

Cooperative Learning Activities For Introduction to MIS

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Abstract

As technology advances, no IS educator has unlimited time and energy to find the latest examples for every topic in their lesson plans, particularly examples that are immediately recognizable and relevant to their students. Fortunately, there are ways to address this issue, one of which is to adopt cooperative learning activities. Cooperative learning is a type of active learning in which students work together to solve problems and find examples that are meaningful for them. This proven strategy harnesses students' own interests and helps them engage more deeply with course material by creating connections and teaching each other. Consequently, it relieves some of the burden on faculty and precludes the need to prepare an answer or example for every possibility. In this paper we explain in detail how we used cooperative learning in an Intro to MIS course. We describe several types of cooperative learning activities and present student feedback, suggesting that the goals of cooperative learning were met. To aid other instructors in quickly and easily applying cooperative learning to their own courses, we provide a list of 50+ specific activities we designed for this course, along with a mapping to common Intro to MIS topics. This research contributes to literature on MIS pedagogy, active learning, and applying cooperative learning, and it should be of interest to MIS instructors wanting to increase student engagement in Intro to MIS classes.

Keywords: Cooperative Learning, Active Learning, Engagement, Introduction to MIS

1. INTRODUCTION

Information systems as a field advances so rapidly that faculty often find their personal experiences with technology obsolete by the time they find themselves teaching a classroom full of students. Social media, for example, one of the hottest trends in IS today, is being driven by firms less than 10 years old (e.g. Snap, Instagram) and the average path to a tenure-track position takes at least that long, if not longer. Therefore, faculty

may find it difficult if not impossible to track the myriad of current trends in the field. Without question, faculty are experts in their area of research, and yet they may be called upon to teach course material only tangentially or minimally related to their specialty. Considering the rapid pace of change and the broad uses for technology, it is nearly impossible for faculty to stay current on every aspect of every course. So how can faculty keep a course fresh, current, and

most importantly, engaging for students, without sacrificing rigor?

Cooperative learning provides a constructivist, critical method for teaching a diversity of students (Cooper, 1995; Johnson, Johnson, & Smith, 1991; Johnson, Johnson, & Smith, 1998). Cooperative learning is a type of active learning in which students work together to solve problems, find examples, and teach each other material. For a survey style course such as the Introduction to MIS, where a majority of students may not be predisposed to enjoy the subject matter, cooperative learning encourages students to explore what matters to them. It meets students where they are and it takes advantage of existing and readily available resources that students already have and are comfortable with, such as mobile phones and laptops. Most importantly, it helps students engage with the material and make connections to things they already know and trust. Finally, it encourages students to value their preexisting knowledge and their peers' experiences. This mode of learning can improve critical thinking, deep learning and teamwork.

In this paper, we present 50+ examples of cooperative learning, in-class activities we tested in Introduction to MIS this past academic year. We explain how we designed these activities based on the principles of cooperative learning, and we provide instructions for MIS faculty to create their own examples to suit their students and their courses. As a proof of concept, we provide evidence from student evaluations of the course.

These activities should interest MIS faculty who use active learning in their classroom to engage students, as well as those who prefer traditional lecture, because the activities provided can be used in either modality. Faculty preparing a new course or updating an existing course are encouraged to borrow and adapt one or more of the provided exercises and experiment with cooperative learning activities.

2. COOPERATIVE LEARNING IN A NUTSHELL

"Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning" (Johnson & Johnson, 1998, p. 5). This is distinct from a standard traditional college classroom in which the professor lectures and the students listen, which can be classified as more individualistic in style. Unlike law and medical schools, where group discussions pit students

against each other, cooperative learning group activities are designed for students to work collaboratively toward an outcome that everyone in the group shares ownership of. In cooperative learning, everyone sinks or swims together.

Extensive research on cooperative learning in college classrooms shows that it improves student achievement, critical thinking competency, and positive attitude toward the subject (Johnson & Johnson, 1998). It can encourage a positive classroom environment and help students build networks with peers, potentially reducing dropout rates for first-year students (Erickson, Peters, & Strommer, 2006). Students working together cooperatively build better solutions than students working competitively, and they are more likely to seek to understand others' viewpoints (Johnson et al., 1991). All of these outcomes are especially useful in today's diverse classrooms and workforce. Employers in particular want graduates who can communicate, empathize, and work well with colleagues in a team (Osmani et al., 2016).

