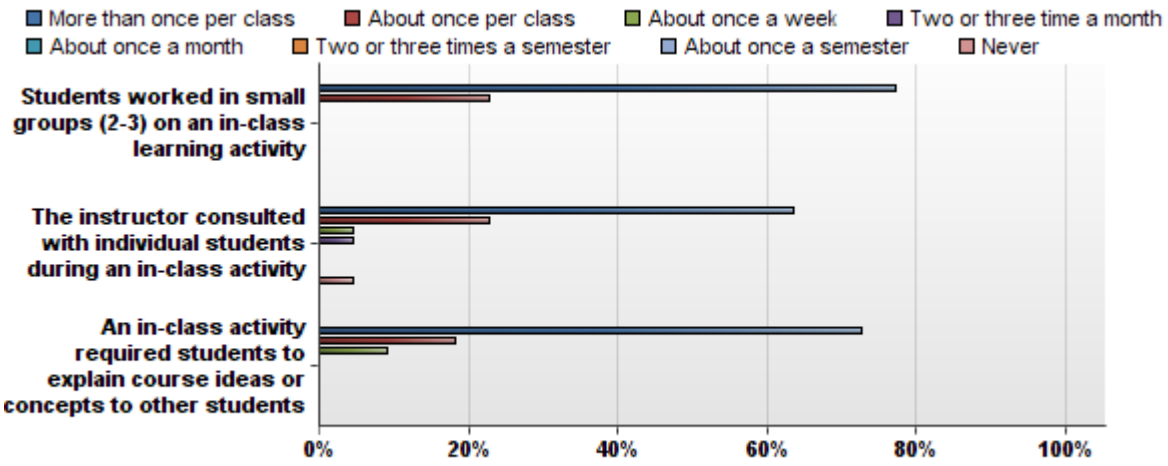
interest in learning. However, a vast majority of the students felt the classroom enhanced the type of learning activities available, and enhanced their learning experience. In fact, 87% of students felt the classroom enriched their learning experience while 78% of students indicated that the classroom promoted discussion and __% thought it helped develop connections with classmates, and 96% felt the classroom offered a physically comfortable learning environment. Finally, 82% of participants believed that the classroom nurtured a variety of learning styles.

Interestingly, less than half of the students (roughly 41%) felt that the classroom helped them develop a connection with their instructor. One suggestion for this finding is that the majority of students felt the classroom was a less significant factor in getting to know their instructor than other, more personal factors or interactions.

In the interactive learning environment students overwhelmingly agreed that technology was easily accessible for instructional purposes, the classroom is an appropriate place for the course, that the instructor was effective in using technology, and that in-class activities were enhanced by the structure of learning environment. The graph below represents student feedback related to these questions.



Results from questions concerning frequency of interaction and in-class activities are shown below. An overwhelming majority of students reported that in-class activities occurred at least once per class and that engagement with course content often necessitated during these interactions. Although fewer students reported frequent interaction between instructor and individual students, that may be a matter of time constraints rather than any other significant factors.



In addition to survey data, the researcher asked participants to give personal feedback some on the learning environment. The following excerpts are taken from this feedback; provided in their own words:

