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LEARNING BY DOING: TWENTY SUCCESSFUL ACTIVE LEARNING EXERCISES FOR INFORMATION SYSTEMS COURSES

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ABSTRACT

Aim/Purpose	This paper provides a review of previously published work related to active learning in information systems (IS) courses.
Background	There are a rising number of strategies in higher education that offer promise in regards to getting students' attention and helping them learn, such as flipped classrooms and offering courses online. These learning strategies are part of the pedagogical technique known as active learning. Active learning is a strategy that became popular in the early 1990s and has proven itself as a valid tool for helping students to be engaged with learning.
Methodology	This work follows a systematic method for identifying and coding previous research based on an aspect of interest. The authors identified and assessed research through a search of ABI/Inform scholarly journal abstracts and keywords, as well as additional research databases, using the search terms "active learning" and "information systems" from 2000 through June 2016.
Contribution	This synthesis of active learning exercises provides guidance for information technology faculty looking to implement active learning strategies in their classroom by demonstrating how IS faculty might begin to introduce more active learning techniques in their teaching as well as by presenting a sample teaching agenda for a class that uses a mix of active and passive learning techniques to engage student learning.
Findings	Twenty successful types of active learning exercises in IS courses are presented.

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Recommendations for Practitioners	This paper offers a "how to" resource of successful active learning strategies for IS faculty interested in implementing active learning in the classroom.
Recommendation for Researchers	This work provides an example of a systematic literature review as a means to assess successful implementations of active learning in IS.
Impact on Society	An updated definition of active learning is presented as well as a meaningful list of exercises that encourage active learning both inside and outside of the IS classroom.
Future Research	In relation to future research, this study highlights a number of opportunities for IS faculty in regards to new active learning activities or trends to study further.
Keywords	active learning, critical thinking, information systems, IS curriculum

INTRODUCTION

Significant changes are taking place in higher education as faculty are expected to design and deliver "innovative, exciting, and relevant learning experiences" (Goode, Willis, Wolf, & Harris, 2007). A rising number of strategies are receiving attention that offer promise in regards to getting students' attention and helping them learn, such as flipped classrooms, online course offerings, flexible learning, hybrid or blended learning, among others. Many of these new and innovative learning techniques stem back to the pedagogical concept of active learning. Active learning is a strategy that became popular in the early 1990s (Bonwell & Eison, 1991; Meyers & Jones, 1993) and has proven itself a valid tool for helping students be engaged with learning. Although active learning has been around for over twenty years, active learning still remains a valuable teaching strategy in that students gain knowledge and experience "through talking and listening, writing, reading, and reflecting" (Meyers & Jones, 1993). Despite claims which suggest active learning is often not used in introductory information systems (IS) courses (Drake, 2012), there has been a great deal of research on active learning in IS classes (e.g., Gudigantala, 2013). However, as with any technique, active learning is not a panacea. Active learning techniques must be applied with consideration of the outcomes to make the learning process meaningful to the student (Drake, 2012).

The purpose of this research is to review previously published articles related to active learning in IS courses and to consolidate prior research to provide a meaningful list of strategies that encourage active learning. Specifically, our research question asks: *What are examples of active learning exercises used in IS courses that have been shown to be successful?* Our list includes twenty types of active learning exercises that have been successful in IS courses that can encourage students to engage more thoughtfully with course material both inside and outside of the classroom. This collection of exercises can be useful for IS faculty looking to implement active learning strategies in their classrooms. To demonstrate how IS faculty might begin to introduce more active learning techniques in their teaching, the discussion includes a sample agenda for a class that uses a mix of active and passive learning techniques to engage student learning.

This paper is organized as follows. The next section presents a background of active learning. The following section presents the twenty successful types of active learning exercises in IS that were identified using a systematic method for assessing research. This paper concludes with a discussion as well as future opportunities for IS faculty interested in using or researching active learning in the IS classroom.

ACTIVE LEARNING

Previous research suggests the exclusive use of a traditional lecture within a learning environment limits student learning (Bonwell & Eison, 1991). Implicitly, the use of lectures assumes that the instructor has valuable, stable knowledge to pass on to a student, but knowledge is dynamic in today's

changing world (Thomas & Brown, 2011). Lecture is a common instructional technique since it is the method in which many instructors learned their discipline (Fink, 2003) and is the predominant teaching method used by many IS professors, particularly in introduction to IS courses (Gudigantala, 2013; Wang, 2007). This traditional form of learning encourages standardization and requires students to master facts and tasks as opposed to learning how to inquire about the world (Thomas & Brown, 2011).

As mentioned in the previous section, active learning was popularized in the early 1990s. At the time, active learning was defined as "instructional activities involving students in doing things and thinking about what they are doing" (Bonwell & Eison, 1991). Since their introduction, active learning techniques continue to alter the dynamic of the classroom allowing students to do more than just listen by engaging in activities inside and outside of the classroom that involve students in discussion and reflection (Massey, Brown, & Johnston, 2005; Meyers & Jones, 1993). These active learning environments are more student-centered in that students are encouraged to develop skills rather than an instructor-centered environment in which the focus is on the teacher conveying information (Bonwell & Eison, 1991). It is often the case that with an active learning approach, teachers facilitate what goes on in and out of the classroom, while students take responsibility for the learning that occurs (Domínguez & Jaime, 2010). Embracing active learning approaches enables an instructor to think less about how to ensure students will absorb information and to think more creatively about how to engage students within a changing world (Thomas & Brown, 2011).

With the increasing use of technology inside and outside of the classroom, instructors have additional options to incorporate different types of active learning techniques. Because of these changes in the classroom environment due to technology, active learning has become a well-researched topic and many of the new, innovative techniques that are used in classrooms today are rooted in the concept of active learning (e.g., flipped classroom, flexible learning, hybrid or blended learning). In an effort to update the view of active learning in light of pedagogical innovations, we define active learning as *one time or ongoing student exercises that are introduced in the classroom to encourage student thinking and participation in an effort to engage students in the learning process*.

This new definition of active learning is consistent with the many definitions of active learning found across disciplines from education to engineering (e.g., Bonwell & Eison, 1991; Domínguez & Jaime, 2010; Prince, 2004). While some might argue that any homework assignment would fulfill the definition of active learning, active learning is typically introduced inside of the classroom, but may continue both inside and outside of the classroom. Specifically, the core tenet of active learning is the focus on engaging students through activities that enable higher levels of learning (Prince, 2004).

Active learning has been found to be a significant predictor of student success (Serva & Fuller, 1999). The use of active learning enables students to clarify, question, consolidate, and appropriate new knowledge (Meyers & Jones, 1993). Instructors who are frustrated with students that fail to adequately prepare for class, are bored in the classroom, and seem to retain little of what was presented in class would benefit by redesigning their course to include more active learning components (Fink, 2003).