Cooperative learning overlaps with team-based learning (TBL) in many ways, except that cooperative learning is broader. Officially, TBL is a highly structured, specific pedagogical method and it requires specialized training to adopt in its entirety (tblc-admin, n.d.). Generally, in a TBL classroom, students solve team-based problems, consisting of ambiguous cases related to the course material. Cases are ambiguous in the sense that there is not one right answer and teams have to decide on a course of action. While cooperative learning may include these kinds of activities, it may also include shorter, one-off activities such as those presented here.

Cooperative learning may also be classified as a form of active learning, in that students are engaged in their own learning process. A few central tenets set cooperative learning apart from other modes, primarily that group members must hold each other accountable to promote each other's learning (Johnson et al., 1991). These concepts are easier said than done; we provide some class activities designed to encourage students to hold one another accountable and promote each other's learning, but we do not contend to have mastered this aspect.

Cooperative learning is not a new concept in MIS per se, but nor is it a prevailing mode of teaching (Leidner & Fuller, 1997; Leidner & Jarvenpaa, 1995). For example, a brief search of the AIS Library for "cooperative learning" produced 215 results in the past 27 years, most of which are

not related to teaching IS courses nor do they provide easily adapted models for other faculty to emulate. The Journal of Information Systems Education (JISE) provides a handful of examples that may be useful in teaching augmented reality (Frydenberg & Andone, 2018), wiki pages (Hazari, North, & Moreland, 2009; Lending, 2010), programming and software development (Hadar, Sherman, & Hazzan, 2008; Powell & Wimmer, 2015; Simkin, 2005), or a systems analysis and design capstone course (Harper, Lamb, & Buffington, 2008; Magana, Seah, & Thomas, 2018). However, as helpful as these examples are, few of them share specific, ad-hoc activities to engage students in the classroom. We hope that providing specific activities and a process to build them will improve MIS education.

3. ACTIVITIES

The process of designing cooperative learning activities for a class need not be laborious. Faculty are creative people, and well-designed class activities provide students with a window into faculty's thought process, without which students may feel lost or disengaged. A good cooperative learning activity fulfills three goals: (1) engage students with the material in such a way that they cannot complete the exercise individually; (2) encourage students to work together and in doing so, teach each other their individual understanding of the material; and (3) assess how well students learned the material. We provide various types of cooperative learning activities and recommend that faculty test a few of each kind to determine what works best for their teaching style.

Although the provided activities are based on specific course and textbook chapter objectives, the format could be modified to nearly any subject in MIS. Students enjoy being involved in the lecture, discussing material in small groups, and applying knowledge to hands-on activities. To create a good cooperative learning activity, identify points in the lecture where examples help to illustrate the material, but where there are too many examples to cover in class or the concepts change rapidly from year to year. Business use of various systems to compete, Bring Your Own Device (BYOD) controversy, or data privacy policies, are just a few good examples. Next, determine how deeply students should engage with the material. Do they need to find and share examples to help understand the concepts or do they need to apply critical thinking to assess the examples? For a cursory introduction, a seek and find works well, but for a deeper understanding, we recommend using hands-on practice.

One quick to implement and well-known activity is Think-Pair-Share (TPS). In TPS, students are given a task to complete on their own, such as searching for an example of the lesson just presented or solving a problem. This step is known as "Think". Students then "Pair" up with other students and each student "Shares" with their peers the example they created. TPS typically takes three to four minutes, after which the instructor randomly calls on a few pairs to share their examples with the class. This "individual accountability ensures that the pairs take the tasks seriously and check each other to ensure that both are prepared to answer" (Johnson & Johnson, 1998, p. 56). It allows students to seek out the information that interests them, gives students practice in searching for information related to the course, and encourages them to share their interests with peers. TPS may ask students to list as many examples as they can think of, or seek out examples. Rather than everyone having the same example of the lesson handpicked by the instructor, each student leaves with an individualized, self-selected example plus multiple additional examples. Considering the rapidity with which IT changes, this mode of learning ensures that students learn fresh examples. When sharing their examples with peers, students have to defend how their example meets the criteria.

Another example of cooperative learning includes creative activities, which are typically hands-on, applied activities in which students solve a problem or practice drawing a figure. These creative activities can engage students who may be less interested in the technical aspects of an MIS course. They can also engage students' imaginative associative ability (Benedek, Könen, & Neubauer, 2012) and help them make connections that they wouldn't otherwise see when trying to think of just a 'right' answer. These hands-on activities often illustrate places where students' understanding is weak and provides a space for students to ask clarification questions.

