Bring Your Own Device in the Information Literacy Classroom

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Abstract

In the 2013 school year, a team of librarians in the Parrish Library of Management and Economics at Purdue University taught a business information literacy course to approximately 500 management students in eight 70-person sessions. Due to limitations on a set of iPads borrowed from another department, one of two concurrent classes was taught with a set of iPads, while another had a Bring Your Own Device (BYOD) policy, where students brought their own laptops or iPads. Focus groups, observations of behavior, and final evaluations were utilized to evaluate the comparative perceived effectiveness of the two technology approaches. This paper consists of three parts: an introduction to both methods of content delivery with a description of the results of the project; a discussion of the relative value of each method; and finally, proposed best practices for where, when and why to use each method for library instruction based on the TPACK (technological, pedagogical, and content knowledge) framework.

Keywords: instructional technology, libraries, TPACK, information literacy, business librarianship

Introduction

BYOD (bring your own device) is an important emerging trend on college campuses. As wireless connectivity has become pervasive and the presence of personal devices a fixture in today's classroom, universities look to devices to provide additional instructional support to students. In 2012, BYOD topped the Educause's top 10 IT issues affecting education and IT professionals (Grajek & Pirani, 2012).

In some ways, libraries have been operating on a BYOD model for many years. More structured library instructional sessions typically lack explicit BYOD policies even though formal information literacy instruction often depends upon real-time access of library resources in the classroom in order to reinforce concepts. For example, if a librarian wishes students to gather together multiple resources to make an argument, they will need to access those resources, but this activity is stunted if access is not feasible.

We sought to investigate BYOD in the information literacy classroom for a practical reason: to decide what technology to request in the future for planning of instructional lab spaces. In addition, we also wanted to use the technology comparison as a means to reflect on how our information literacy pedagogy is affected by the technology we employ. We had several guiding questions we considered when setting up the study: How well does a BYOD policy work in the information literacy classroom? Do students use their devices effectively in the information literacy classroom? How can we better integrate BYOD into our content and pedagogy? Does an explicit BYOD policy affect student satisfaction in the classroom when compared with a section where devices were not required?

In order to address our guiding questions fully, we adopted the TPACK framework (Mishra & Koehler, 2006; Niess, 2005). TPACK is a helpful framework for thinking about device use in the information literacy class as it incorporates diverse aspects of teaching into one model. The framework is made up of seven constructs: pedagogical knowledge (PK), content knowledge (CK), technology knowledge (TK), technological content knowledge (TCK), pedagogical content knowledge (PCK), and technological pedagogical content knowledge (TPACK, see Figure 1) (Mishra & Koehler, 2006; Niess, 2005). For our purposes, TPACK is serving as a framework that can guide reflection to help librarians as they incorporate technology into learning environments.

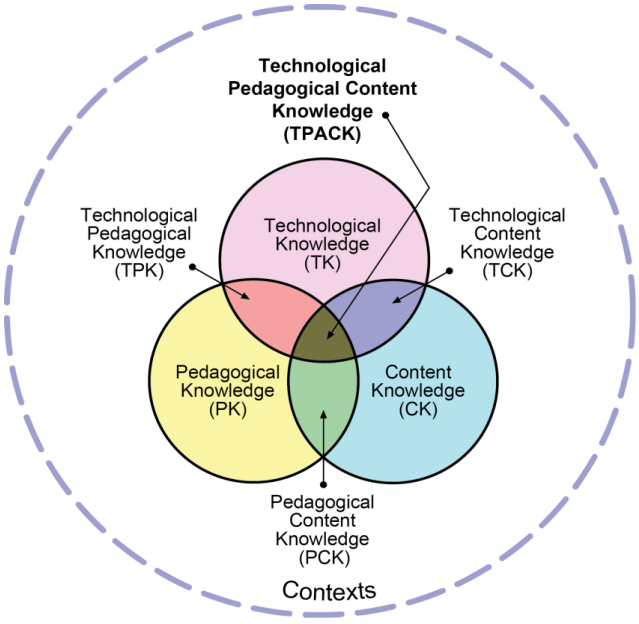

Figure 1- TPACK framework (reproduced by permission of the publisher, © 2012 by tpack.org)

This paper shows the results of a small comparative study, but is also meant to be reflective and address ways librarians think about BYOD, supply iPads, and other technology options in the scope of the larger issue of how to connect students, content, and learning in meaningful ways.

Introduction to Course

MGMT 175 is a one-credit, eight-week information literacy course required in the School of Management at Purdue University. It is usually taken upon entering the school. The purpose of the course is to teach students business information literacy skills as well as traditional information literacy competencies. In addition to identifying scholarly, trade journal, and other types of articles and general library information, students also learn the basics of business research, such as how to find information on companies, markets and industries. The stated primary goal for MGMT 175 is: "Students will be able to evaluate & synthesize information in order to accomplish a specific business purpose" (MGMT 175 Syllabus).