There are barriers to active learning for instructors that seek to transition from a traditional lecture format. Instructors with large classes are the most likely group of instructors to avoid the consideration of active learning exercises (Pundak, Herscovitz, Shacham, & Wiser-Biton, 2009). Instructors may also avoid using active learning if the instructor has a large amount of required material that must be covered in a class, meaning that quantity of content becomes more important than student understanding (Pundak et al., 2009). Even if an instructor is interested in active learning, it is likely that the instructor may have had zero to few role models demonstrating this method in their educational upbringing (Niemi, 2002). Active learning can also be challenging in an online environment as many instructors move to online learning or flipped classrooms. Recent research has just started exploring how to make active learning work in an online format (Hathaway, 2014; Martin, 2012; Salm-

on, 2013). Course ratings may also be a concern for faculty interested in active learning. While recent research has found that millennial students prefer active learning exercise (Therrell & Dunneback, 2015), other research has found students give lower course evaluations in classes with active learning (Martin, 2012). Some students prefer lectures because it allows them to be passive learners and memorize material so the student can receive high marks in a course (Lowman, 1995).

As mentioned above, the purpose of this research is to review previously published articles related to active learning in IS courses and to consolidate prior research to provide a meaningful list of strategies that encourage active learning. Not only is the goal of this paper to identify successful active learning in IS activities, but also to demonstrate opportunities for introducing more active learning exercises in the classroom. Those with large classes or instructors that must cover large amounts of content can still explore using active learning techniques in IS courses to improve student learning and outcomes. Instructors that wish to transition to a more active learning environment can use traditional lectures that are interspersed with meaningful active learning exercises (Gudigantala, 2013). In fact, previous research has found that the attention span of students during lecture is 15 minutes (Wankat, 2002). Instructors can consider the introduction of more active learning strategies by having a series of short lectures that also include periods in which students can engage with the course material more actively. Furthermore, while some past research assumes that active learning can only take place in the classroom (which is considered a limitation of active learning) (Drake, 2012), this research considers active learning exercises that engage students both within a class period or outside of class.

This paper reviews previous research of active learning in information systems courses to offer ideas to instructors that are interested in incorporating more active learning exercises in their courses. Some topics in courses may lend themselves to strategies that enable students to gain experience through doing, while other strategies help students become active learners through observation.

IDENTIFYING SUCCESSFUL ACTIVE LEARNING EXERCISES IN IS

In our attempt to answer the research question regarding what examples of active learning exercises have been successfully used in IS courses, we performed a systematic literature review. A systematic literature review is defined as "a form of secondary study that uses a well-defined methodology to identify, analyze, and interpret all available evidence related to a specific research question in a way that is unbiased and (to a degree) repeatable" (Kitchenham, 2007). The technique of systematic literature reviews is valued due to the transparency and replicability of this method. There are a number of examples to follow when completing a systematic review of literature (e.g., Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012; Mitchell & Zigurs, 2009). To identify previous research which studied the use of active learning in information systems courses for this research, a systematic method for assessing research from Mitchell and Zigurs (2009) was followed. Specifically, the method includes (1) identifying the concept of interest, (2) identifying the papers to be included, (3) coding for aspects of interest, (4) analyzing the results from coding, and (5) identifying the avenues for future research (Mitchell & Zigurs, 2009). Table 1 outlines this process including the specifics from this research.

In this study, the concept of interest is active learning, which was defined in the previous section. The papers included in this research were found through a search of ABI/Inform scholarly journal abstracts and keywords using the search terms "active learning" and "information systems" from 2000 through June 2016. We also screened for relevant articles within the Informing Sciences Institute library and the Association for Information Systems (AIS) eLibrary.

Our initial ABI/Inform search yielded 41 relevant papers with additional journal papers and conference proceedings included from the two other relevant databases. Our screening of the Informing Sciences Institute library and the Association for Information Systems (AIS eLibrary) helped us to

identify 26 additional papers. This provided a total of 67 papers that were identified for initial consideration for our literature review.

Table 1. Structured Method for Assessing Prior Research

	Method Step (Mitchell & Zigurs, 2009)	**Study Specifics**
1	Identify the concept of interest	Active learning, the concept of interest, is defined as *one time or ongoing student exercises that are introduced in the classroom to encourage student thinking and participation in an effort to engage students in the learning process.*
2	Identify the papers to be included	Searched ABI/Inform for "active learning" AND "information systems"; screened relevant databases (such as the Informing Science Institute library and the AIS eLibrary) for research related to "active learning." Note: Papers that focused on active learning in courses other than information systems courses in college level courses were excluded from further analysis.
3	Code for aspects of interest	The active learning exercise used in each study was documented/coded (including class assignment specifics, duration of one or more class sessions, and location whether in-class or out of class); codes were analyzed for emerging groups/categories.
4	Analyze the results from coding	Five categories emerged including 1) visual presentations, 2) collaborative student projects, 3) technology interaction, 4) assessment, and 5) games. Figure 1 summarizes the results.
5	Identify the avenues for future research	The discussion and conclusion section highlights some of the future active learning in IS opportunities.

As a part of our identification process, we found the need to exclude manuscripts for various reasons. First, we excluded manuscripts in which the paper was conceptual (i.e., did not discuss successful active learning practices) or did not focus on active learning. We also excluded manuscripts that considered active learning in contexts other than information systems courses at a college level. For example, manuscripts in which active learning was part of the literature review but not a concept of study or active learning was studied in relation to high school students were excluded. Additionally, research in progress work, research that did not explain the active learning exercises, or research that did not discuss the success of an exercise were not included in our analysis. As a result, we excluded 18 papers, which yielded 49 relevant papers which were included in our analysis (see the Appendix).

Following the identification of potential papers for inclusion, active learning exercises were identified from each paper. In examining each active learning exercise, notes were made regarding the type of class activity, the duration of the activity (i.e., one or more class sessions), and whether the activity was performed in-class or out of class (see Table 2). These activities were examined to identify if any similar groupings or categories emerged. It is important to note that some of the research articles examined more than one active learning approach and therefore were coded accordingly (e.g., Gudigantala, 2013; Hovorka & Rees, 2009; Massey et al., 2005; Mok, 2014). During the process of coding and categorization, twenty different types of exercises were identified and logically grouped into the five categories presented in Figure 1. The five categories include 1) visual presentations, 2) collaborative student projects, 3) technology interaction, 4) assessment, and 5) games.

