Technology as the Enabler of a New Wave of Active Learning

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How New and More Robust Technologies Are Changing the Way We Teach

Education has always been slow on the uptake of new technology. As instructors, we have established, time-worn methods of teaching, and the performance nature of the job puts an emphasis on reliability and predictability. The last thing an instructor wants to be doing is fumbling around trying to make something work in front of an audience of 200 undergraduates. Although LCD projectors and whiteboards have made purely blackboard-based teaching less common, instructors have resisted more complicated and exotic forms of teaching technology. The bandwidth was not there, the technology was hard to understand and use, and the supporting technology was not robust enough to ensure a reliable, positive learning experience.

But things have dramatically changed in the past 10 years. Though we still keep progressing along Moore’s Law and benefit from yearly increases in computer processing speed and cheaper storage, we are finally seeing education technologies that are easy-to-access on a variety of computer platforms, easy-to-use for both students and faculty, and much more robust and failure-proof. All of a sudden, we see instructors keen and eager to bring technology into their classrooms and actually doing so in new and exciting ways.

We are teaching in a period when the pace of technological change is quite breathtaking. When we wrote the Call for Papers in the summer of 2010, the

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iPad was only a few months old; 2 years later almost 100 million have been sold worldwide. Back then Twitter and Skype were just starting to gain real popularity, and the touch-screen smart phone was still an expensive novelty. Now these are mainstream, and we cannot imagine life without them. These represent the populist tip of the iceberg and underneath these there have been a large number of technological trends that have affected management education over the past 5 years.

Perhaps the most important development for the instructor has been the dramatic increase in both bandwidth speed and reliability. Although this has made it easier for instructors to leverage streaming video in the classroom, improved bandwidth has facilitated a lot more innovative teaching than just showing cool YouTube videos. Improved bandwidth coupled with global connectivity means that students can reliably access learning content and converse with instructors and fellow students from almost anywhere, at any time. Teaching used to stop at the classroom door. Now instructors can "teach" students while they stand in line at the grocery store, commute to work, or "relax" on the beach.

In addition, true platform and device independence means that students and instructors can access learning materials from a variety of operating systems, browsers, and devices without the technical quirks and incompatibilities that caused so much frustration in the past. Only a few years ago, most electronic-based learning experiences were designed to be resident inside personal computers and optimized to work on specific operating systems such as Windows 95, XP, or the Mac OS. These days, most electronic-based learning experiences are designed to be resident on the Internet or "cloud," and accessed by any device with an Internet connection, including laptops, tablets, and smart phones.

Alongside these technological developments has been an explosion in the number of accessible, high-quality, and mostly free online content, including textbooks, articles, blogs, videos, games, and simulations. These give instructors an enormous amount of material to draw on. In addition, we have also witnessed the arrival of robust, stable feature-rich course management systems that provide a solid platform for students to not only access online content but also communicate with instructors and other students.

We believe that these advances in modern technology are enabling two major changes to management education. First, this technology is helping us finally remove passive learning—more specifically the lecture—out of the physical and virtual classroom, freeing up time for more active learning. Second, it is enabling new and exciting ways to build active learning into the physical and virtual classroom and management education in general. The six
articles in this special issue attest to the emerging power of technology to facilitate such active learning.

Although there is considerable controversy about what constitutes “active” and “passive” learning, most would agree that students learn best when they are active, engaged participants. From the very first issues of the *Journal of Management Education (JME)* almost 40 years ago, active learning has been the primary emphasis of this publication. Countless articles in *JME* have encouraged instructors to reduce their reliance on lecturing and spend more time in the classroom teaching through exercises, group projects, simulations, and other experiential methods.

But despite all the research in *JME* showing that active learning is more engaging, more effective, and preferred by students, passive classroom learning, as epitomized by the lecture, has persisted in the classroom. One reason is that until very recently, the lecture (or at least the lecturette) was still needed in the classroom. For years, books and photocopies of cases and articles were pretty much all that students had access to outside the classroom. These text-heavy materials often did a poor job of introducing managerial concepts and only addressed one particular learning style. Concept-heavy textbooks did not help, often obliging instructors to introduce and explain multiple theories about concepts such as motivation, leadership, and culture. In-class lectures were needed to help students make sense of the material and understand which concepts were most important.