A third cooperative learning activity that students particularly enjoyed and found productive were group quizzes. On the first day of covering new material, students completed a quiz independently with an online quiz program. These short five-question reading quizzes were multiple choice and questions were structured so as to require applying material to a problem (rather than simple vocabulary). Students did not immediately receive feedback on their performance. Quizzes were given during the first five minutes of each class session. The next day

of covering the material, students worked in their assigned groups to complete the same quiz again on paper. An example of an applied quiz question is given in Appendix A.3. Per Johnson & Johnson (1998, p. 85), "Listening to students explain how to complete the assignment to groupmates provides better information about what students do and do not know and understand than do correct answers on tests or homework assignments."

A fourth activity that can be completed outside of class are learning logs for each day, wherein students briefly reflect on and write about what they learned (Johnson & Johnson, 1998, p. 118). The assignment criteria was to write two to four sentences, or one paragraph per day. Students turned in the learning logs after each module (4 chapters or weeks per module, for a total of 8 entries per module). The first semester this course was taught, students were asked to complete logs throughout the course, but based on student feedback to reduce these, in the second semester, students were only required to complete logs for the first module and then could choose to continue the logs on their own.

Reflection is an important piece of the cooperative learning model, because it provides a means for students to identify what they learned in their own words. This learning feedback loop reinforces the material. Particularly with first-year students, instructors should model tasks such as daily or weekly reflection to reinforce healthy study habits for college that may be new or unknown to students (Erickson et al., 2006). By building these activities into the homework assignments required for the course, students can learn how to better prepare for future courses in college. These assignments were worth less than 2% of the total course grade and submitted online as pass/fail, which created minimal grading work for the instructor.

Although in-class participation was not graded directly, test questions reflected the knowledge gained from these activities. Which meant that students who ignored these activities or skipped class generally did not perform as well on the exams. The next section discusses how to implement these activities in a typical college class.

4. IMPLEMENTATION

In Appendix A.1 and A.2., respectively, we present a list of the specific activities we used and a typical class schedule for a 75-minute class. This schedule is based on research from Johnson

& Johnson (1998) on how to mix informal cooperative learning groups with traditional lecture. This mode of teaching engages students with the material, breaks up a long lecture into manageable 15 minute chunks and gives the instructor time to collect breath, reorganize notes, and assess how well students are learning the material.

While students completed each activity, the instructor would walk around the room and work with groups who seemed to be stuck and engaged with students on a more personal level, or gave them more individual attention on difficult material, as needed. This was a great opportunity to discover what from the lecture may have been confusing; especially if the cooperative learning activity involved solving a problem, students could appear confused, less interested, or just plain stuck.

In a class of 45 students, each group had five members, in order to keep group size small enough to maintain individual accountability but still robust in the event that students withdrew from the course. Groups were randomly assigned at the beginning of the term. For in-class quizzes and assignments worked outside of class, students worked in their assigned groups. However, for ad hoc or in-class activities, students could work with their assigned group or the people sitting near them. For cooperative learning, it is recommended to make groups as heterogenous as possible, but in a class where student makeup was relatively homogeneous, this was difficult to accomplish. Ideally, given unlimited resources, an instructor would want to survey students as to their backgrounds, prior experience with the course, and interests or other measurements, and then attempt to assign group members based on these items. For large classes and in the interests of time, groups were randomly assigned.

To encourage reflection and build in accountability, after each activity, faculty discussed with the class what they learned and called on two or three groups at random to share their answers and then discuss their examples. It was particularly important to discuss how each example related to the material and the objectives and to previous material learned.

5. STUDENT FEEDBACK

Student evaluations of the course were generally positive. Excerpts from student evaluations clearly show that students appreciated the engaging, cooperative activities.

Q. *What did you like best about the course?*

"I genuinely learned new things; I liked application practices we did in class."

"The interactive class lectures" and "the interactive group activities."

"The direct application of business process knowledge. Open discussions and group work."

"Interactive and made you think of real life examples on the material. Also group quizzes."

"Activities in lecture were useful as well as real life examples."

"The lectures were good because they were broken up into short activities so the class did not feel as long."

"You asked class discussion questions and connected the topics to real world things we could relate to. I also liked how we were in groups so it was easier to learn things from asking questions to peers outside of class."