Table 2. Research Coding Details

	Activity Type	Article Count	Duration of Activity	Activity Location
1	IT in the News	1	One or More Classes	In Class
2	Subject Matter Experts	3	One or More Classes	In Class
3	Technology Demo	2	One Class	In Class
4	Company Videos	1	One Class	In Class
5	Business Proposals	4	Semester Project	Out of Class
6	Industry Projects	4	Semester Project	Out of Class
7	Interactive Cases	4	One Class	Out of Class
8	Virtual Projects	6	Semester Project	Out of Class
9	Online Notes	3	One or More Classes	Out of Class
10	Social Learning	8	One or More Classes	Out of Class
11	Software Animations	2	One Class	In Class
12	Technology Simulations	4	One Class	In Class
13	Formative Quizzes	3	One or More Classes	In Class
14	Instant Feedback Quizzes	3	One or More Classes	In Class
15	Automated Technology Quizzes	3	One or More Classes	In Class
16	Student Written Questions	2	One or More Classes	Out of Class
17	Individual Games	1	One or More Classes	Out of Class
18	Team Games	1	One or More Classes	In Class
19	Role Playing Games	3	One or More Classes	In Class
20	Online Games	1	One or More Classes	Out of Class

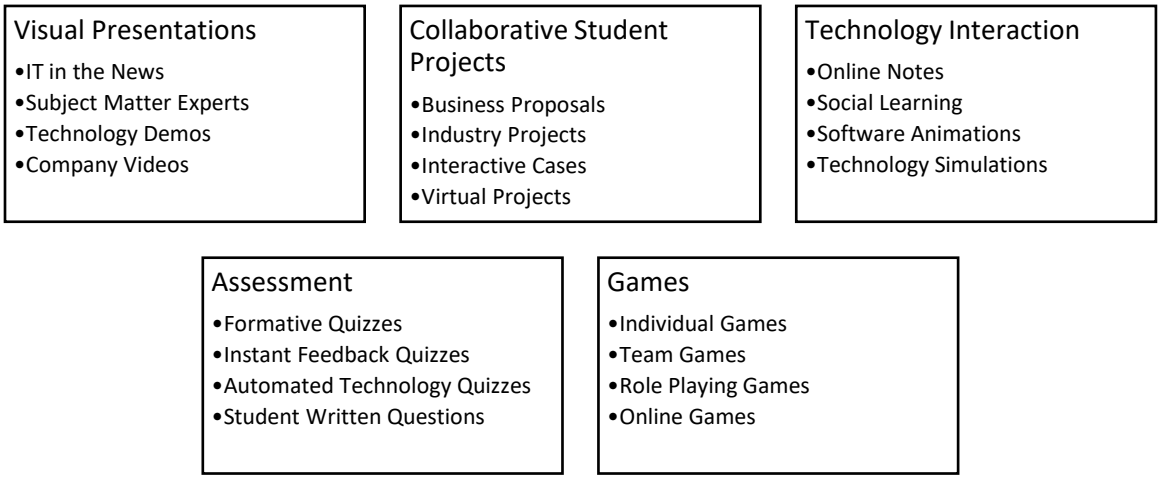

Figure 1. Categories of Successful Active Learning Exercises in IS

The remainder of this section presents each of the five categories identified in this study and discusses the active learning exercises that were identified in the review of the literature. For each successful active learning exercise, we identify considerations for faculty that might be interested in adopting the exercise in their classroom. Each active learning exercise can be implemented in a variety of ways to meet the needs of the instructor and satisfy learning objectives. We provide one example as to how each exercise might be implemented in a classroom as well as potential benefits of each exercise in an effort to stimulate the creativity of information systems faculty as they consider how to introduce active learning exercises in their courses.

1. Visual Presentations

Including visual presentation exercises in an IS course is one way to include an active learning component to faculty lectures by increasing the effectiveness of transmitting information. Successful visual presentations exercises include *IT in the news, subject matter experts, technology demos,* or *company videos*. The primary benefit of complementing traditional lecture with visual presentations is to increase students' retention of course content by presenting alternative viewpoints or examples. This category can also be useful for encouraging student speaking within the classroom. Faculty interested in complementing their lecture with visual presentations can use these exercises to replace a full class period or plan for short 5-15 minute presentations during class meetings. Specific examples are outlined in the following sections.

IT in the News

Individual student presentations give students the opportunity to relate class concepts to real world situations and cases. Gudigantala (2013) asked students to use newspaper articles, work experiences, videos, photos, or any other relevant sources to relate course topics to the real world in quick three minute presentations. In class presentations were complimented with a one-page report. The instructor using this technique noted that students were interested and engaged in the presentations (Gudigantala, 2013).

What to do: Assign students to a presentation schedule in which the first part of each class will be devoted to a couple of 5-minute IT in the News presentations. Allow students to choose the topics and submit 1-page write-ups along with presentations. *Main benefit*: Increases student speaking skills and keeps students up to date with current IT topics.

Subject Matter Experts

Bringing guest lecturers on-campus has been found to bring relevance to a classroom (Eveleth & Baker-Eveleth, 2009). Other research has also suggested asking students to be involved in finding and interviewing the guest lecturer (Li, Conn, & Markham, 2014). This approach requires the students to prepare discussion questions in advance as well as allows students to reflect on the experience and lessons learned. Zhang and Spiteri (2012) even went so far as to ask students to serve as the subject matter experts, requiring student groups to teach various programming topics in their course. The findings from this student teaching experience identified that students gained a deeper understanding of the topics they taught to others.

What to do: Invite a guest speaker to visit class and ask students to prepare possible questions for the speaker ahead of time. *Main benefit*: Brings relevance to classroom and credibility to the content shared in the textbook and by the faculty member.

Technology Demos

Previous research recommends using technology demonstrations to illustrate key course concepts (Gudigantala, 2013). For example, Gudigantala (2013) used a technology demonstration in class to show how Google Documents can be edited by sharing a file with a student and having a live interaction. Technology demonstrations can also be used to visualize IS that may seem abstract or unknown

to students (e.g., Microsoft SharePoint and Salesforce's CRM) and strengthen learning. Mok (2014) even used technology demos in the form of flipped classroom, 20-minute, youTube videos covering programming instructions for students to access outside of class as often as they needed in order to grasp the course concepts. In this study, students appreciated the opportunity to take ownership of their own learning with these on demand demos (Mok, 2014).

What to do: Depending on the class topic of the day, prepare a 15-minute in class demonstration that actually walks through a technology tool and shows how it works (as opposed to simply talking about it) (e.g., Google Docs, Microsoft SharePoint, Salesforce CRM, etc.). If possible, allow students to have an opportunity to use the tool and share their ideas about how it might be useful in the workplace. Screen capture videos can even be posted online after class for students to watch again if needed. *Main benefit*: Increases effectiveness of information transmission with visual demonstration and encourages students to identify the value of the technology for various tasks in the workplace.

Company Videos

Company videos allow students the opportunity to watch presentations from real businesses or interact with various organizations. The development of sophisticated video collaboration technologies give faculty an opportunity to bring in guest speakers regardless of their physical location. For example, Chilton (2012) used a relationship with university alumni to create a video collaboration with a company interested in hiring IS students. The students worked on a semester long project with the sponsoring firm and used video interactions with a company to manage the collaboration. Student, organization, and faculty feedback from this real world experience was highly positive.