Videos were (and remain) a powerful, passive learning alternative to lecturing, and some scholars argue that the engagement that film can engender makes it a medium prompting active learning (e.g., Bluestone, 2000; Holbrook, 2009; Serey, 1992; Serva & Fuller, 2004, Smith, 2009; Tyler, Anderson, & Tyler, 2009). But, until recently, videos were physically embedded in either a VHS tape or DVD. This meant that the only logistical, practical way for large groups of students to view them was in the classroom. Showing videos in class consumed large amounts of time and sometimes the playback technologies did not work (Champoux & Billsberry, 2012).

Ultimately, instructors still needed to spend some class time either “talking at” students through lecturing or showing videos to introduce and explain managerial concepts *before* they could confidently move to more experiential learning. After all the explaining and video showing was done, there often was no time left for active learning.

The early versions of PowerPoint and other presentation software had good intentions, but ultimately made things worse. Initially, PowerPoint helped instructors better organize their lectures, and “jazz” them up visually.
with fancy graphics and animations. Originally envisioned to make the problematic-but-necessary passive lecturing more efficient and appealing, it unwittingly caused more passive learning in the classroom as instructors created more slides, and thus had to take more time in the classroom to get through them all.

But over the past 10 years, more powerful personal computers; increased bandwidth; more robust, stable software; and an explosion in online content has finally allowed us to move lectures and videos out of the classroom. Instead of being just an efficient way to project slides, PowerPoint and similar programs allow instructors to easily create lectures and multimedia-based learning sessions for out-of-the-classroom viewing. Instructors can use technologies such as Adobe Presenter to add voiceovers to their PowerPoint presentations and publish them online for web-based access. Other technologies allow instructors to seamlessly add quizzes to test comprehension, polls to elicit student feedback, and include branching scenarios to help personalize and customize the presentation based on student choice. Easy to use video production software allows instructors to record their lecture (either in the classroom or studio) and turn it into video-on-demand for future students. In short, instructors now have a variety of ways to move their lecture out of the classroom and turn it into a powerful learning experience that students can access at their convenience.

Increased bandwidth has also allowed instructors to move the viewing of video outside the classroom, and the rise of YouTube and other streaming video repositories have provided instructors lots of explanatory and demonstrative material. Why spend time creating a high-quality explanation of a specific concept, when someone else has already done it elsewhere? Interestingly, advances in technology have enabled what some instructors call “flipping the classroom”; instead of using classroom time for lecturing, and out-of-class time for homework assignments, project work, and other experiential learning activities, modern instructors can have students watch lectures outside of class and spend time in class engaged in active learning. Overall, there still may remain some good, pedagogical reasons for passive learning in management education, but emerging technology has reduced the need to use valuable classroom time for it.

Although we have highlighted increased bandwidth and more robust software as enablers of these advances, it is perhaps the platform and device independence of servers and networks that now house software and material that has most allowed instructors to redesign their teaching. This innovation has freed instructors from the need to call on extensive technical support to make things happen; instructors can set up and run the technology confident

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that it will not “fall over” or only run on some students’ devices. This development is reflected in the articles in this special issue, with authors variously showing how audience response systems (“clickers”) can be easily added in to presentation software, and how an online game developed by a third-party supplier can be incorporated into teaching.

But standing back from the particular contents of this special issue, we are humbled by how quickly and dramatically technology is moving and in ways that can directly influence the way we teach. We started out by noting that just over 2 years ago, the iPad was still a twinkle in its creator’s eye. Where will we be in 2, 5, 10 years time? It is impossible to predict, but one trend seems unstoppable; end users, in our case instructors, will have hardware and software that is more robust and easier to use, and this will bring more opportunities for active learning.

This Issue

The second impact of technology on management education is even more important. As the articles in this special issues attest, emerging technology is also helping us build active learning into the physical and virtual classroom in new and exciting ways. This is ably demonstrated by the first article in this special issue.

