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How an Active Learning Classroom Transformed IT Executive Management

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Abstract

This article describes how our university built a unique classroom environment specifically for active learning. This classroom changed students' experience in the undergraduate executive information technology (IT) management class. Every college graduate should learn to think critically, solve problems, and communicate solutions, but 90% of students are not prepared for white collar jobs. Active learning pedagogy, which involves students directly in their own learning, improves these skills, but active learning exercises are difficult to implement in traditional rank-and-file classrooms. Students are accustomed to passive lectures and they tune out or stare at screens, further frustrating overworked faculty. In this article, we showcase the impacts of creating a modular space to support multiple arrangements and new activities, particularly group discussions. This room included state-of-the-art collaborative tools to support group work and writeable tables to encourage creative expression. Creativity is essential to discovering new solutions to difficult problems. Students reported that this combination of environment plus pedagogic change broke them out of their stupor. It forced them to think more critically and to become involved in class, which increased faculty satisfaction with the course. This article contributes to the literature on how to teach IT management to undergraduates. It also contributes to the sparse literature on how the classroom environment affects student learning, engagement, and critical thinking.

Keywords: active learning, learning environments, critical thinking, IT management, executive leadership, innovative pedagogy

1. INTRODUCTION

Employers expect college graduates will know how to think. College should prepare students to think critically, solve problems, and communicate solutions. Companies consistently rank critical thinking and communication in the top five skills new graduates should know how to do. Furthermore, most raw facts that students memorize are obsolete within a few years after graduation. This problem is even more acute in technology-based fields such as management information systems (MIS). Additionally, 90% of college graduates are unprepared to hold white-collar jobs, further reducing the value of their degrees (Selingo, 2015). Something needs to change, but how?

One important component of a well-rounded MIS education is information technology (IT)

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management. How can we train students to become IT managers? In this article, we discuss how we built a classroom specifically designed for active learning pedagogy, which enhanced the faculty's ability to teach skills needed in IT management. In active learning, students actively participate in classroom activities as opposed to being passive sponges of faculty wisdom. We changed the nature of learning by changing the learning environment. Students reported being more engaged in class and faculty enjoyed the flexibility to design more interesting sessions.

Executive IT management teaches students how to think strategically about IT resources from a manager's perspective – no easy feat for students with little or no work experience. More perplexing, the real world doesn't have "right" answers. To make good decisions, managers must take stock of available resources, assess options, and meet measurable goals. How do we teach students to do that, without creating clones of our own thinking? We must teach students how to actively think for themselves.

The next sections review the literature about active and place-based learning and describe the course and university settings in which this intervention happened. We then discuss how the IT management course was changed and the impacts on students and faculty. Finally, we describe the future of this research and suggest how other schools could implement this program.

2. LITERATURE REVIEW

Critical thinking is notoriously difficult to teach (Willingham, 2008), particularly in fast-paced, uncertain environments such as IT. Every day, we see thousands of companies solve similar problems in different ways. Did Apple get it right, or Microsoft? IT strategy differs from company to company and sometimes from moment to moment, even within the same company. So how can students with no corporate or IT backgrounds learn IT management?

Transferable critical thinking skills are the key. Skills transference occurs more frequently when learned in context rather than in a vacuum, and students' learning environment can profoundly affect what they take away from a course. Courses with more student-faculty interaction, active student involvement, and "teaching for understanding" increase students' capabilities, whether they are part-time or full-time students (Kember & Leung, 2005). Therefore, the combination of active learning in the right environment should improve students' ability to learn critical strategic thinking, which is a major component of good IT management.

Unfortunately, very little literature talks about how to use active learning to teach IT management. Few studies have measured its effectiveness and outcomes, and none discuss how to build an active learning classroom. For example, Duron, Limbach & Waugh (2006) outline a 5-step framework for critical thinking and active learning. One of the most effective skills teachers need is the ability to question. In other words, students are not spoon-fed answers; in an active learning environment, they must find the answers on their own. In our experience, students unaccustomed to this pedagogy find it frustrating at first, but these skills are vital for students entering an uncertain environment such as IT.

We need to prepare students to ask the right questions and to sift through mountains of information, some of it right, some wrong. Active learning in the right setting can do that. The next section further explains why active learning is vital to teaching IT management.

The Importance of Active Learning

Active learning is any kind of pedagogy that involves the student in his or her own learning, in contrast to more traditional, "passive" forms of teaching such as "sage on the stage" style lectures (Wingfield & Black, 2005). Considering active learning's broad definition, it encompasses various models and theory-based pedagogies such as discussion-based lessons, problem-based learning, role-play, and service learning. Active learning also overlaps with other pedagogies, such as constructivism, cognitive apprenticeship heutagogy and andragogy. Any of these models may potentially fall under active learning's broad umbrella (Bauersfeld, 1995; Blaschke, 2012; Collins, Brown, & Holum, 1991; Wingfield & Black, 2005).

In constructivism, teachers act as facilitators while students co-construct knowledge within the classroom in an attempt to create a level playing field (Bauersfeld, 1995). Active learning overlaps with constructivism, in that students cannot remain passive and construct knowledge at the same time. Cognitive apprenticeship ties into active learning because in cognitive apprenticeship, the teacher and student make their thinking visible as they process new knowledge (Collins, et al., 1991), which actively

involves students in the learning process. Similarly, heutagogy (self-determined learning) and andragogy (self-directed learning) are overlapping niches within the broader definition of active learning (Blaschke, 2012).

Active learning is especially important for teaching IT management, because students need to actively learn "to operate in an information rich environment" (Oberman 1991, p. 198). Students entering IT jobs must contend with a rapidly changing environment and potential information overload. IT changes at a faster rate every day. Every new innovation creates a new playing field. IT managers must adapt. For example, in 2009, the advent of Facebook revolutionized marketing and public relations. Between selfie sticks, viral marketing and foodies, the world hasn't been the same ever since.