What to do: Invite a guest speaker from different geographical location to visit class virtually through the use of Skype, Zoom, Blackboard Collaborate, or Adobe Connect. Have the students prepare a video presentation for the guest speaker in return. *Main benefit*: Brings relevance to classroom and enables students to interact with working professionals in the field.

2. Collaborative Student Projects

The category of collaborative student projects allows for students to work together to solve real problems or challenges. These types of projects may require more work from the faculty perspective, but students can increase their knowledge, problem-solving skills, and team skills with these types of exercises. Collaborative student projects can include *business proposals, industry projects, interactive cases,* or *virtual projects*. The main benefit from collaborative student projects is that these projects force students to work together to solve complex business and technology problems while encouraging critical thinking. These projects can be included in class as short in-class collaborative problems or span the length of a semester with various deliverables throughout the class. Specific examples are outlined in the following sections.

Business Proposals

In introductory IS courses, a number of concepts are presented to students that explain how technology is used in organizations (e.g., enterprise resource planning, customer relationship management). One way to help students experience these different concepts is to require them to work together on a semester long project developing a business and addressing the various technology concerns (Gudigantala, 2013). One of the main benefits from this type of collaborative student project is that students are required to work together over a period of time both in and out of class which helps students think about topics more deeply and develop interpersonal skills. Abrahams and Singh (2010) required students over the course of four successive semesters to develop an online business and guidebook. This experience gave students the chance to learn about e-commerce while working in the industry as well as an opportunity to write and reflect on what they learned throughout this multi-semester project. Similarly, Moura and van Hattum-Janssen (2011) used student projects to teach students database concepts and found that these active learning techniques led to more motiva-

tion from the student perspective. This activity also proved valuable in a liberal arts context in which students are less familiar with information systems and programming, yet the instructors encouraged students to build basic websites with limited business logic and database elements to demonstrate technology in an e-commerce context (Ghosh, Naik, & Li, 2014).

What to do: Over the course of the semester, have students work in teams to develop a comprehensive business plan which takes into account the topics from each week of the course. *Main benefit*: Gives students a deeper understanding of course concepts and increases critical thinking and teamwork skills as they tackle these concepts for their own hypothetical business.

Industry Projects

IS faculty can use group projects in participation with industry to give students real organizational insights. For example, a study from Astani (2006) assigned student teams to Chief Information Officers (CIOs) and asked them to interview CIOs and present their findings to class. This exercise allowed students to engage with industry professionals and share their learning experiences in an active learning setting. Students developed a better understanding of the role of a CIO as well as learned about the management issues that senior managers face. Gricar, Pucihar, and Lenart (2005) similarly linked students with organizations asking students in group projects to select e-market services for a partnering industry sponsor and asked students to present their recommendations to their partner company. This type of project allowed students to learn about e-commerce adoption as well as provided real-life consulting experience. A study from Mason (2013) partnered students with real businesses to volunteer in roles as a part of a database practicum which benefits students with real world experience and exposure. A final example from Tanner and Scott (2015), used a flipped classroom for a sequence of classes with 83-163 students and incorporated a systems analysis and design project in which students had to work with an industry partner to demonstrate what they had learned in the course.

What to do: Over the course of the semester, have students work in teams to address a real client problem. Teams could even work on the same client problem with the client choosing the winning solution at the end of the semester. *Main benefit*: Brings relevance to course work and gives students real world experience with team members and clients.

Interactive Cases

Interactive cases ask students to apply theory discussed in a lecture in order to make decisions with the goal of solving a real world business problem (Eierman & Schuldt, 1998). Specifically, Eierman and Schuldt (1998) created a hypertext case that students could walk through and choose the next step in a scenario. These types of interactive learning tools can result in increased learning and retention (Eierman & Schuldt, 1998). An added benefit of interactive or multimedia case studies is that students that tend to have a more negative attitude toward technology (e.g., non-technology majors, females, and other minority groups) have been found to gain interest in technical topics through these interactions (Sankar & Raju, 2002). Another successful approach is to use a traditional case study, but include both individual and group tasks to encourage students to work together to solve different problems within the case and report their findings to the group (Taneja, 2014). In information security courses, interactive cases in which students are able to explore the workflow and responses to cyberattacks can be useful in demonstrating key concepts from the course (He, Kshirsagar, Nwala, & Li, 2014).

What to do: Develop an interactive case where students are given a scenario and have to make choices. Some textbooks provide these types of interactive cases, but a simple implementation might use the adaptive release feature available with Blackboard. *Main benefit*: Increasing interaction improves critical thinking as well as student interest.

Virtual Projects

Collaborative virtual team projects offer another alternative to increase group work interaction in an IS course. In virtual interactive projects, students collaborate with partners through the use of technology and experience real world projects and challenges (Ramiller, 2002). For example, virtual collaboration projects have been common to help students learn systems development concepts by requiring student teams to virtually work together through the development of a system (Adya, Nath, Sridhar, & Malik, 2008; Adya, Temple, & Hepburn, 2015; Davis, Germonprez, Petter, Drum, & Kolstad, 2009; Ramiller, 2002). Some studies have even explored the use of virtual world technologies for virtual team group work and found that students were willing to learn more due to the rich, engaging technology (Schiller, 2009; Wagner & Ip, 2009).

What to do: Over the course of the semester, have students work in teams with students from another geographical location on a joint business project. *Main benefit*: Gives students experience of working with people through the use of technology and increases their understanding and preparedness for the real world.

3. Technology Interaction

The technology interaction category can be used to increase student involvement by engaging with students with technology. Technology interaction activities include *online notes, social learning, software animation,* or *technology simulations*. The primary benefit of including technology interaction in a course is to encourage students to identify the key concepts from class and communicate them in a way that demonstrates their understanding. As faculty in the area of IS, it is also important to encourage the use of technology and to help students understand the benefits of technology. The technology interaction activities described below can be allowed as in class activities or assigned as out-of-class work.

Online Notes

There are a number of collaboration technologies available that can be used for sharing class material online (e.g., blogs or microblogs, wikis, Microsoft OneNote, Evernote, or even course management systems like Blackboard). In one example, Zheng (2013) used a class blog to introduce course concepts, experiences, questions, problems, reviews, and notes and found that, although there were challenges, students were able to learn from one another. Another example from Sun and Gao (2014) showed how graduate IS students could use web annotation tools as an alternative to discussion forums. This research found that the web annotation was rated as easier to use and pay attention to as well as more engaging than the traditional discussion board methods. Hovorka and Rees (2009) suggest that despite the challenges that can occur with these types of assignments, students become motivated by knowledge discovery and reflection when using these tools.