In the physical classroom, clickers are a great example of how emerging technology is helping build active learning into the epitome of classroom-based passive learning, the lecture. Traditionally, clickers were small devices that allowed instructors to ask multiple-choice questions and quickly display the aggregated results for the entire class. The first-generation clickers were hardwired into the classroom and relatively expensive. The second-generation clickers were small, handheld devices built on stand-alone wireless technology. Similarly, the software associated with clickers progressed from separate, stand-alone software to ask, aggregate, and display results, to easy-to-use applets that could be embedded directly into PowerPoint slides.

In “Clickers in the Classroom: A Review and a Replication,” Shawn M. Keough first reviews the findings of 66 empirical studies of clicker use in a variety of courses and instructional settings. He finds that the known benefits of clickers include instant feedback on student comprehension; increased student attendance, attention, and participation; and improved performance in examinations. The author then conducted his own evaluation of clicker use in a management education setting and confirmed that not only did students prefer class sessions that incorporated clicker technology, but they felt that they performed better, received more timely feedback on their performance,
and participated more in class. He also found that students in course sections that employed clickers performed better than students in identical course sections without the technology. The only minor negatives were the occasional technology glitch, and the need to remember to bring the clicker to class.

Even as we reviewed and accepted this article, clicker technology was evolving. PollAnywhere.com removes the need for special clicker technology, turning phones, tablets, laptops, and any device with Internet capabilities into a virtual clicker. Instructors can embed PollAnywhere questions into their PowerPoint slides and then direct students to a special website address where they can answer multiple-choice and even open-ended questions. The results are aggregated and posted in real-time on the PowerPoint slide.

Technology is also radically changing the virtual classroom. For many years, bandwidth and device limitations kept the virtual classroom mostly a passive learning experience. Students could reliably read posted, text-based material, and perhaps participate in a text-only discussion board, but anything more sophisticated or visual was plagued with connection and download issues. Nowadays, increased bandwidth, improved video and audio streaming capabilities, and more robust, feature-rich communication platforms allow instructors to create a live, synchronous, virtual classroom using the same active learning techniques they might employ in face-to-face classrooms. With technologies such as Blackboard Collaborate, Adobe Connect, or WebEx, instructors can facilitate discussions, poll students, conduct role plays, respond to virtual raised hands, and send students off in virtual buzz or breakout groups. Even sophisticated, active learning approaches such as the case teaching method can be successfully employed in the virtual classroom, both in asynchronous and synchronous formats.

In “An Examination of the Effectiveness of Case Method Teaching Online: Does the Technology Matter?” Sharon Watson and Jann Marie Sutton compare case teaching in face-to-face, online-synchronous, and online-asynchronous discussion formats. After evaluating whether these three approaches embody the Seven Principles of Good Practice in Undergraduate Education (Chickering & Erhmann, 1996; Chickering & Gamson, 1987), they compared student satisfaction across courses using different online discussion formats and student satisfaction of competing discussion formats within the same course. Overall, they found that students preferred asynchronous discussion boards because they (a) could read and contribute to case discussions at their convenience and (b) were easier to learn and master than current synchronous technologies. In a single online course, students felt they learned more from asynchronous case discussions than they did by completing and submitting
individual case analyses, but they preferred individual case analyses because they were easier to manage personally.

Even active-learning-based group projects are now feasible and effective online. In “Virtual Team Meetings: Reflections on a Class Exercise Exploring Technology Choice,” Rebecca A. Bull Schaefer and Laura Erskine describe an active-learning exercise to help students experience the opportunities and challenges associated with virtual team meetings. In a traditionally face-to-face course on teams and teamwork that employed field-consulting projects as a major group deliverable, the instructors had each consulting team choose an appropriate virtual meeting technology and conduct their next group meeting online. Some teams used online discussion boards, whereas others used chat rooms and instant messaging. In a subsequent classroom session, the students discussed their experience with their chosen virtual meeting technologies. Interestingly, although most students claimed to be very comfortable interacting online socially with friends and family, most found virtual meetings to be very challenging and hindered by technology glitches and learning curve issues. Still, teams recognized the benefits for meeting online, especially its convenience and conversation-storing capabilities, and many teams voluntarily continued to use virtual meeting technology as they completed their consulting projects.