Q. *Overall impression of the course?*

"I enjoyed the course."

"It was great. One of the few classes that I thought was truly interesting."

"I really liked this course!"

"I found the class to be different from others I've taken, but that's what made it fresh and interesting."

Students suggested implementing more interaction and more hands-on assignments. Despite having two or three activities per class, some students requested more group work in-class. This feedback indicates both direct student validation of cooperative learning activities as well as an indication of high levels of engagement with the material (and thus the course as a whole) that such activities engendered. Notably absent were any criticisms that the course was irrelevant, out-of-date, or not applicable to the students' current technological environment.

6. CONCLUSION

In this paper we defined cooperative learning, related it to active learning and Team Based Learning (TBL) and described four types of activities in detail. The beneficial outcomes of these activity types were discussed and evidence of these outcomes supported with student evaluation comments. Further testing and refinement of these activities should further improve student outcomes, although this was not the primary purpose of this paper. Rapid technological change is a perpetual challenge for information systems educators seeking to relate IS concepts and examples that are immediately

relevant to the students in their classes. By consistently engaging the students in providing their own relevant examples via cooperative learning activities, we believe we have helped address this challenge in our classrooms using a technique that other educators could easily adopt where useful in their own classrooms. To further aid our fellow educators, we present 50+ cooperative learning activities in Appendix A.1.

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Appendix A.1. Cooperative Learning Activities

These activities are based on Using MIS by Kroenke & Boyle, 10th ed.

Ch	Topic	<i>Instructions to Students for In-Class Activities</i>
1	Introduction to MIS	<ul style="list-style-type: none"> • Draw a picture of what MIS means to you. Write a few sentences in notes to define it to a close friend or parent. • Why are you majoring in business? • TPS. Create an example of DIKW. In your notes, write an example of DIKW you've experienced recently. Don't think too hard about it. Draw the words in a pyramid shape. • Find a partner and share your DIKW example. Learn your partner's name and their example well enough that you could explain it to the class if called upon. In pairs, learn about partner, then introduce them. Tell us their name, major, something fun they did this summer or over break. • TPS. Write down the name of a specific company with whom you have done business, one that uses IT in some way. Think about how the 5 tech "laws" and how they affect business for that company? • Form a group of 3. Learn names. Discuss your examples of how the 5 laws affect doing business in the 3 companies you identified.
2	Collaboration	<ul style="list-style-type: none"> • TPS. Write 1 or 2 sentences defining collaboration in your own words. Can you think of a time when you had a good experience collaborating with someone else? What made it work well? • Discussion. Review your definition of collaboration and the prior experience you wrote down. Was it collaboration or cooperation? Why? • In your groups, create a list of top 10 IT developments you've witnessed in your lifetime. Include year they became mainstream, for example: 2007: Apple released the touchscreen iPhone. • Discussion. How do you keep up with the newest tech? As business professionals, how can we keep our skills up to date? Identify 3 ways to keep up to date. • With a partner, think about your future career in business and decisions you might need to make. Write down: one example of a structured decision and one example of an unstructured decision. Which of these do you suppose can be automated more easily?
3	IS strategy	<ul style="list-style-type: none"> • In groups, consider Wal-Mart. Classify the 5 forces as strong or weak. How do they affect how Wal-Mart does business? How do you suppose IS affect Wal-Mart's ability to react to these forces? • TPS. Draw the 2x2 table for Porter's 4 competitive strategies. Identify a company for each cell in the 2x2 table. What IS do they use? • Group activity. Review Fig 3-8 and 3-9 on p 90-91. Can you identify what was changed? • TPS. Can you find the LinkedIn profile of a [university] grad who is or was working as a business analyst? What do they do? Where do they work?
4	Hardware, software and mobile	<ul style="list-style-type: none"> • Binary calculations worksheet. [Available upon demand.] • TPS. Come up with as 2 or 3 examples of each kind of software (Custom, COTS, etc.) How to develop the software is often a question companies ask themselves. • Class brainstorming session. Advantages and disadvantages of thick-client/native vs. thin-client/web. • Discuss BYOD policies. • Class debate/discussion. Is IT making us dumber or smarter?
5	Databases	<ul style="list-style-type: none"> • TPS. Write the definition of a database in your notes. List its parts. • Class discussion. Talk about your eID and other information used to keep track of your school records. What might the design view look like? • Brainstorm. Why might users not need the raw data view?