What to do: Use a course wiki (available in many course management systems) and require students to add notes, examples, and questions related to course concepts. *Main benefit*: Increases student engagement and interest with course concepts while allowing them to use a technology.

Social Learning

The term social learning is used to include the social applications of Web 2.0 and tablet PC technology uses in education (Olla & Choudrie, 2009). Web 2.0 technologies like wikis and social bookmarking have been used in previous research to develop a collaborative knowledgebase for a class (Hovorka & Rees, 2009; Kane & Fichman, 2009). Agarwal and Ahmed (2013) used a wiki tool to help write test questions and found that this tool led to a student-centric and concept-centric learning experience. Another study required the use of social technologies, specifically Google Docs and spreadsheets, for the completion of an e-business plan (Huang & Behara, 2007). Williams and Chinn (2009) required students to use Web 2.0 technologies (including sites such as YouTube, social networking sites, mash-ups, Twitter, and others) to create a viral sports management campaign as a part of their coursework. One recent study has claimed that business programs, particularly in the area of

IS, should be included social technology courses in their programs and included an explanation of three different options for doing so, all of which were well received by the students (McHaney, Warkentin, Sachs, Pope, & Ormond, 2015). Finally, a study from Thoms (2012) found that students really enjoyed the social learning aspect of Twitter as it increased the options for information retrieval by allowing students to participate from anywhere. In fact, the general findings from these social learning studies reported increased student engagement as an outcome of the active learning exercise (Huang & Behara, 2007; Williams & Chinn, 2009).

What to do: Require students to use a Web 2.0 technology like Twitter or Slack and develop a process for students to post. Students create a community where they can share notes, news items, comments, and questions. *Main benefit*: Increases student engagement and interest with course concepts while allowing them to use a technology as well as increases student communication and creates a technology supported community/social network for learning to happen in and out of class.

Software Animations

Software animations can be used to aid in teaching a number of concepts from database security (Murray & Guimaraes, 2009) to accounting information systems students (Parker & Davey, 2011). For example, Murray and Guimaraes (2009) used software animations to teach database topics like referential integrity allowing students to watch demonstrations for updating and deleting data in a database. Parker and Davey (2011) created a computer assisted teaching tool to simulate real world experiences and even to help with grading by comparing the student submitted files with the solutions files.

What to do: Use video capturing software (e.g., Panopto, Camtasia, etc.) to create videos with screen images which illustrate course concepts to students and post for students to view or have students create videos demonstrating how to use various features and software within a context. *Main benefit*: Increases effectiveness of information transmission with visual demonstration.

Technology Simulations

Often introductory IS courses do not allow for students to have hands-on experiences with many of the advanced enterprise technology solutions. Beyond the technology demonstrations, technology simulations enable students to work with the technology and experience its use. Previous research examined the use of technology simulations specifically related to enterprise resource planning (ERP) to see if students would gain a better understanding of ERP and business process knowledge (Pridmore, Deng, Turner, & Prince, 2014). In this research, students were able to complete hands-on SAP business exercises (e.g., pre sales activities, order entry, vendor selection) following a class lecture (Pridmore et al., 2014). The findings suggested that using the technology simulation tool after a class lecture was an effective teaching approach that allowed for business students to acquire solid ERP knowledge. Leger (2006) presented similar conclusions from the use of SAP simulations to teach ERP concepts. Another study used technology simulation, not to teach a specific technology tool, but instead to teach IS students about project management concepts (e.g., project failure and escalation) (Nulden & Scheepers, 2002). A technology simulation tool was developed illustrate different events used to simulate real life occurrences (Nulden & Scheepers, 2002). The findings from this study showed that student interaction was increased through simulation, and students were able to learn the required concepts of study. In another example of technology simulations, first year business students, taking an introductory IS course, completed an eSimulation in which they had to develop a solution to problem for a fictional fashion store in which students interact with online spreadsheets and avatars (Coldwell, Craig, & Goold, 2011). Faculty found that this simulation, offered to 3,000 students per year, can be adapted for different cohorts of students (Coldwell et al., 2011).

What to do: Leverage educational partnerships with large software companies that offers technology access and training/simulation modules (e.g., Microsoft SAP, etc.). Allow students to work through

simulations in or out of class time and then discuss. *Main benefit*: Increases effectiveness of information transmission with hands-on simulation as well as provides students with relevant skills for the workplace.

4. Assessment

Active learning exercises focused on assessment can be used to increase student questioning and ultimately test performance. Active learning activities related to assessment can include *formative quizzes, instant feedback quizzes, automated technology quizzes* (using clickers or other student response systems), or *student written questions*. The main benefit of assessment exercises is to increase the likelihood that students will be prepared for class by having completed assigned readings or other work. These exercises also allow the students to demonstrate the concepts that they know as well as knowledge they have not yet mastered. These assessment activities can be added to a class prior to or following traditional lecture. Specific examples are outlined in the following sections.

Formative Quizzes

Formative quizzes are ungraded in-class quizzes with questions relating to the day's lecture to help students realize if they fully understood the course concepts (Gudigantala, 2013). The quizzes are ungraded and are mostly to highlight important course concepts (i.e., recommended note taking or active listening). Formative quizzes can be used to help guide the lecture and the note taking. Studies have found that note taking improves comprehension and long term retention of material (Kiewra, 1991) as well as maximizes interest in IS courses (Mukherjee, 2005). In a systems analysis and design course, which also used a flipped classroom approach, formative quizzes were used to help students identify what content was understood and aided faculty in identifying areas that need further instruction in class (Tanner & Scott, 2015). Students commented that the use of these quizzes, even though ungraded, encouraged them to read the material prior to class (Tanner & Scott, 2015).

What to do: Quiz students at the start of class with questions related to the day's required reading. *Main benefit*: Increases student test performance by allowing them to take better notes and prepare for exams as well as allows students to receive instant feedback on the material that they understand and areas in which they need to improve.

Instant Feedback Quizzes

Instant feedback quizzes can be used to show students questions related to course concepts that were just answered and then elicit responses (Gudigantala, 2013). For example, following a class lecture, students can answer some questions that ask "do you understand" the concepts that were just presented. These types of questions help students to summarize the lecture as well as receive instant feedback regarding their understanding. Makhurjee (2004) uses in-class quizzes to ask students five questions about a business case and then follows up the graded quiz with a discussion of the case, concepts, and the higher order learning questions from the quiz. The findings from this study suggest that in-class, instant feedback quizzes can be used to help students practice course concepts as well as encourage class discussion. Another study from Mok (2014) used instant feedback quizzes following the review of online videos in order to verify that students were indeed watching the required course video lectures.

What to do: Quiz students at the end of each class with questions related to the topics that were just discussed. *Main benefit*: Increases student test performance by allowing the student to identify what content must be learned in preparation for exams.