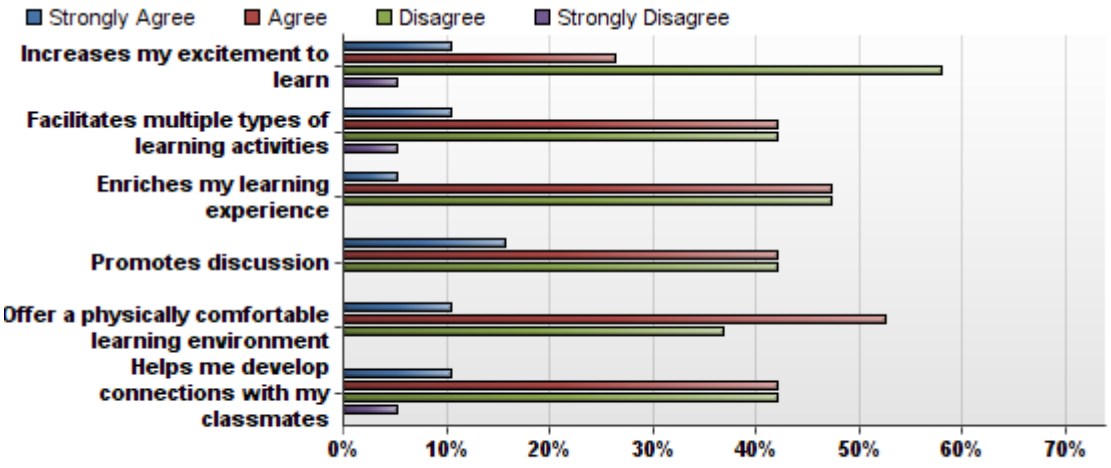
> *I like the individual chairs. The chairs do move (for group discussions they could be clustered together). I liked the use of multiple screens for viewing the PowerPoint presentations. The circle made it easy to see who was talking.*
>
> *It's easy to talk in groups in this space. The rows make it nice to break up discussion into smaller pieces that we can talk about in small groups and still share with the class.*
>
> *It is a bigger space so it is easier to move around if we need to work with groups. Partner discussion, it is easy to turn and talk to a partner in the classroom to discuss the content*
>
> *The room is great for group discussions in the way the desks are arranged.*
>
> *The central focus is on the teacher and board. The classroom set up makes it easy for me to read and take notes from the professors PowerPoint. The small groups worked well because it allowed us to share and communicate ideas with our fellow students.*
>
> *Any time we would have group discussion it was easy to hear other classmates and it was easy to ask the instructor questions because he was able to walk around the room. Also, the room was small enough so that you could ask him questions really wherever he was in the room.*

The comments for the interactive learning environment were positive, and tended to focus on the flexibility in the arrangement of the classroom, the extent to which it provided opportunities for engagement and interaction (particularly discussion), and the extent to which the classroom environment allowed students to access the instructional technology.

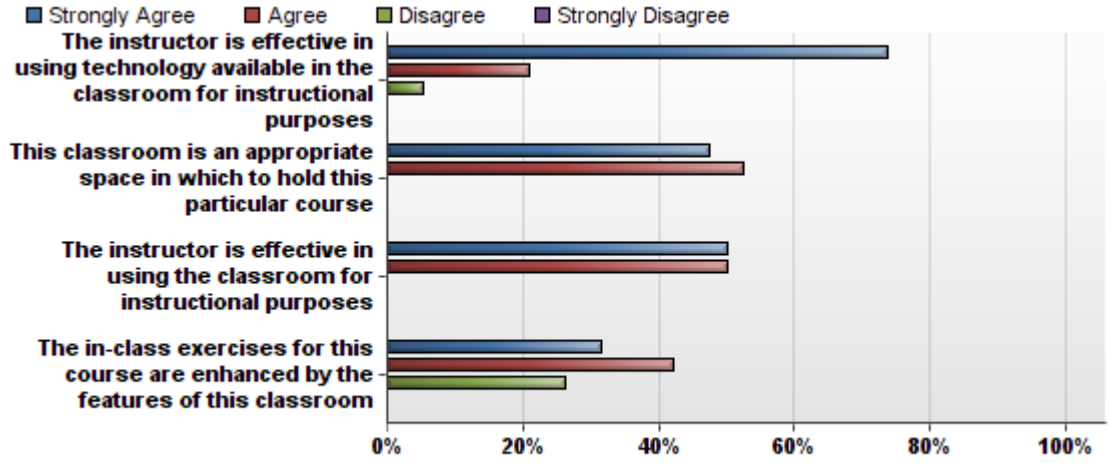
TRADITIONAL CLASSROOM

In contrast to the interactive learning space, 72% of the students in the traditional classroom indicated that they had taken a course in a similar classroom. Given the commonality of this traditional classroom structure, it is no surprise that the majority of students have experience with this environment. This also makes it easy to understand why a majority indicated that the traditional classroom offered a physically comfortable learning environment – familiarity may sustain a certain comfort level for individuals.

