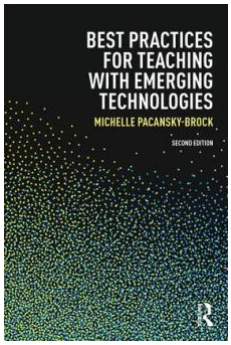

Best Practices for Teaching with Emerging Technologies

Second Edition

by Michelle Pacansky-Brock

Introduction: The Flipped Classroom

"Students today are unmotivated."

"Students today don't care about anything but their grades."

"Students today feel entitled and aren't willing to work hard."

Have you found yourself saying or thinking any of these things? If so, you are experiencing the effects of significant problems in higher education. This chapter will attempt to unpack statements like these by examining them within a social context and reframing them as symptoms of pervasive problems in higher education, rather than an entire generation of lost souls. We will examine learning within the fabric of a society that has been transformed from the inside out by emerging technologies and ask whether or not our current learning practices are still relevant in light of these sweeping changes. To put that another way, are our students the problem? Or is it our instructional model?

This chapter serves as our initial exploration into some of the ways "emerging technologies" are reinvisioning college learning. In the context of this book, emerging technologies are defined as tools that fall into one or more of the following four categories: cloud-based applications, that are easily stored online and accessible from anywhere with an internet connection; Web 2.0 tools, that make the creation and sharing of multimedia content simple; social technologies, tools that connect individuals and make communication an interactive process; and mobile apps, applications that are designed to operate on mobile devices (smartphones or tablets). The tools featured in this book have demonstrated potential

to enhance college learning by making it easier for instructors and students to create and share multimedia content, build relationships at a distance, and make learning more interactive and collaborative.

As educators, it's common for us to teach the way *we* were taught and it can be challenging to step outside of our practice to reflect on and analyze our teaching approaches. But doing so can be an enlightening experience. This book will take you for a ride through my own journey of enlightenment that inspired me to see my teaching practices from a new perspective.

What's New in This Edition

This edition has been refreshed from cover to cover to ensure it remains relevant in light of new trends in technology. In the years following the first edition, smartphone ownership became mainstream and the social media use has increased. Learning management systems are still deeply embedded in the fabric of teaching and learning in higher education, but more faculty are identifying the potential that web-based tools hold for student engagement and learning. In light of these trends, this edition includes the following chages:

- Statistics related to technology use in this introductory chapter have been updated.
- The title for chapter two has been changed from "A New Paradigm for a New Century" to "Towards Participatory Pedagogy" to focus more explicitly on teaching and learning and less on a period of time.
- Chapter six, "Mobile and Beyond" has replaced with a new chapter, "Unlocking Learning." This change was made in consideration of the mainstream adoption of smartphones. The new chapter was written to address the growing skepticism educators have about learning management systems (LMSs). The chapter examines the emerging trend of faculty who are teaching in the public web, considers how this trend

impacts a student's preparedness for life after college, and critically considers the role that the open educatioanl content may play in the future of teaching and learning.

- All chapters have been updated to include additional tips and showcases illustrating how faculty are using specific technologies in their teaching
- New tools have been added in place of technologies that no longer exist.
- Some screenshot illustrations have been eliminated, as familiarity of particular features has increased.
- References to mobile applications and mobile learning, in general, are now baked into the chapters themselves, reflecting the mainstream use of mobile devices.
- The book's online resource site, TeachingWithEmergingTech.com, has been refreshed to include additional links and updates about tools that are sunsetting or are out of business.

From Teaching to Learning

There are particular catalysts I encountered throughout my journey that jarred me just enough to pause and consider whether or not I was doing the very best I could to meet the diverse needs of my students. One of those catalysts was an article written by Barr and Tagg in 1995, which I reflect on more deeply in Chapter 2. In their article, "From Teaching to Learning," the authors examine how our underlying assumptions and traditions inform the very outcomes of our practice. And they argue that a paradigm shift, from teaching to learning, is occurring across education. As we consider this argument more than two decades later, I think it's safe to say that the paradigm has not been dramatically transformed—but I do believe that the changes brought about through digital, mobile technologies outside the walls of our classrooms are accelerating the urgency for this paradigm shift.