Instructors are also leveraging technology for active learning by engaging students with real-world analytical tools. In the past, proprietary financial databases and industry-standard business analysis software were either too expensive for higher education institutions to license, store, and use or too complicated to integrate into coursework. Today these databases and tools are much less expensive and have more intuitive, easy-to-use interfaces. Not only does building real-world tools into active-learning exercises give greater face validity and relevance to the activity, but it can also help build cutting-edge, entry-ready skills that can serve as a competitive job advantage on graduation.

In “Instructional Design, Active Learning and Student Performance: Using a Trading Room to Teach Strategy,” Alice Stewart, Susan Houghton, and Patrick R. Rogers describe how they have students research companies using the same tools and databases employed by investment bankers and financial analysts. In a strategy-oriented capstone course, the authors replaced traditional classroom instruction with project work in a special computer lab equipped with financial databases and portfolio analysis tools. Students complete a series of case analyses that were built around use of industry-standard tools. Not only did the students respond favorably to these relevant, engaging, real-life exercises, but they ultimately performed better on the finance
and accounting portion of a standardized business test than did students taking a more traditional strategy course without these learning experiences. They conclude that “[d]eveloping assignments that are completed collectively in class or computer labs with students working together to acquire data and apply it to business problems in real time is the basis for improved student learning.”

Social networks and social media are, by definition, an active learning experience for those who subscribe and contribute to them. In terms of management education, business-oriented social networks are increasingly becoming a primary point of collaboration among managers and professionals, and also provide a learning opportunity for students.

In “Linking In With LINKEDIN,” Joseph G. Gerard describes how he created a career development and networking exercise built around LinkedIn, a popular professional networking website. Instead of having students post introductory pictures and bios in the course website, the author had students establish LinkedIn accounts and post their information there. In later assignments he had students search and establish linkages to classmates, colleagues, and acquaintances, and some took it a step further and requested linkages to those outside their immediate professional network. Ultimately, students wrote a reflection paper on the experience and what they learned about networking, career development, and establishing a professional image. Overall, the students found it to be a valuable experience and understood the potential of online professional networking to further their careers.

Finally, the explosion of web-based games and simulations provide another opportunity to build active learning into both the physical and virtual classroom. Many of these games and simulations have a business orientation, or take place in a business environment, and instructors can leverage them to demonstrate specific business concepts. Many of these online games involve multiple players, or are collaborative by nature, which adds to the learning experience.

In “Using FarmVille in an Introductory Managerial Accounting Course to Engage Students, Enhance Comprehension, and Develop Social Networking Skills,” Cynthia Krom used a popular Facebook game to help students not only build an intuitive understanding of basic accounting concepts but also build stronger social connections with their classmates. In FarmVille, players create and manage a virtual farm, an activity that requires basic accounting. As the author states,

[S]tudents run a virtual business, with measures of profit and loss, planning and budgeting, spoilage of product, capital investment,
decision-making challenges including resource constraints, and opportunities for vertical or horizontal integration. Cooperation with other “farmers” is essential to success, and issues of corporate social responsibility are part of the game.

The instructor also developed in-class exercises and quizzes based on FarmVille that helped connect accounting principles to game dynamics. Follow-up surveys showed that not only did students enjoy the learning experience and felt that it helped them understand accounting concepts in a fun, engaging way, but the collaborative aspects of the game helped them build stronger relationships with their fellow classmates. Many of them continued to play the game long after the class was over. Overall, the instructor found that students who were being taught accounting while playing the game were better able to manage complexity and make cross-concept connections than those students who did not play the game.

**A Final Thought**

Who knows how technology will affect management education in the future. We are fully aware that the technologies and tools we mention in this introduction will seem outdated and quaint in only a few years. Perhaps the trend is more important as we are now witnessing a more rapid uptake of technology into the management classroom than ever before. Most encouraging of all is an unexpected by-product—a concomitant rise in active learning. These technologies seem to be changing the way we teach and providing a new wave of interest in active forms of instruction.

Technology will never be a panacea for management education. As instructors, we know all too well that the same Internet technologies that help facilitate active learning in the physical or virtual classroom can distract students from learning in that same classroom (Turn off those cell phones! Close those laptops!). But perhaps technology has grown and evolved to a point where this is less a hindrance to teaching and has become an enabler of active learning, both in face-to-face and virtual classrooms.

**References**