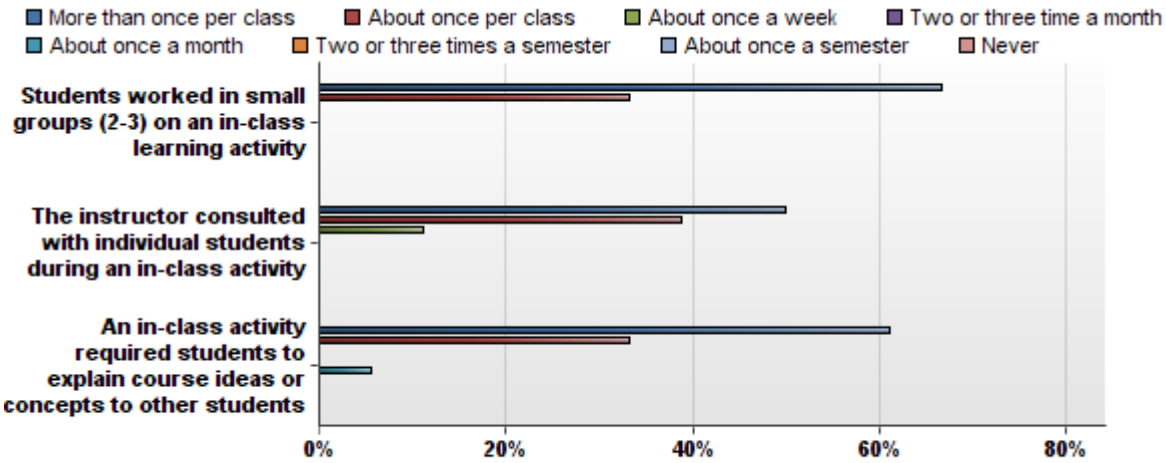
In the traditional classroom the majority of students indicated that the classroom did not enhance their interest or excitement in learning. In fact, 63% disagreed/strongly disagreed that the classroom increased interest in learning. The traditional classroom students were almost evenly divided on whether or not the classroom helped them develop connections with their classmates. Likewise, just a slight majority (52%) agreed/strongly agreed that the traditional classroom enriched their learning experience. Also, a mere 52% majority felt this classroom facilitated multiple types of learning activities.



All of the students in the traditional classroom agreed that it was an appriopriate environment for the course. In addition, all of the students agreed/strongly agreed that the instructor was effective in using the classroom for instructional purposes. A vast majority of the students felt the instructor was effective in using available technology for instuction. However, the percentage of students who felt the classroom features enhanced in-class exercises was not quite as significant. This may be attributed to the less dynamic environment of the traditional classroom with its relative difficulty in rearranging seating for these activities.



Both sections of this course are taught in roughly the same manner, with the same video clips, images, and powerpoint pesentations. In-class activities and discussion groups are utilized in both sections. All students in the traditional classroom reported working in small groups on in-class activities at least once per class. The majority of students felt the instuctor consulted with individual students at least once per class and in-class activities required engagement with content.



Students in the traditional classroom environment also provided personal comments in addition to the survey questions.In the traditional classroom, comments varied but tended toward the negative regarding spatial arrangement. The following are excerpts from these comments:

> *The classroom is visually unappealing, so I have a hard time focusing and staying engaged in the lessons.*
>
> *The classroom works well with lecture dominate course but discussion based courses such as this they are better suited elsewhere.*

Large group discussion is difficult because we are all sitting in rows. It's difficult to see anyone and so your comfort level in the room is rather low making it difficult to share any thoughts.