Automated Technology Quizzes

Technology quizzes take advantage of clickers or similar automated response technologies that allow for in-class polling and are an interactive way to ask questions of the class. Clickers can be used in a number of ways including clicker quizzes, self-assessment, or even in relation to the two previous

assessment categories (formative quizzes and instant feedback quizzes) (Davis & Petter, 2008). Clickers are also a means to assess student understanding of concepts prior to a lecture or other active learning techniques to adjust the content based on the students' knowledge and understanding of a topic (Drake, 2012). Previous research has found that the majority of IS students perceive that automated technology quizzes using clickers improved their course performance (Hauck & Nelson, 2006). If faculty do not have access to clickers, there are free websites (e.g., http://www.polleverywhere.com/ or https://www.mentimeter.com/) where students can use their cell phones to text a code for in class electronic polling.

What to do: Use clickers or other options for in class polling to ask questions throughout a lecture. *Main benefit*: Increases student involvement and engagement during class.

Student Written Questions

The development of course exams offers an opportunity to be creative with assessment and the use of active learning in an IS course. A study from Daigle and Doran (1998) used an active learning approach for the creation of test questions. In this study, students were asked to submit, integrate, and review test questions. The research suggests that student developed test questions can contribute to the student's knowledge of learning as well as lead to life-long learning. The study from Daigle and Doran (1998) relied on ASCII or rich text files for student questions and then compiled them into one document, but other studies have even explored the use of wikis for student written questions (Agarwal & Ahmed, 2013).

What to do: Ask students to write test questions. Student can present test questions in class which gives the remainder of the class an opportunity to review the questions or make other suggestions. *Main benefit*: Engages students with course material and increases critical thinking and test preparation.

5. Games

The final category, games, allows for students to be creative and to ultimately increase their knowledge and skills. Games might include *individual games, team games, role playing games,* or *online games*. The main benefit of games is to actively involve students in class or in the mastery of class concepts. While individual or online games can be assigned outside of class, team or role playing games can be used in class. Faculty looking to implement games in class can try some of the following examples before exams to help students identify what they know and still need to learn as they prepare for an exam.

Individual Games

Studying for exams is generally not perceived as an exciting task. To help students become more prepared for exams in an engaging way, Massey et al. (2005) tested the use of crossword puzzles as an individual game that students could use to master course concepts. The findings suggest that individual games can be beneficial in terms of student perceptions about learning as well as in relation to exam scores. Some textbooks include crossword puzzles or other individual games as a part of their supplemental tools. If instructors are interested in creating their own crossword puzzles, Massey et al. (2005) used http://crosswordkit.com/, and other free alternatives are available online.

What to do: Provide students with crossword puzzles that use course concepts and definitions. *Main benefit*: Engages students with course material and increases test preparation.

Team Games

Along with individual games, group or team games can be used to help in exam preparation. Massey et al. (2005) found that the use of the group game, "Jeopardy", helped in reinforcing conceptual knowledge as well as allowed for visual application. Other games faculty might be interested in test-

ing might include "Who Wants to be a Millionaire," classroom timed races, or other types of team contests.

What to do: Play team games in class prior to exams as a way to practice course concepts and definitions. *Main benefit*: Engages students with course material and increases test preparation.

Role Playing Games

Role playing offers individuals the opportunity to make their own choices based on their perceptions. One study used role playing in an IS course to discuss an Amazon.com business case and found that the role-playing technique proved to be superior to traditional case discussion methods (Kerr, Troth, & Pickering, 2003). Another study used role playing to teach students about systems analysis concepts, asking students to act as the different departments of a hotel and use LEGO blocks to represent resources (money, time, knowledge, system success, and failure) (Freeman, 2003). Using the LEGO blocks, students have to work through a resource allocation challenge. The findings from this study suggest that role playing can allow for an alternative exposure to IS concepts as well as a valuable concept review. A third study used role playing in the form of debates to teach students about information ethics (Peace, 2011). Role playing in the form of debates requires that students have a firm grasp on course concepts in order to make valid arguments and students in this study rated the experience highly.

What to do: Provide students with role descriptions and ask them to act out case study situations or argue different viewpoints in a business meeting or debate. *Main benefit*: Involves students actively in the classroom and forces them to have a deeper understanding of a situation or perspective.

Online Games

There has been a lot of growth in the online gaming industry. Previous research specifically looked at the use of an online auction game in an the area of e-commerce education (Lok & Ngai, 2005). The study found that business students enjoyed the opportunity to play bidder and seller and that this type of active learning works well for learning about e-commerce concepts. Some IS textbooks even offer online games as supplemental tools. For example, Paradigm's, "Our Digital World" has a game version of Spin to Win or Double Pursuit to coordinate with every chapter available on their online website (http://irc.emcp.com/index.php?titleID=2815&title=Our%20Digital%20World%2C%202e).

What to do: Prepare an online auction simulation game or use another online game to illustrate course concepts. Discuss and reflect in class following this activity to see what students thought. *Main benefit*: Engages students with course material and increases test preparation.

The discussion above presented five main categories. Table 3 summarizes these above mentioned benefits from each category as well as challenges that instructors might be faced with in each area.

Table 3. Benefits and Challenges of Active Learning in IS Exercises

	Category	Research Benefits	Possible Challenges
1	Visual Presentations	• Increases information transmission • Increases student retention • Encourages student speaking	• Resource identification (guest speakers, technology, etc.)
2	Collaborative Student Projects	• Increases student knowledge • Encourages problem solving • Encourages critical thinking • Increases team skills	• Increased faculty workload • Team management issues • Resource identification (business partners, technology, etc.)
3	Technology Interaction	• Increases student involvement • Illustrates technology benefits • Allows for out of class work	• Resource identification (technology, cost, support, etc.) • Necessary faculty training
4	Assessment	• Increases student preparation • Increases test performance	• Increased faculty workload • Resource identification (clickers, electronic polling, etc.)
5	Games	• Increases knowledge • Encourages active involvement • Allows for concept mastery	• Resource identification (games, etc.) • Increased faculty workload

DISCUSSION AND CONCLUSION

The goal of this paper was to identify active learning exercises that have successfully been used in IS courses. After reviewing the background of active learning, we present twenty types of exercises that have been presented in previous research. We grouped the exercises into five categories including 1) visual presentations, 2) collaborative student projects, 3) technology interaction, 4) assessment, and 5) games (see Figure 1). Faculty looking to adopt some of these active learning exercises may be interested to start with a quick one-time in class activity. To aid this approach we have provided Figure 2, which can help faculty identify activities that might be quick, one time in-class activities versus activities that require longer time commitments. Once faculty are comfortable adopting active learning exercises in their class, they may attempt longer semester projects.