Active learning seminars are much more effective than traditional ones for "creating interest, learning effectively, preparing for careers, learning how to apply knowledge, and developing independent learning skills" based on a pre- and post-study experimental design (Sivan, et al., 2000, p. 385). To make discussion based lesson plans even more effective, Page and Mukherjee (2005) claim that active learning in the form of negotiation exercises teaches students valuable, higher order critical thinking skills such as analysis, synthesis and evaluation. Certainly, these skills are necessary for effective IT management. Thus, we incorporated these activities into our active learning pedagogy, as discussed in Section 5.

However, it is not enough to add active learning pedagogy to lessons. The learning environment itself must change. The first stage in active learning is disequilibrium, because "the mental discomfort...challenges students to think actively and constructively" (Oberman 1991, p. 198). Place-based learning immerses students in the world around them, which increases context and deepens learning (Gruenewald, 2003; Semken & Freeman, 2008). However, immersive learning environments are limited by the fact that most university classes must remain inside a physical room on campus.

A "community of inquiry" in which students are encouraged to ask questions to learn the answers on their own is vital for critical thinking and deep learning (Lipman, 2003). In fact, it may be the only way it occurs. When students take a deep learning approach, they seek to understand material, which improves recall. With surface learning, students attempt to memorize information without considering what it means or why it's important. Surface learning tends to be forgotten, because it is not connected to anything in memory. An active learning environment should therefore improve critical thinking and deep learning. To explain why we changed the IT management class at this university, the next section describes the context of the IT management course within the larger university setting.

3. THE UNIVERSITY AND IM&S PROGRAM

The University of South Carolina Upstate is a 4-year, regional senior campus linked to a Research One institution in the Southeast United States. The University has approximately 5,700 students and 300 faculty with 4/4 teaching loads, resulting in a low student to faculty ratio. The school's metropolitan mission is to provide high quality baccalaureates who are ready to work. The Information Management & Systems (IM&S) program at the University is uniquely situated in the College of Arts & Sciences. The program is neither Computer Science nor Business, yet it teaches a lot of both.

It also has a vibrant, accredited healthcare information management (HIM) minor. The HIM minor attracts nursing students who don't want direct patient care. (The nursing school is the largest and oldest on campus.) As a result, students in the IM&S program often filter in from other majors where they do not quite "fit." This unique balance between computer science, business, and nursing means that IM&S students are more diverse and sometimes less prepared for strategic thinking. Students don't always know what MIS is or what it does, but they want to work with people and computers.

The local region sorely needs these majors to fill IT management positions, because employers report negative unemployment, with fewer candidates then job openings. Therefore, this course is important for students entering the field. The next section describes the course.

4. EXECUTIVE IT MANAGEMENT

Executive IT management teaches students how to strategically manage IT resources. The course covers the gamut of IT management strategy and issues and challenges facing IT executives including IT alignment, governance, executive leadership, oversight, return on investment analysis, project management, and risk management. Before taking this class, students

have learned about relational databases, technical presentation and communication, data warehousing, social informatics, and introductory programming. Project management is often taken concurrently.

The course is required for IM&S majors and students typically take it their senior year. A section is taught every fall and spring and alternating summers. On average, 25 students enroll in the course each semester. In Fall 2014, students were 70% male and 30% female. In Spring 2015, the students were exactly the opposite (70% female and 30% male).

Originally, the course was taught by a retired IT executive who relied on lectures. Graduates felt the information was useful, but that they did not have sufficient opportunities to practice management skills during the course. Students also felt unprepared to make IT management decisions. This faculty member left the University, which created an opportunity for new faculty to revamp the course. The next section discusses how the classroom and the course were changed to support active learning.

5. ACTIVE LEARNING INTERVENTION

In October 2014, the U.S. Department of Education awarded the University a $2.2 million Title III grant to build "active learning spaces" and infrastructure on campus to encourage active learning which should ultimately increase student retention. Student retention is a major university strategic goal. The University applied for this grant because it wanted to initiate new strategies to engage students in their education. As part of the grant, engagement and retention are regularly measured through surveys and focus groups of faculty and students involved in the active learning program.

The University decided to roll out one classroom per building annually, in order to test what works, and maximize outcomes over time. Based on its natural fit with active learning pedagogy, executive IT management was selected as one of eight pilot courses. The first active learning classroom was built in January 2015. This room has innovative, moveable furniture. Almost every piece of furniture in the room can be moved and rearranged to support learning activities, including small to large group work. The tables and chairs are lightweight and/or wheeled. Some tabletops are glass and the room has a dozen personal whiteboards to support brainstorming and creative expression. Very few chairs have chair backs, encouraging students to move around and preventing them from getting "too comfortable."

The room is equipped with an Epson Bright Link projector on either side of the room. The room was designed around the concept of "no front of the room" and having dual yet opposing projectors facilitates that vision. As a result, the focus shifts to students and student-based learning. See the Appendix for photos of the room.

Environment is a major influence of student involvement in higher education (Astin, 1993). In this course, students learned in a new and constantly changeable environment. Every week, the furniture was rearranged to suit the day's activity. Students were asked to sit in a new place every week so as to stimulate disequilibrium. Just as active learning prevents student passivity, the environment should not be passive in the learning process either (Whiteside, Brooks, & Walker, 2010).

Along with benefits to creating environments conducive to student learning, Bronfenbrenner (1993) suggests that government programs, university policies, and interactions between faculty and other students impact student behavior (Renn & Arnold, 2003). Therefore, it is neither the pedagogy nor the classroom, but the unique combination of both that creates results. For these reasons, the University intentionally designed spaces conducive to active learning. Faculty received additional training in active learning pedagogy to increase their success in the new room.

Course Redesign

In creating a new kind of course, the first item changed was the textbook. In order to make the course more realistic and maintain student interest, the textbook was changed to an academic novel titled Adventures of an IT Leader by Austin, Nolan and O'Donnell (2009). Published by Harvard Business Review, it tells the story of Jim Barton, a management executive who is unceremoniously thrust into the role of Chief Information Officer (CIO).