Paradigm shifts can be painfully difficult, as they require a complete overhaul to the foundations that inform our processes and traditions. According to Barr and Tagg, they are most likely to occur when two indicators are present:

1. When "difficulties or anomalies begin to appear in the functioning of the existing paradigm which cannot be handled adequately."
2. When an alternative paradigm surfaces "that will account for all that the original paradigm accounts for . . . and [that] offers real hope for solving the major difficulties facing the current paradigm."[1]

I argue that low student engagement and motivation is a difficulty that college professors face as a result of using class time to deliver passive lecture content to students who are thirsty for something different. And the desire to ward off student use of mobile devices in the classroom is another difficulty that continues to create friction within the functioning of our current paradigm. Here we will unpack these difficulties by examining the way accelerated technological changes have resulted in deep-rooted shifts in generational preferences that exacerbate the way students and professors relate to college classes. We will also consider the lecture within the context of brain research and explore the ways that emerging technologies can be used to foster the type of multisensory learning that *all* of our brains crave.

Additionally, by sharing a case study from my own college teaching, I offer an alternative paradigm, the "flipped classroom," a term that was first used by two high school chemistry teachers, Jonathan Bergmann and Aaron Sams, around 2007, became increasingly popular through the work of Salman Khan and the Khan Academy in 2011, and, more recently, has been adopted by professors around the world.[2] The flipped classroom model uses video recordings of lectures (or other online resources) that are shared with students *before* class time,

freeing up face-to-face time to interact with students and apply the information learned in the videos. Ultimately, classroom time is transformed from a passive to an active experience and the role of the instructor shifts from "sage on the stage" to "guide on the side." This chapter provides insight, guidance and an essential toolkit for instructors who wish to get started with transforming their learning model.

This chapter is intended to open your eyes to the possibilities emerging technologies hold for changing the way college has been taught for hundreds of years and to possible ways that instructors might transform their own teaching.

Tectonic Generational Shifts

I am a member of Generation X. I was born in 1971—the year the microprocessor was invented, Greenpeace was formed, Ms. Magazine originated, the voting age in the US was lowered from 21 to 18, Walt Disney World opened, the FDA approved soft contact lenses, and the US Supreme Court upheld a controversial measure to bus children in an effort to desegregate minority populations. Like you, the events and experiences of my generation played an important role in shaping who I am today.

Growing up in the heart of California's Silicon Valley, technology has always played a major role in my life. I have many vivid memories that mark some of the ways technology has influenced me. My dad had a long career as a research scientist at IBM. His home office was just below my bedroom and late at night, I would often hear a high-pitched squelch when he would dial in on his modem and connect to the "mainframe" computer. At the time, that noise was simply annoying to me but now I can appreciate what he was doing. In the early 1980s, my dad was among the small group of American employees who continued to work from home

after leaving the office. In those pre-PC days, having a computer at home was rare and having one that was connected to a network was an anomaly.

I also remember one evening when my dad called me into his office and pointed my eyes towards the large computer on his desk. He leaned towards me and pointed at a few bright green words that were moving horizontally across the black screen and said, "That's a message from my co-worker." I didn't understand the complexity of that statement but I can remember how completely stunned and exhilarated I felt as I stared at those words. "You mean, you're talking to someone on that screen who isn't here?" I asked. The prospect of communicating with another person at a distance through a computer dazzled me.

I also remember the excitement I felt in grade school when my parents rented our first VCR from the neighborhood video store. VCRs were *expensive* and renting one for brief periods was the only way we could have the luxury of watching a movie we selected from the shelves of the video store. We lugged it home in a big black carrying case, figured out how to operate it, and huddled together on our family room sofa as we anticipated watching a movie that we selected together. And while early VCRs did have the ability to rewind and fast-forward, doing so required one to get up off the couch and manually turn the dial. And when the phone rang during the movie, our choices were to get up and answer it because it was attached to a wall (and we had no idea, by the way, who was on the other end) or just let it ring—voicemail and answering machines weren't in the picture yet.