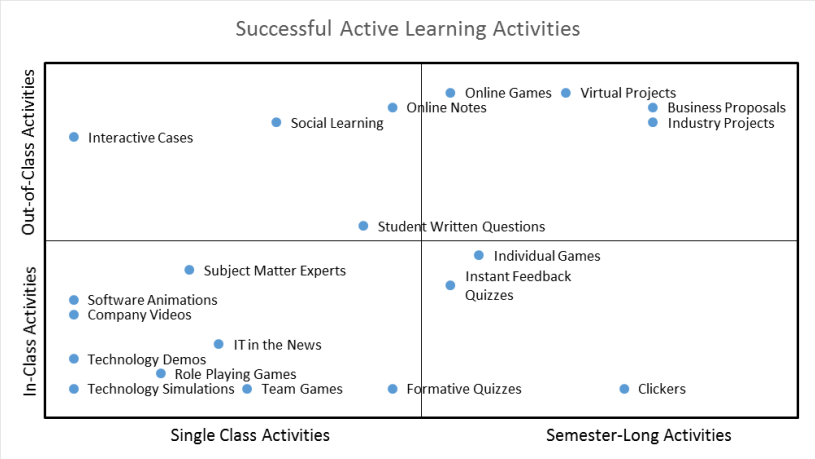

Figure 2. Successful Active Learning Exercises in IS by Duration and Location

Furthermore, it should be emphasized that faculty do not have to abandon the traditional lecture format in the IS courses (Gudigantala, 2013). Instead they can supplement their lecture with some of the suggested active learning exercises. As we mentioned above, instructors that wish to transition to a more active learning environment can use traditional lectures that are interspersed with meaningful active learning exercises (Gudigantala, 2013). Previous research has found that the attention span of students during lecture is 15 minutes (Wankat, 2002). Instructors can consider the introduction of more active learning strategies by having a series of short lectures that also include periods in which students can engage with the course material more actively. Figure 3 shows an example of what this class structure might look like.

Tentative Schedules of Activities
Week 15 – Class Date/Time

Learning Objective: Understand the role of information systems in helping people working in a group make decisions more efficiently.

1) Review course material from the prior class – **Automated Technology Quiz** (10 minutes)
2) **IT in the News** (10 minutes)
   a) John Smith, Sally Jones
3) Lecture: Business Intelligence (15 minutes)
4) Exercise: Hands-on with **Technology Simulation** (20 minutes)
5) Lecture: Business Intelligence (continued) (15 minutes)
6) Topic Wrap up and Announcements (5 minutes)
   a) Read Chapter 13 for next time

Figure 3. Example Class Structure Using Three Active Learning Exercises

The tentative schedule of activities shows what a typical class might look like when discussing the topic of business intelligence systems including three different active learning exercises. The class starts with an automated technology quiz using clicker questions for assessment and to make sure the students really understood the previous class topics. This review is followed by a couple of student IT in the News presentations. The class lecture on business intelligence would last about 15 minutes and would be followed up with a technology simulation showing what a business intelligence system might do. This simulation is followed by another 15 minutes of lecture and a topic wrap up.

There are limitations of this research. In terms of the literature review, while we did follow a systematic approach to identifying previous research on active learning in the IS classroom, the review of successful active learning exercises is not comprehensive. As a part of our search, we included only successful, published active learning interventions in IS. Therefore, we did not include (nor did we find) examples of failed active learning exercises. Some papers included lessons learned, but the active learning interventions reported in this paper were activities that were identified as successful by the authors. Furthermore, we focused exclusively on active learning exercises used in IS courses, but there could be strategies in other disciplines that could be adapted to IS content. The choice to focus on IS-based active learning exercises is to provide faculty interested in active learning with tested, successful exercises that have been successful in teaching information systems content.

There are also limitations to active learning. For example, some of these active learning exercises may require classroom technology in order to support certain activities like simulations or games in the class or even automated technology quizzes. Some active learning exercises may need a different structure to the room (open space or rearrange desks for games and role-playing) (Delisle, 1997). Obtaining resources, such as finding guest speakers, access to organizations, and additional cost of simulations to students or university may be another obstacle. The presentation of twenty different types of exercises, many that can be adapted to suit a variety of learning environments, should be able to stimulate ideas and creativity for faculty interested in incorporating active learning in the

classroom. Finally, implementing active learning in the classroom may require some instructors take on an additional work load to successfully implement active learning exercises in the classroom. Some courses may even require a redesign to course content and delivery (Fink, 2003). However, one way to manage this task could be to intersperse active learning with traditional lecture, or make improvements to a few class meetings each semester until entire course is redesigned.

As mentioned in Table 1, the final step in the systematic method for assessing research from Mitchell and Zigurs (2009) is to identify future research avenues. In relation to future research, this study highlights a number of opportunities for IS faculty using active learning exercises in their courses. Some of the categories presented include a number of exercises that have been tested and published showing the value of that particular active learning exercise in IS. However, a few of the categories lack empirical support. For example, the use of team games is probably something that many IS instructors use, but not much research is published related to team games and active learning in IS. In fact, we only found one example studying the use of Jeopardy. Other categories might also benefit from additional research and empirical study. Furthermore, while this research focuses on active learning exercises that have been studied in the context of IS classes, there are many opportunities to study other active learning approaches that have not been studied in an IS discipline. For example, future research may look at the use of active learning exercises that have not been researched in IS such as one minute papers, fish bowl, flash cards, pair discussion/checking, write/pair/share, concept mapping, and others (Faust & Paulson, 1998). Finally, researchers might note that there are opportunities to not only focus on pedagogical studies of active learning in IS, but to focus on further research and emerging trends in other student centered approaches to learning (e.g., active learning in a flipped classroom).

While some researchers have criticized components of active learning suggesting that active learning can only take place in the classroom and that few studies have actually looked at the application of active learning in IS (e.g., Drake, 2012), this research addresses some of those shortcomings by broadening the idea of active learning to include in-class and out-of-class activities as well as presenting research of active learning in IS. Active learning can be a rewarding instructional approach for both students and instructors. Students that participate in active learning tend to learn better, retain concepts and find learning more enjoyable with active learning activities (Faust & Paulson, 1998). Through active learning, instructors potentially benefit from more interested and engaged students. While active learning activities may initially appear to be challenging to implement, this paper offers suggestions to offer faculty practical suggestions as to how to incorporate more active learning activities in their information systems courses.