Ch	Topic	Instructions to Students for In-Class Activities
6	Cloud	<ul style="list-style-type: none"> • TPS. Suppose you were starting a company. What does your company do? Review Fig 6-5 on p 207. Should you use cloud services? Why or why not? Get in a group and discuss. • Debate Discussion. Will cloud replace physical devices? • Debate Discussion. Net Neutrality and digital divide.
7	Organizational Processes	<ul style="list-style-type: none"> • TPS. Create a list of differences between structured and dynamic processes. • TPS. Consider [this university] as an enterprise within a system of entities. What might be an example of workgroups and inter-enterprises in relation to [this university]? What characteristics do the IS have? • Discussion. What kinds of information might be stored in a CRM? Why? • Discussion. What are pros and cons of information silos? • Physical activity. Stand up and cross your arms. Note which arm crossed over which. Now switch them. How does that make you feel? • Group work. Review the case study on p. 288-290 about the tale of 2 interorganizational information systems. What went right? What went wrong? Identify 5 lessons learned to help prevent future project failures.
8	Social media	<ul style="list-style-type: none"> • TPS. How many networks do you belong to? • TPS. Name the 5 components of Social Media. • Discussion. Why might cooking channels generate more revenue than beauty channels? • Discussion. What does it mean to say, you are the product? • Discussion. Should companies try to prevent ad block software? Why or why not? • Group work. Think about your potential company. Create a social media strategy to market your products competitively.
9	Business intelligence	<ul style="list-style-type: none"> • Discussion. Which of these companies have you heard of, and why? Blockbuster vs. Netflix. Barnes & Noble vs. Borders. • In pair, rank the 4 companies by how much or little you suspect they use Business Intelligence in their strategic operations. • Identify communications in list as push or pull. Explain. • Discussion. Is the current enthusiasm for big data just a fad?
10	Security	<ul style="list-style-type: none"> • TPS. Can you label the diagram Fig 10-1 showing threat, loss, vulnerability, safeguard, target. Can you think of an example of each item? • Discussion. Why might companies hesitate to report data losses and security breaches? Why don't they report vulnerabilities until they're patched? • Group work. Find information about one of the categories of malware. What is it? Has it been discussed in the news recently?
11	Management	<ul style="list-style-type: none"> • TPS. Pick a major company. Find an example of an org chart from this company showing IS and/or IT functions. With your partner compare the charts. What do they have in common? What are different? • TPS. Select one of the job titles listed and search LinkedIn for an opening. With partner, discuss the positions, where are they located. Are you qualified or plan to be soon? If not interested in this career, think about how this class will help you work with that person in the future. • Discussion. Will economics drive most US companies to outsource routine development to other countries?
12	Systems Development	<ul style="list-style-type: none"> • TPS. Search for examples of SDLC waterfall. Do they look same or different from book? • Requirements gathering exercise. Pick a partner. Interview them about their requirements for a Super Bowl party or a wedding. Write these down. [Second step: Instructor swaps papers between pairs. Can you plan this event without asking for further clarification?] • TPS. In your notes, draw and label the triple constraint triangle. • Discussion. Do Parkinson's and Murphy's Laws conflict? How do they work together or against each other? • TPS. Search for examples of Gantt charts. What do you think?

Appendix A.2. Sample 75-Minute Class Schedule

<i>Time required</i>	<i>Lesson Planned</i>
5 min	Brief reading quiz administered individually on first day of material and as a group on second day of material
10-15 min	Introduce day's material and present about 1/3 of lecture
5-10 min	Activity related to the material
10-15 min	Present next 1/3 of lecture
5-10 min	Activity related to the material
10-15 min	Present last 1/3 of lecture
5-10 min	Activity related to the material
5 min	Homework reminders, answer questions, allow students time to get to next class, flex time in case lecture and activities run over
75 min	Total time

Appendix A.3. Example Applied Quiz Question

Q. ABC Consulting pays Aramark for cafeteria services all year long, and IBM pays ABC Consulting for data analyst projects on an as-needed basis. InfoSys, an India-based consulting company, pays IBM for mainframe services in exchange for project work. Which of these four companies is outsourcing to another company?

- A. Only IBM, because InfoSys is outside the U.S. but the other 3 companies are located in the U.S.
- B. All four are outsourcing services to someone else.
- C. Everyone but Aramark is outsourcing services to someone else.
- D. Everyone but InfoSys, because companies outside the U.S. cannot outsource.