I compare that to the context in which my own children are growing up and the contrast is staggering. Before my husband and I made the move to DVR, my boys complained that our TV was "broken" because they couldn't rewind the shows as they watched them. Now that we have DVR, all of us have newfound expectations about watching television. We purposely avoid sitting down and watching a show at its airing time because watching advertisements is, well, a waste of time. Rather, we record specific shows and watch them at a time that fits into

our schedule, which also extends the convenience of fast forwarding through all the commercials to watch a 60-minute show in 45 minutes.

Additionally, the emergence of iPods around 2005 not only shifted the paradigm of the music industry, putting corporations (like Tower Records, an icon of my generation) who didn't change along with the times out of business, but also dramatically altered a user's listening experience. I was in fifth grade when MTV launched. I remember sitting in front of the TV for hours waiting to see my favorite videos be played. My experiences were controlled by the decisions of the VJ (arguably, choices are still controlled today by media corporations but this fact is much more transparent than it used to be). And when my favorite videos were played, I would click "record" on my 25-pound boom box and capture the song's audio on my tape cassette. (Yes, I now realize that was copyright infringement but I don't recall a critical discourse about this problem when I was a child.) Those cassettes were treasures to me. I took pride in the personalized music collection I had created and would scribble a customized title like "Michelle's Mix—1, 2, etc." on the front of each tape—and even make copies of the tapes for my best friends. There is no doubt in my mind that I was thirsty for personalized experiences, much like today's youth are.

In contrast, there has been copious literature written about the Millennial generation, people born between 1980–2000 and the first generation to become of age in the new millenium. In 2016, Millennials surpassed Baby Boomers as the largest generation in the United States[3]. They also comprise the traditional college age student population (18–24) but, each year, their age creeps further and further into the age group that is considered "non-traditional." For example, in 2016, the oldest Millennials are 36 years old and in 2015 they became the largest generation the US labor force.[4] Colleges and universities are no longer preparing for the Millennial generation. We are now having them master a set of skills they need to transition to the workplace, set themselves apart from others, and become productive contributors to society. A

subtext of this book will be to ask the question, "Are the skills our students acquire throughout the path of completing a 4-year degree the *right* set of skills that will support their success in a digital society?"

Data shows that there are certain trends identifiable amongst those in the Millennial generation. They are more skeptical than other generations, as employees are more likely to challenge the status quo within an organization, embrace lifelong learning and continue to acquire new skills, view technology as a solution, see a job as a contract rather than a calling in life, feel comfortable in times of uncertainty, and see work as just a piece of what it takes to lead a fulfilling life, and they believe learning should be fun.[5] Yes, I said, "fun."

The proliferation of digital technologies and, subsequently, smartphones have played significant roles in shaping these generational characteristics. Smartphones were introduced to the mainstream in 2007 when the iPhone was released and eight years later smartphone ownership was already well into the mainstream with 64% of adults owning one.[6] Smarphone ownership is even higher (85%) among Americans age 18-29, which is a critical data point to consider because smartphones are changing the way individuals connect with others, learn, and participate.[7] American smartphone owners in the 18-29 year old age group are more likely than older Americans (age 30-49) to use their phones to get information about a job (69% compared to to 44%), access educational content (44% compared to 34%), and submit a job application (34% compared to 16%).[8] Younger Americans age 18-29 are far more likely than individuals over age 50 to use their smartphones to access interact on social networking sites (91% to 55%), watch videos (75% to 31%), and listen to music or podcasts (64% compared to 21%).[9]

Individuals who become of age in our mobile, digital develop social groups by interacting with individuals in both the physical and online realms. For example, my son, who is fourteen at the time of writing, and lives with me in California regularly plays MineCraft, a popular

online video game, with people he calls his friends who live in Australia and New Zealand. He's never met these people in person, but he speaks with them regularly on Skype and connects with them on Snapchat. The point here is that "online" is a *culture* to young people. Yet to most colleges, *it is a delivery method.*

Digital and mobile technologies provide young people with rich options and highly personalized, community-oriented experiences. As such, Millennials are more likely than older generations to want to understand why they are asked to engage in an activity and may seek out clear expectations in advance. I am familiar with the tension these characteristics can cause in college classrooms that are founded upon a top-down hierarchical model in which the professor dictates what students will do and the students are expected to be quiet and do it. This is one of the reasons Chapter 1 of this book includes tips for cultivating a community-oriented classroom.