Students experience what it's like to be the CIO through the eyes of a non-IT person as he copes with a hostile CEO, an infrastructure replacement project, and a major data security breach, all while learning how to align the company's IT strategy with its corporate mission. Barton's world – like ours – doesn't have easy answers. Very little is cut and dry.

However, because it's a story, students find it approachable, memorable and useful.

The next major change to the course was to make it heavily discussion-based. It was not designed as a flipped classroom, although students were expected to read the material before coming to class. There were no formal, passive lectures, nor standard PowerPoint slides. Material was delivered through the textbook-novel, six case studies from various sources, and six chapters from an unpublished book on IT debates.

Cases were selected based on a few factors. First, length was important to increase buy-in. The first case reading assigned was short, no more than ten pages, to ease students into the format. Inexperienced students sometimes express dismay if they have to read too many pages in the first assignment (Barnes, Christensen & Hansen, 1994). Second, cases were selected that were closely aligned with topics in the textbook and objectives of the course. Finally, preference was given to cases about well-known companies or technologies that students already knew, to make the case more approachable for students with limited IT work experience.

The course also involved six IT debates. Based on Gill's case method approach, students discussed the merits of the issues (Gill, 2012). Issues included whether privacy still exists given the ubiquity of data collection, whether large-scale ERPs are dying out, and whether IT really makes work more productive since it takes up so much time, for example. To prepare for debates, all students read a prepared chapter of background material. Each debate was assigned to a small group who researched the issue more deeply and presented their findings to the class to discuss in more detail.

Critical thinking means making an informed decision after considering all sides of a situation, or as much information as you have available (Hooks, 2010). IT management involves dealing with uncertainty and weighing risks. Therefore, discussions and activities were designed to get students to see multiple sides of an issue. Students considered "pros and cons" of their decisions in order to weigh options. They were encouraged to go outside the class materials to research issues and to think through the consequences of their decisions. Therefore, after the debates, all students were asked to decide the issue individually. Students reflected on the issues in an online feedback form given at the end of each class. The take-home midterm and final exams were essay-based and designed to test students' critical thinking abilities. Compared to the previous semester, students in the active learning class were better able to articulate their thoughts and communicate the reasons for their decisions – both hallmarks of critical thinking. The next section describes some of the activities students completed in the active learning classroom.

Active Learning Examples

Students created the majority of the meaning and sense making within the course by themselves, with faculty serving as a subject matter expert and sometimes facilitator. Students were encouraged to work together. The day's discussion usually began with small group work to get everyone on the same page. Smaller groups were more effective at getting reticent students to participate, which was particularly important in a predominantly female class.

Students designed the rules for class discussions at the beginning of the semester, and they were encouraged to police themselves. For the most part, students behaved collegially and they supported each other. In one poignant example, one student bravely came to class after three of his friends had died in one week. He was obviously upset. He was excused to leave, but he chose to stay. The class politely asked if there was anything they could do to help. A few students went so far as to hug him in sympathy, and then he was politely let to absorb the discussions going on around him. Thankfully, most days were much less emotional.

After small group work, the whole class worked together. Although students led the discussions and explored the issues themselves, they still needed guidance to focus their efforts. One particularly effective exercise were the problem solving slides. A set of four to six slides were displayed on one or both of the Epson whiteboards. Students did not see the slides before class. The slides contained open ended problems. The class designated someone to write the answers on the slides to solve the problems. Problems typically brought together material from multiple sources including those students had not seen before. For example, to discuss how to allocate IT budget resources, students categorized a company's IT systems into a grid for Competes versus Qualifiers (Austin, et al., 2009). In another example, students compared the advantages and problems associated with outsourcing, and one

of the slides gave students a chart showing industry trends, which they could then (or not) incorporate into their discussion on the topic. These slides were later uploaded to the course learning management system for later study. Example are given in the Appendix.

Students could also write on the tables to make group decisions. In discussing case studies, students were challenged to list facts, assumptions, analysis and decisions as a way of categorizing knowledge. Most chose a SWOT analysis (strengths, weaknesses, opportunities, and threats). By writing down ideas collaboratively, students were forced to discuss their ideas with the group. Students could also use the tables to doodle and draw out ideas. Writing while thinking improves recall and creativity (Brown, 2014). These activities improved communication in small and large group settings, as shown in student feedback and learning outcomes, described in the next section.

6. STUDENT LEARNING OUTCOMES

Assessing and grading students' work in an active, participation-based course is difficult. In this course, students were assessed based on how well they prepared for class, their willingness and enthusiasm for the day's activities, and their self-reflection of those activities. Preparation was graded based on the quality of the student's contribution to the day's discussion. Were they aware of the day's lesson topic? Did they bring notes to class? Did they bring questions? Were they moving the discussion along or did they sit quietly, staring at their phone? Did their end of class reflection mention the day's topic? Did they leave class with any burning questions?

Students' perceptions of their learning are almost as important as their performance. Students reported that the classroom environment affected their learning. Students stated that the classroom arrangement encouraged them to get to know their fellow students, to come out of their shells, to network with classmates, and to better prepare for class discussions. The fact that their peers might judge their performance (as opposed to just the teacher) altered how they felt about the class.

Students were asked for feedback at the end of the semester in the form of online surveys and in-person focus groups. The survey data for this course was collected with other courses, so we cannot report it here. However, student feedback from the focus groups could be separated out. It was overall positive.

Compared to a traditional classroom, students felt the room was beneficial for discussion. They preferred this room for discussion over a traditional classroom. For example students reported that "In this type of classroom, it was easier to figure out who was talking instead of having to look behind you. You actually heard other peoples' ideas." As a result, "I felt more involved and [like] I mattered more… in more traditional classrooms, you don't get to talk unless you raise your hand."