Data-driven decision-making is an important skill for business people who have to use many different types of information throughout their careers. The course has an explicitly problem-based curriculum where students solve problems both individually and in groups on topics ranging from solar panels to chocolate to over-the-counter pharmaceuticals. The 70-student sections are taught by three business librarians' in an active learning classroom. Students sit in four to six person groups, with one desktop computer per table provided (see Figure 2).

Figure 2- MGMT 175 Class in Session.

A version of the course had been taught for six years, but the requirement for all 500 incoming management students was new for the 2013-2014 school year. Previously it had been taught to groups of 40 in a computer lab space. The librarians redesigned the course to accommodate the larger group. Since the enrollment was larger than any available computer classroom, the course was moved out of the computer lab space to an active learning classroom furnished with tables favorable to group work. However, since the course still required real-time use of business information to reinforce concepts, the need for access to web-based resources was still extant. Because the course objectives revolved around business information and student real time access to it, we began to explore other technology frameworks, including BYOD and borrowed iPads.

During the spring of 2013 the three librarian instructors participated in Purdue University's course transformation program "Instruction Matters: Purdue Academic Course Transformation" (IMPACT) wherein the course was redesigned from primarily lecture to using flipped learning. In the spring 2013 semester, in the midst of course redesign, they distributed a technology survey to 32 students in a computer lab section. The survey showed that while most students had laptops, phones and clickers, they were reluctant to bring them to class. Thirty students owned a laptop computer, and 30 owned a smartphone. When asked how comfortable they would feel bringing a laptop regularly to class, 17 percent (n=5) were uncomfortable. In addition, they did not want to share computers with other students. When asked if the student would be willing to share their laptop with others in a group project setting, a majority of the students (n=17) said no.

BYOD versus BYOD light: A Comparison

In the fall 2013 semester, two librarians were each teaching a 70-seat section of MGMT 175. A cart with 15 iPads to lend students during class was available during one of their weekly course sections but not available during the other. Seeing an opportunity, they decided to compare their sections in terms of course evaluations.

The courses had the same learning objectives and were taught using the same quizzes and videos. In one section (BYOD class), students were required to bring their devices (laptop, tablet, or smartphone) to class every week. In the other section (BYOD light, or iPad class), it was only recommended that students bring their devices, with iPads available in class for their use. Students had the option during the class to check out an iPad using a written form which included the student's iPad inventory number. The iPads were pre-loaded with apps for internet access; there was also an instruction sheet available that walked them through how to download free apps like Prezi. Students did not need an ID to use the device, though they did need an Apple ID in order to download apps.

The classes were assessed in three ways: behavior in class (did students take iPads, did students vocally protest having to bring their laptops to class), mid-course focus groups and course evaluations.

Small Group Instructional Diagnosis (SGID) focus groups were conducted by the Center for Instructional Excellence and were conducted with the instructors out of the room. SGIDs are a commonly used tool to obtain objective feedback from students about what they feel is working and isn't working in their learning environment (Coffman 1991). Data was collected from individual groups, discussed as a class, and group consensuses were noted.

In the first week of the iPad class, all 15 iPads were used. The next week, that number decreased to five. Every week, more students elected to bring their own devices rather than use the provided desktop computer or iPads. The use of iPads did not entirely diminish. Some students (2-3) would check out iPads throughout the semester, based on what was going on in the class, and how many of their group members brought laptops. When asked, students said they liked having a computer with which they were more comfortable. In the BYOD class, students did not protest when BYOD was introduced. This was a surprise for the instructors, as they had expected from the survey a large amount of push-back. Students had articulated a very clear distaste for bringing their laptop to class in theory, but when they were required to do so explicitly, they seemed to be less concerned.

SGID results showed that BYOD students were divided on the policy. Students pointed to it being beneficial to have devices to follow along in class and made them more likely to duplicate results on their own. Students reached consensus that sitting in groups and working with their own monitors was helpful, but there was a minority who also believed that having devices was distracting. BYOD light students did not mention the iPads specifically as distracting but the iPads were not viewed as necessary and commented "bring our own device is fine, everyone has them and it's not hard to bringing your laptop with you" (SGID results).

On a 1-5 scale, overall, students rated the BYOD class higher, rating the course a 3.46 mean versus a 3.16 for course overall. This is significant at the .1 level, which is appropriate for exploratory research such as this (Gall, Gall & Borg, 2007). However, t-test for quality of means did not find this difference significant as on .05 level, $t(102)= 1.718$ $p=0.089$, $d=0.35$ (see table 1). The effect size (d) shows that there was a small, significant, magnitude of difference. As another comparison, the information on a computer lab version of the course, the mean course grade was also 3.46. In analysis, only one question was found to be statistically significant at the 0.05 levels: this course has clearly stated objectives.