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APPENDIX: ACTIVE LEARNING IN IS STUDIES BY CATEGORY

Category	Exercise	Exemplars
Visual Presentations	IT in the News	Gudigantala, N. (2013). *An Active Learning Approach to Teaching Undergraduate Introduction to MIS Course*. Paper presented at the 19th Americas Conference on Information Systems, Chicago, Illinois.
	Subject Matter Experts	Eveleth, D. M., & Baker-Eveleth, L. J. (2009). Student Dialogue with Online Guest Speakers. *Decision Sciences Journal of Innovative Education, 7*(2).
		Li, L., Conn, S., & Markham, C. (2014). *Promoting Active Learning in Distance Education: A case of student-centered guest lecturing*. Paper presented at the Southern Association for Information Systems.
		Zhang, A., & Spiteri, L. (2012). Cooperative Learning and Soft Skills Training in an IT Course. *Journal of Information Technology Education, 11*, 1165-1179.
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	Company Videos	Chilton, M. (2012). Technology in the Classroom: Using video links to enable long distance experiential learning. *Journal of Information Systems Education, 23*(1), 51-62.
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		Gricar, J., Pucihar, A., & Lenart, G. (2005). Active Learning Model for Teaching B2B e-Marketplaces. *Journal of Information Systems Education, 16*(1), 103-108.
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	Interactive Cases	Eierman, M., & Schuldt, B. (1998). *Interactive Cases in MIS*. Paper presented at the Americas Conference on Information Systems.

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		He, W., Kshirsager, A., Nwala, A., Li, Y. (2014). Teaching Information Security with Workflow Technology - A Case Study Approach. *Journal of Information Systems Education*, *25(3),* 201-210.
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		Taneja, A. (2014). Teaching Tip. Enchancing Student Engagement: A Group Case Study Approach, *Journal of Information Systems Education 25(3),* 181-187.
	Virtual Projects	Adya, M., Nath, D., Sridhar, V., & Malik, A. (2008). Bringing global sourcing into the classroom: Lessons from an experiential software development project. *Communications of the Association for Information Systems, 22*(2), 33-48
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		Zheng, J. (2013). *Active and Collaborative Learning through a Blog Network.* Paper presented at the Southern Association for Information Systems.
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		McHaney, R., Warkentin, M., Sachs, D., Pope, M. B., & Ormond, D. (2015). Teaching social media in business. *Journal of Information Technology Education: Innovations in Practice, 14*, 39-62.
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		Thoms, B. (2012). Student perceptions of microblogging: Integrating Twitter with blogging to support learning and interaction. *Journal of Information Technology Education: Innovations in Practice, 11*, 179-197.
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	Software Animations	Murray, M., & Guimaraes, M. (2009). *Tutorial: Teaching Database Security using a set of Software Animations.* Paper presented at the Southern Association for Information Systems.
		Parker, K. R., & Davey, B. (2011). *Applied Learning with the Virtual Teaching Assistant.* Paper presented at the Americas Conference on Information Systems.
	Technology Simulations	Coldwell, J., Craig, A., Goold, A. (2011). Using eTechnologies for Active Learning. *Interdisciplinary Journal of Information, Knowledge, and Management,* 6, 95-106.
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Assessment	Formative Quizzes	Gudigantala, N. (2013). *An Active Learning Approach to Teaching Undergraduate Introduction to MIS Course.* Paper presented at the 19th Americas Conference on Information Systems, Chicago, Illinois.
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	Instant Feedback Quizzes	Gudigantala, N. (2013). *An Active Learning Approach to Teaching Undergraduate Introduction to MIS Course.* Paper presented at the 19th Americas Conference on Information Systems, Chicago, Illinois.
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		Mukherjee, A. (2004). Promoting Higher Order Thinking in MIS/CIS Students Using Class Exercises. *Journal of Information Systems Education, 15*(2), 171-179.
	Automated Technology Quizzes	Davis, A., & Petter, S. (2008). *The case of clickers: Experiences from the instructor perspective*. Paper presented at the 3rd Midwest Association for Information Systems Conference (MWAIS-03), Eau Claire, Wisconsin.
		Drake, J. R. (2012). A Critical Analysis of Active Learning and an Alternative Pedagogical Framework for Introductory Information Systems Courses. *Journal of Information Technology Education: Innovations in Practice, 11*, 39-52.
		Hauck, R. V., & Nelson, M. (2006, May 5-6). *Embedding Student Clickers in an Introductory Management Information Systems Course*. Paper presented at the 1st Midwest United States Association for Information Systems Conference (MWAIS-01), Grand Rapids, Michigan.
	Student Written Questions	Agarwal, N., & Ahmed, F. (2013). *Collective Learning Paradigm for Rapidly Evolving Curriculum: Facilitating student and content engagement via social media*. Paper presented at the Americas Conference on Information Systems.
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		Kerr, D., Troth, A., & Pickering, A. (2003). The Use of Role-Playing To Help Students Understand Information Systems Case Studies. *Journal of Information Systems Education, 14*(2), 167-171.
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	Online Games	Lok, C., & Ngai, E. (2005). *Active Learning of E-Commerce: A Case Analysis of Online Auction Game*. Paper presented at the Pacific Asia Conference on Information Systems.

BIOGRAPHIES

Dr. Alanah Mitchell is an Associate Professor of Information Systems in the Department of Information Management and Business Analytics in the College of Business and Public Administration at Drake University. Her Ph.D. is in Information Technology from the University of Nebraska at Omaha. Professor Mitchell's research focuses on the design, implementation, and use of information and communication technologies for collaboration, specifically in global virtual teams. Additional areas of study include e-commerce and information systems pedagogy. She has published in such journals as *Journal of the Association for Information Systems*, *Communications of the Association for Information Systems*, *The Data Base for the Advances of Information Systems,* and *International Journal of e-Collaboration*, as well as others.

Dr. Stacie Petter is an Associate Professor of Information Systems at Baylor University. She earned her PhD in Computer Information Systems from Georgia State University. Stacie's primary research examines issues associated with software project management. She also conducts research on the impacts of information systems and research methods. Her work has appeared in multiple journals, including *MIS Quarterly*, *Journal of Management Information Systems*, *Journal of the Association for Information Systems*, *The Data Base for the Advances for Information Systems*, among others. She serves as an Associate Editor for *MIS Quarterly* and *Information Systems Journal*.

Dr. Albert L. Harris is a Professor in the Department of Computer Information Systems and Supply Chain Management at Appalachian State University. Dr. Harris received his Ph.D. in Management Information Systems from Georgia State University. His research interests include IS education and IT ethics. He co-edited a book titled *Managing Global Information Technology: Strategies and Challenges* and has published 9 book chapters and over 80 refereed scholarly articles in academic journals, and conference proceedings. Dr. Harris was Editor-in-Chief of the Journal of Information Systems Education for 10 years. He was a Fulbright Scholar to Adam Mickiewicz in Poznan, Poland in 2016, a Fulbright Scholar to the University of Évora in Évora, Portugal in 2006, an Exchange professor to the University of Angers, in Angers, France (2008-09), and a Visiting Professor at Vorarlberg University of Applied Sciences in Dornbirn, Austria (2007-2010). Dr. Harris was named the EDSIG Distinguished Information Systems Educator of the Year in 2014, awarded the AIS Award for Outstanding Contribution to IS Education in 2012, and named an EDSIG Fellow in 2010.