Another student said that "the furniture gave me a relaxed feeling where I was able to feel comfortable to talk more." "It allowed for more communication and to allow students who usually would not communicate too easily. The furniture in the class placed us (the students) in a position to interact with one another and bounce thoughts and ideas off each other." On the other hand, "Some people were resistant to change…you're used to that one seat you sit in all semester. From a teacher standpoint, I can see why it was good because students sat next to someone new." Students got to know their fellow classmates better than they would in a traditional classroom.

As far as what they learned in the course, students stated that it "helped in how to make difficult decisions and handle those situations in a diplomatic manner." Further, that "learning how to critically think about situations helps me in my career. I enjoyed the group activities that we later shared to the group. It helped me to understand some of the material that I did not fully get. The notes from our class helped me understand material in some other courses a little better because we discussed it." In other words, students identified that they were learning to think critically and connected it with their careers. Students noted how the room worked in tandem with the discussions to actively involve them in their own learning.

7. FACULTY REFLECTION

From the faculty's perspective, this course would be difficult to facilitate for anyone inured to traditional lectures. It required giving up control of the class space to students. It entailed additional preparation before class to design how to run the space. It also required a high tolerance for ambiguity, empathy and emotional intelligence, to know when to press a matter and when to let it go. These skills are needed for any

discussion-based course, but the active learning classroom cast a spotlight on these issues and brought them to the forefront. In addition to designing the discussion, we also had to think about the space itself. We had to account for the furniture and the physical space. For example, with students working in small groups around low tables, at least one student would have her back turned. The dynamic changed because the teacher was no longer the sole focus. Teaching in this environment sometimes felt like spinning plates on spindles. In order to succeed, students had to be prepared for a different dynamic.

Preparing Students for Active Learning

Students were forewarned ahead of time what to expect, and how they might benefit. This mode of learning may not work for all courses in the MIS curriculum, particularly those with hard and fast "right" and "wrong" material. However, IT management strategy is hard to learn without seeing it in action. Therefore, for IT management, it helped students to practice these skills.

For faculty considering active learning interventions, we offer some advice. First, plan to move around a lot. Try to think outside the box. Designing interactive activities for each day's lesson is rewarding, creative and fun. Don't be surprised if some activities flop. They will. It doesn't mean you've failed; you've learned something. Perhaps it needed a scaffold assignment first. Perhaps it was just the wrong group of students. What works with a group of students in the morning section may not work in the afternoon and vice versa (Brookfield, et al., 2012). The same thing happens in industry, and we should prepare students to try new things.

No Right Answers

Even late in the semester, when students should have been completely comfortable with the active learning environment and the discussion-based format, they would look to the professor when they talked. Although students understood that they controlled the learning space, they were still ingrained to the old pedagogy. They didn't completely trust their control over the space. Students in general are very sensitive to faculty dominance and/or reticence in a classroom. Faculty hold a lot of power, because they control students' grades. It is hard to overcome years of conditioning in one semester.

One method to alleviate this problem was to turn students' questions back on them. Especially if students asked, "is that right?" for validation, the answer was, "You tell me." In this way, students were forced to consider the facts. More importantly, it enforced the idea that they control their own learning. If students persisted, they were encouraged to look it up or have a friend look it up on their smart device to find an answer, or to ask the class at large. If the question spoke to faculty expertise as a member of the discussion, only then would students get a direct answer.

Students who are used to being fed answers find this practice somewhat frustrating at first, but over time, they learn to appreciate it. In a sense, it's freeing. They come to realize that they know more than they think they do, and that they are allowed to decide the answers. They aren't required to think like the professor – just to think. To better prepare students for this learning environment, it's essential to explain the rules from the outset. Explain how student participation will be graded and how students will benefit. Relate the material directly to topics that students know.

8. CONCLUSIONS

Theoretically, based on how people learn, an active learning environment should improve student outcomes. However, evidence of this link is sparse. Wingfield & Black (2005) found no link between course design and student grades, satisfaction, or perception. The only perceptible difference that students reported was in the course's usefulness in their future careers (p. 123). In this case, we changed the room and the pedagogy, and students reported they noticed the difference. Their critical thinking improved. More importantly, students and faculty enjoyed the course.

While it would be infeasible to expect schools to build dedicated active learning spaces overnight, it is still possible to incorporate active learning into traditional rank-and-file desk arrangements. By allowing and even encouraging students to rearrange the room to suit their needs, we can simulate active learning pedagogy. If we refuse to give students every answer while teaching them to find their own answers, we will create the next generation of critical thinkers, which is exactly what college is supposed to do. As one student wrote so eloquently, "Open your mind to new possibilities. Days of the old boring traditional classroom are over."

9. REFERENCES

Astin, A.W. (1993). What matters in college? Four critical years revisited. Jossey-Bass, San Francisco.

Austin, R. D., Nolan, R. L., & O'Donnell, S. (2009). The adventures of an IT leader. Harvard Business Press.

Barnes, L., Christensen, C., & Hansen, A. (1994). Teaching and the case method: Text, cases, and readings (3rd ed.). Boston, Mass.: Harvard Business School Press.

Bauersfeld, H. (1995). The structuring of the structures: Development and function of mathematizing as a social practice. In L.P. Steffe & J. Gale (Eds.), *Constructivism in Education* (pp. 137-158). Hillsdale, NJ: Erlbaum.

Blaschke, L. M. (2012). Heutagogy and lifelong learning: A review of heutagogical practice and self-determined learning. *The International Review of Research in Open and Distributed Learning*, 13(1), 56-71.

Bronfenbrenner, U. (1993). The ecology of cognitive development: Research models and fugitive findings. In R.H. Wozniak & K.W. Fischer (Eds.), *Development in context: Acting and thinking in specific environments* (pp. 3-44). New York: Erlbaum.

Brookfield, S. D., & Preskill, S. (2012). Discussion as a way of teaching: Tools and techniques for democratic classrooms. John Wiley & Sons. Chicago.