Doing group work, it is hard to form groups in the classroom because you may not always have room to disperse and when listening to other groups talk, you cannot see everyone in the room so it is hard to pay attention to who is talking if I can't see them.

There could be more space to move around or see the screen.

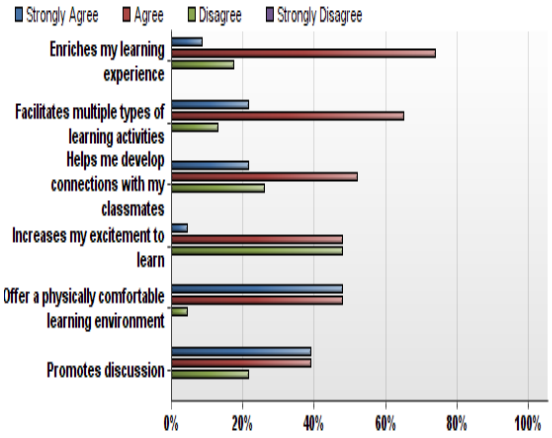
I wish it had windows. Sometimes I feel like I'm in a cinderblock cell.

The room does not facilitate cooperation and communication among students

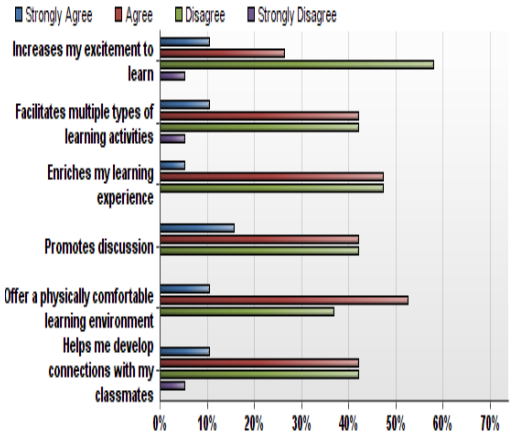
It is a standard classroom...not much to report!

A SIDE-BY-SIDE COMPARISON OF THE RESULTS

Interactive learning environment



Tradidional Classroom



When we compare the above histograms side-by-side, we can see that on the question of enhancing the learning experience, the perceptions of students in the interactive classroom are more positive. Namely, the vast majority of students in the interactive learning environment felt that the classroom enhanced their learning whereas only about half of the traditional classroom students agreed/strongly agreed with this statement. Similarly, facilitation of multiple types of learning activities shows disparities in perceptions of students in the different classrooms, with over 80% agreed/strongly agreed in the interactive learning space while just over half agreed/strongly agreed for the traditional classroom environment.

Perhaps the most telling of these differences is in the development of connections with others. Just over 50% of the students in the traditional classroom felt the environment helped develop connections with others while over 70% agreed/strongly agreed the interactive learning promoted such interactions. With the significance this paper has placed in the efficacy of interaction, personal connection to others, and meaningful learning experiences, the differences noted between these classroom environments is highlighted and detailed in the belief that effective learning environments should be constantly evaluated and adjusted as needed. Interactive, dynamic environments such as the one studied here may well provide multiple benefits for varied learners, multiple learning styles, various content areas, etc.

CONCLUSION

This study revealed clear differences in perspective regarding engagement, interaction, and environmental effects on the impact of instructional technology. The interactive learning environment enhanced interaction between students and instructor, as well as enhancing interaction between students in the classroom in small group discussion and overall classroom participation. Students had a very strong belief that the interactive learning

environment enhanced their learning. Further studies would be helpful in better determining the actual impact of the interactive learning environment on student learning outcomes.

One surprising of the study was finding out that students in the interactive learning environment had higher expectations regarding the use of instructional technology. Future studies might help clarify more effective uses of technology and instructional strategies for using technology in interactive learning environments as opposed to traditional classroom.

Another clear indication of this study is that more research is needed on interactive learning environments to better understand their potential and effective use in teaching college students in the university setting.

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