Question	Course	N	Mean	Std. Deviation
Overall I would rate this course as	iPad	56	3.16	.968
	BYOD	48	3.46	.798
Overall would rate this instructor as	iPad	56	3.59	.890
	BYOD	48	3.54	.824
My skills at finding and using information have improved	iPad	56	3.80	.862
	BYOD	48	3.90	.857
This course has given me skills and techniques directly applicable to my career	iPad	56	3.82	.855
	BYOD	48	3.88	.789
This course has clearly stated objectives	iPad	56	3.96	.894
	BYOD	48	3.54	.743
My instructor used various activities that involved me in learning	iPad	56	3.32	1.193
	BYOD	48	3.69	.879
My instructor made effective use of classroom technology	iPad	56	4.11	.731
	BYOD	48	4.13	.890

Table 1- Descriptive Statistics

Relative Value of Each Method for Library Instruction: TPACK Framework

As described within the TPACK framework, the technological content knowledge was changed but the pedagogy was not considered by the instructors when designing the course for the altered environment (Niess, 2005). The higher mean for student evaluation could be attributed to instructor variability. The lack of difference in course evaluations lends itself to larger questions within this comparative study: even though the technology in the classroom was changed, the pedagogy and instructional design was not. Databases worked appropriately on student laptops, students bringing their own devices were comfortable with their devices and could access documents to share with other students. Each method also had disadvantages: database websites often did not work on tablet screens, nor did they allow for the quick changing of windows that students needed in order to look at more than one document at a time. Laptops required more plugs and more room on student table workspace. Figure 3 shows how the TPACK framework was represented in the current instructional design of MGMT 175.

In a 21st century higher education classroom, students might bring laptops one day and smart phones the next. To be truly agile, librarians should think about how technology affects the classroom, but also about how content and pedagogy (pedagogical content knowledge) can work with technological knowledge (Shulman, 1986). However, since the assignments were still focused on gathering information from multiple sources, students preferred the tool that facilitated this activity most effectively as evidenced by the diminishing use of iPads and the increasing use of personal devices, especially laptops, in the iPad course.

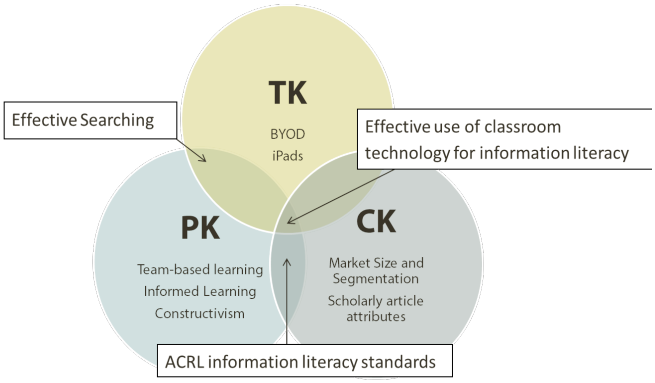

Figure 3

Where, When, and Why: A TPACK Approach

Upon examination of BYOD using a TPACK framework, evaluation of perceived effectiveness of two types of technology in a classroom is more nuanced. Context becomes more important than the technology container. When librarians consider what technology to employ in a classroom, they should consider their pedagogical and content knowledge objectives, as well as additional technological content knowledge they want to introduce in the classroom. Some questions to consider:

- Where does the technology fit into how they conceptualize teaching with technology, thus their own TPACK?
- When are they introducing the technology and what objective does the technology have?
- Why are they bringing this technology into the classroom?

Conclusion: Towards Best Practices

This paper focused on comparing alternate device approaches within a Technological Pedagogical Content Knowledge Framework to the information literacy classroom in order to identify potential best practices in BYOD policy use. Our results suggest that students responded positively to a strict BYOD policy, and even when a BYOD policy was not in place, they preferred to bring their laptops rather than use desktops or iPads. Future iterations of MGMT 175 will be taught using an explicit BYOD policy only.

In addition, the class is being moved from a room where every group of six students had a desktop to a room where there are tables for six but no outlets in order to give students more space for collaboration.

This paper also sought to reflect on ways that librarians think about technology in the classroom. Substantially more research needs to be completed before any best practice can be defined. Possible future areas of research could investigate the interplay between content, pedagogy and technology in further depth. We think about technology as tools to leverage, but we should also consider technology as one component of our larger framework. Ultimately, technology should be seamlessly integrated into curriculum design with content and pedagogy. TPACK can be used to help librarian teachers reflect on designing a classroom experience that is meaningful, contextual and uses technology in a way that makes sense.

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