Brown, S. (2014). The Doodle Revolution: Unlock the Power to Think Differently. Penguin.

Collins, A., Brown, J.S., & Holum, A. (1991). Cognitive apprenticeship: Making thinking visible. *American Educator*, 15(3), 38-46.

Duron, R., Limbach, B., & Waugh, W. (2006). Critical thinking framework for any discipline. *International Journal of Teaching and Learning in Higher Education*, 17(2), 160-166.

Gill, G. (2012). ISM4300 and the case method. *Journal of Information Technology Education: Discussion Cases*, 1(1), 1-21.

Gruenewald, D. A. (2003). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32(4), 3-12.

Hooks, B. (2010). Teaching critical thinking: Practical wisdom. New York: Routledge.

Kember, D., & Leung, D. P. (2005). The influence of active learning experiences on the development of graduate capabilities. *Studies In Higher Education*, 30(2), 155-170.

Lipman, M. (2003). Thinking in education. Cambridge University Press.

Oberman, C. (1991). Avoiding the Cereal Syndrome. *Library Trends*, 39, 189-202.

Page, D., & Mukherjee, A. (2007). Promoting Critical-Thinking Skills By Using Negotiation Exercises. *Journal of Education For Business*, 82(5), 251-257.

Renn, K.A. & Arnold, K.D. (2003). Reconceptualizing research on college student peer culture. *The Journal of Higher Education*, 74(3)

Selingo, J. (2015, January 26). Why are so many college students failing to gain job skills before graduation? *The Washington Post*. Retrieved July 8, 2015.

Semken, S., & Freeman, C. B. (2008). Sense of place in the practice and assessment of place-based science teaching. *Science Education*, 92(6), 1042-1057.

Sivan, A., Wong Leung, R., Woon, C., & Kember, D. (2000). An Implementation of Active Learning and its Effect on the Quality of Student Learning. *Innovations In Education & Training International*, 37(4), 381-389.

Whiteside, A., Brooks, D.C., & Walker, J.D. (2010). Making the case for space: Three years of empirical research on learning environments. *EDUCAUSE Quarterly*.

Willingham, D. T. (2008). Critical thinking: Why is it so hard to teach? *Arts Education Policy Review*, 109(4), 21-32.

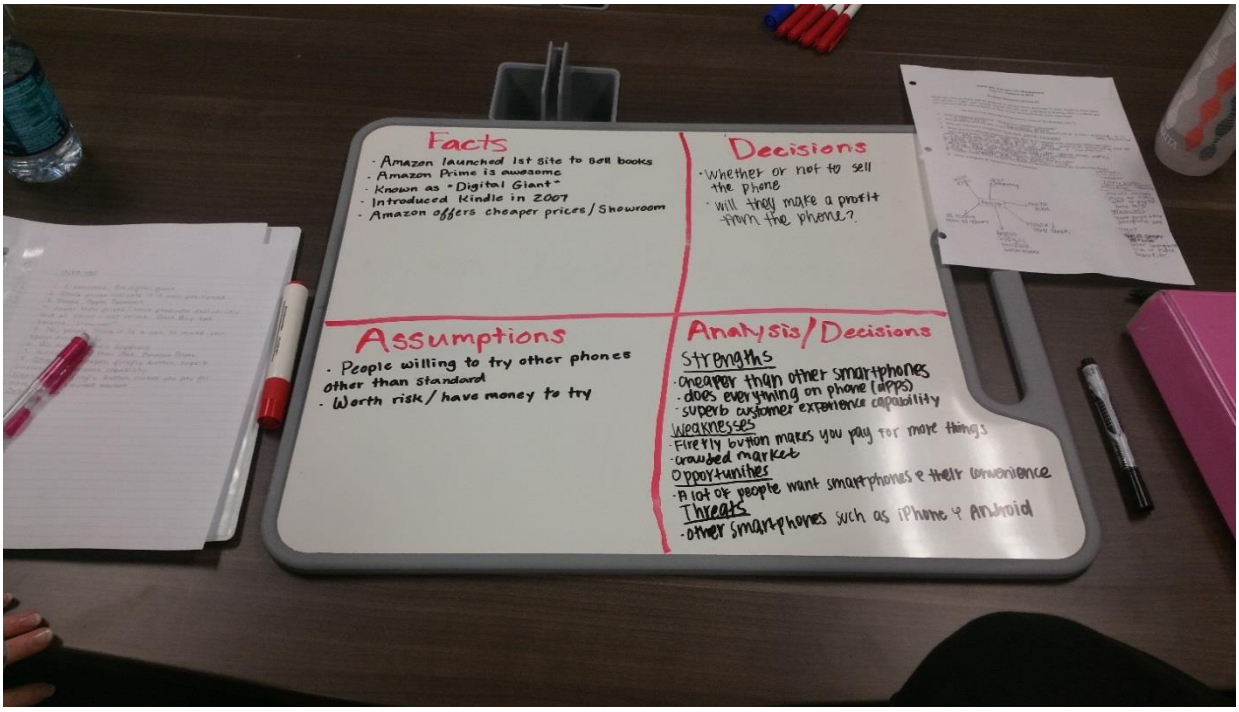
Wingfield, S. S., & Black, G. S. (2005). Active Versus Passive Course Designs: The Impact on Student Outcomes. *Journal of Education for Business*, 81(2), 119-123.

Appendix

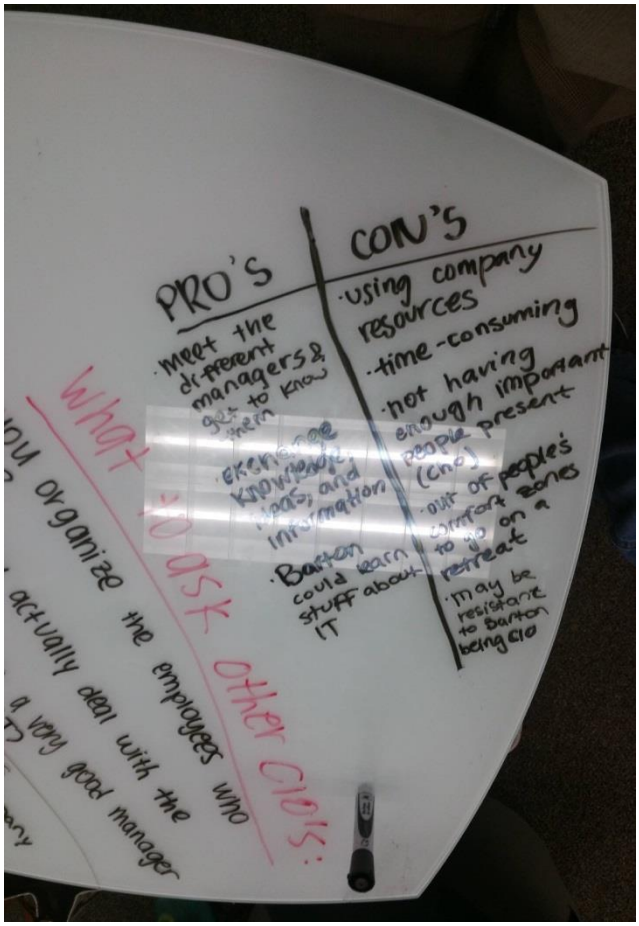
Course Schedule

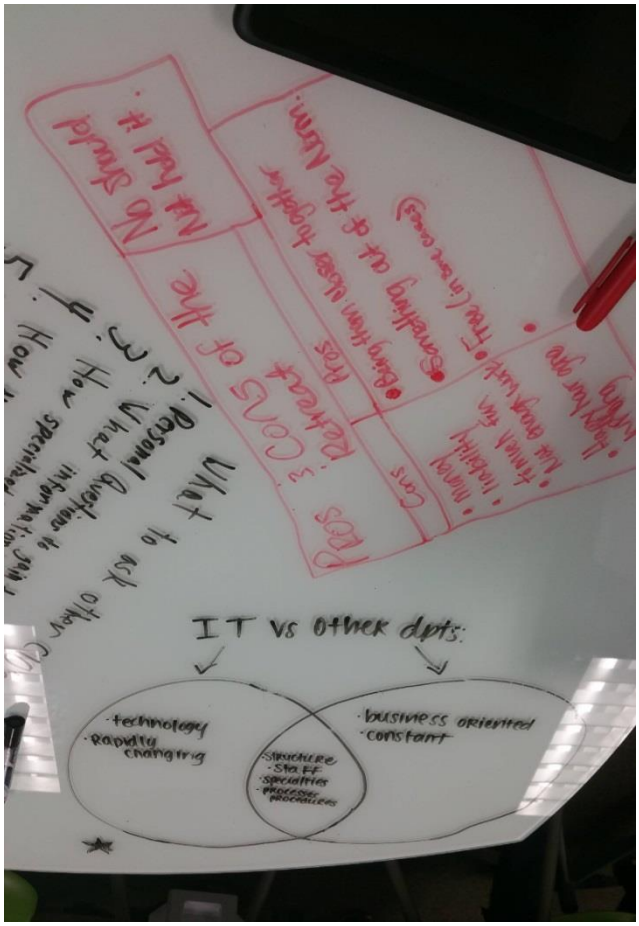
Week	Topics Covered	Readings
1	Introduction to course, create discussion rules	Austin Ch 1 and Case 1
2	Role of the CIO in the organization vs other CXOs	Austin Ch 2-3
3	IT spending and budgets, importance of IT strategy	Austin Ch 4-5 and Case 2
4	IT and competitive advantage	Debate 1
5	IT project management	Austin Ch 6-7
6	Return on investment and role of the board of directors	Austin Ch 8-9 and Case 3
7	Enterprise resource planning, privacy issues	Debate 2
8	Ethics and risk management	Austin Ch 10-11 and Debate 3
9	Policies on emerging technologies such as social media	Austin Ch 12-13 and Case 4
10	Effects of big data on the organization	Debate 4
11	Vendors, human resources, and offshoring	Austin Ch 14-15 and Debate 5
12	Standards versus customization, security vs. risk management, entrepreneurship	Austin Ch 16-17 and Case 5
13	Open source and intellectual property	Debate 6 and Case 6
14	Reflection and focus groups	None

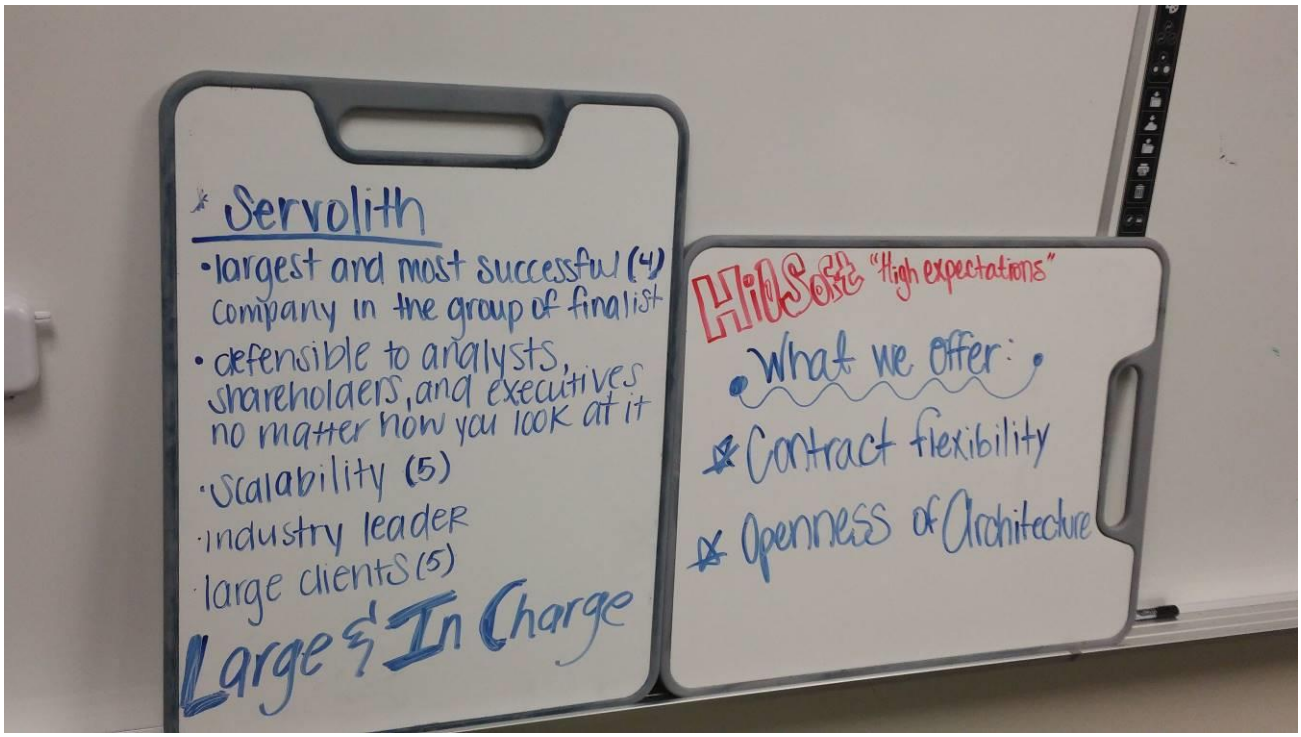
Examples of student work



Examples of student work (continued)



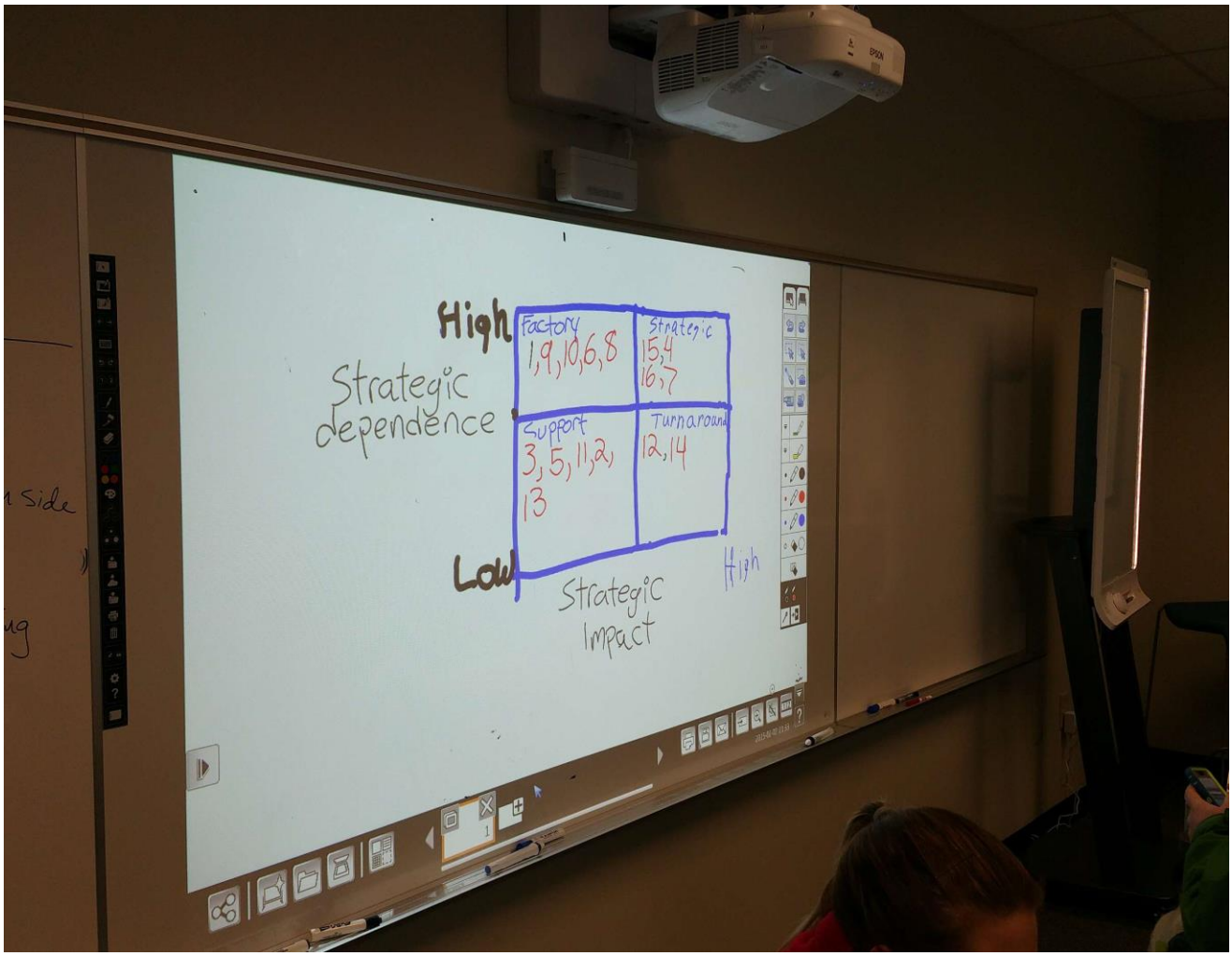




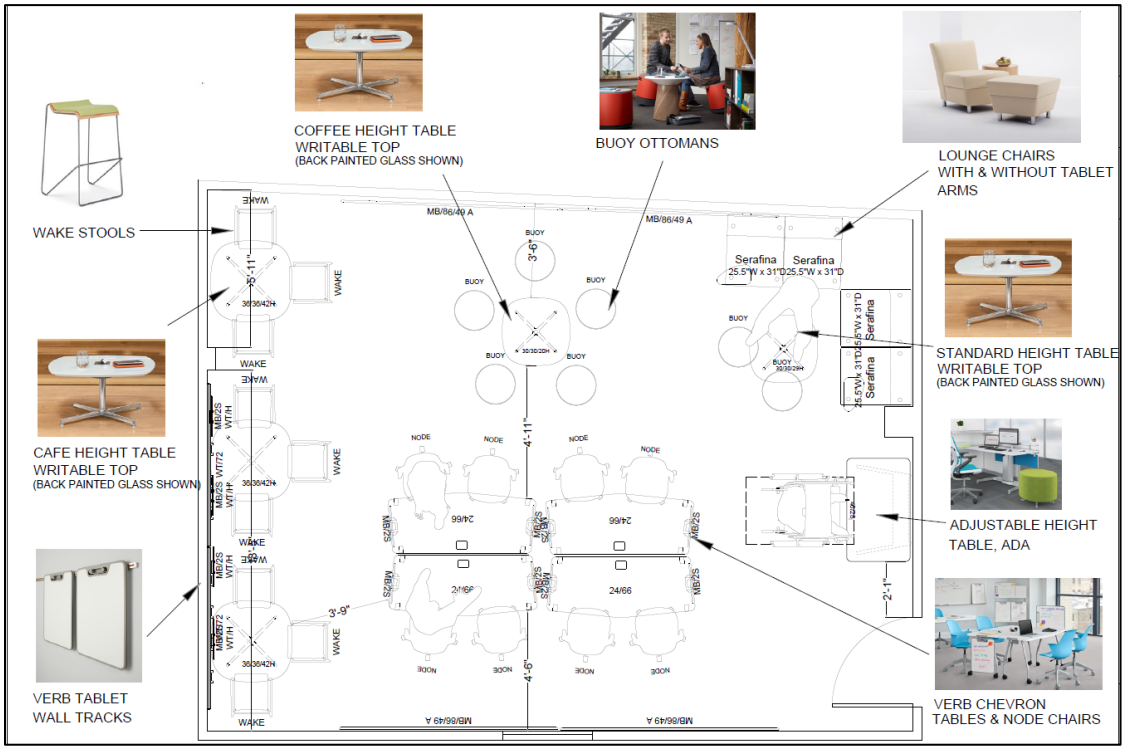
Examples of student work (continued)

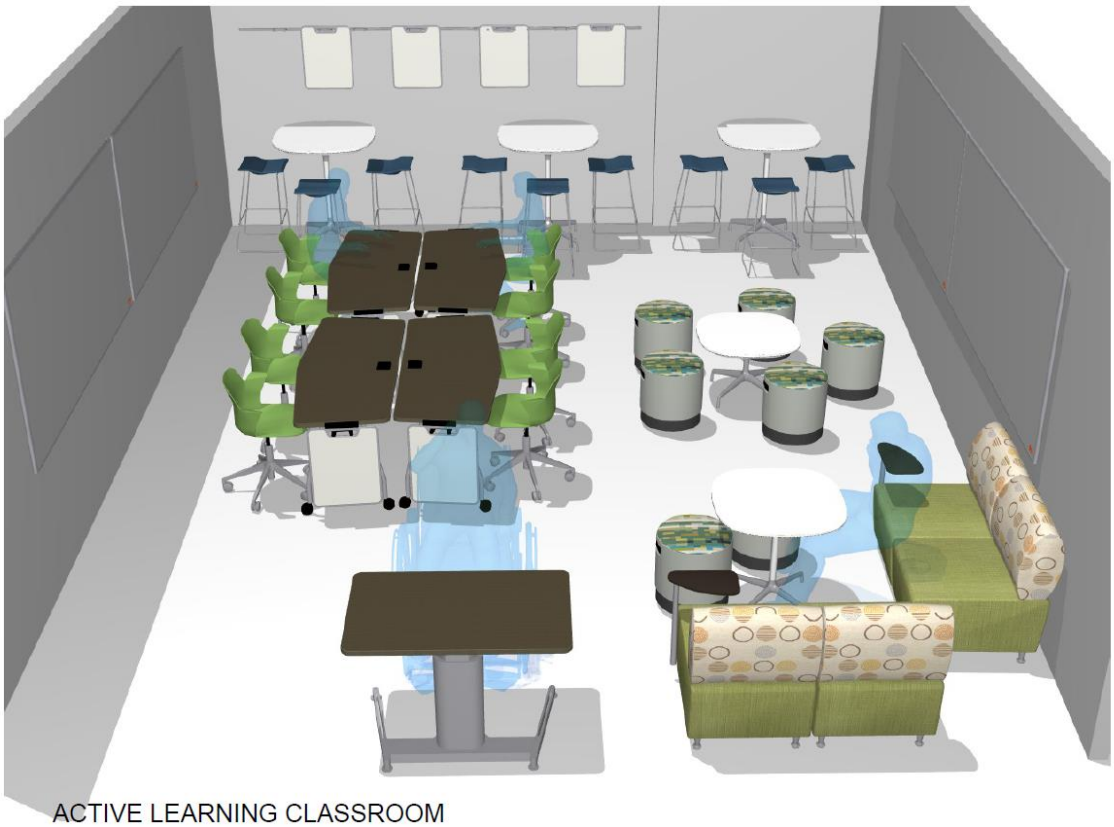
What it's like to be bleeding edge

Benefits	Disadvantages
• look Cool	• Cost $
•	• May have glitches
• New feat.	•
•	• Could Be a Fad
• more sells for Company - more $	• getting Read 2 the punchline for companies Learning Curve



Active Learning Classroom





ACTIVE LEARNING CLASSROOM

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