Let's take this one step further and take a peek at the generation following the Millennials, about which generalizable data does not yet exist since they have not entered the consumer or job market. My two children are both members of the post-Millennial generation—a generation that is yet to be named (but one early suggestion is the "Homelanders").[10] They are the first generation to be raised within a truly digital, mobile society and while we cannot identify their unifying characteristics yet, the Common Sense Enterprises predicts that they will likely be the most "racially and culturally diverse generation in US history" and because of "advances in global communication, they may be the most transient generation as well."[11] This generation arrives on university campuses in 2018.

My "post-Millennial" children, born in 2000 and 2002, received their own iPod between the age of seven and eight and their first smartphone upon entering middle school. An iPod, which seems like an antique relic, held thousands of songs, all selected by the owner. The iPod was also the first instance of mobile entertaining, as it held TV shows, full-length movies, audio

books, and digital pictures—and later versions eventually included a video camera too. iPods amazed me. All that functionality contained in a package that was smaller than the comb I used to carry in my back pocket in middle school.

The iPod was the first technology to begin to re-sculpt the meaning of "personalization" to this generation (I didn't mention that each of my boys had an iPod in their favorite color too). And smartphones? Well, they are in a league of their own. A smartphone is, essentially, an iPod with an internet connection, voice and text communications, robust still and video camera, and a collection of social and entertainment-based apps, curated by the owner. They are not "phones" to my kids. They are devices that they use every single day to document and share their experiences and stay current with the lives of their friends. Their phone is never far away. In fact, a 2010 study found that 90% of Americans age 18-29 sleep with their phone.[12]

Ask yourself this: if your earliest music experiences involved the option to curate your very own audio and video collection and you had access to it at any time and in any place, would you be as motivated to sit by the radio and listen to songs *someone else* has decided to play for you? That's very similar to the motivation and engagement problem we have in college today. It's not that students aren't willing to work hard—I just don't believe that. I've seen amazing passion, dynamism, and effort in my students' work and I've seen glazed, detached stares—the difference resides in the type of learning environment I use to engage them.

Julie Evans is the director of Project Tomorrow, a non-profit organization that facilitates the annual *Speak Up* survey which tracks and analyzes trends in K-12 student learning by surveying nearly 300,000 students each year. Since 2005 the survey has had its finger on the pulse of student use of technology and its correlation with learning preferences. In 2005, according to the survey, half of the sixth graders who were surveyed owned a cell phone (that is a mobile phone without a connection to the internet). In 2010, that statistic held true but an

additional one third of them owned a smartphone. In 2015, 86% of high school students, 72% of 6-8th graders, and 46% of 3-5th graders use a smartphone.[13]

Mobile device use is changing how students interact with their teachers and each other. In 2015, about half (47%) of 9-12th graders say they use Twitter, which is an increase from just 11% in 2011. Also, 27% of students in grades K-12 said they regularly watch videos created by their teachers. Smartphone use by students is also increasing student-teacher contact outside of class: in 2015, 48% of students interact with their teachers via email and 15% through text messaging. Not surprisingly, students are thirsty for more integration of mobile devices into the classroom. Seventy six percent of students think every student should have access to a mobile device during the school day to support learning.[14]

Administrator attitudes and policies about the role of smartphones in the classroom are changing in K-12 education. In 2010, the majority (63%) of principals felt it was not likely that their students would be allowed to use their own mobile devices at school. In just three years, that number decreased to 32% -- almost in half! In 2015, 41% said they were likely to allow students to use mobile devices at schol and 10% said they already allow students to use mobile devices in class to support learning activities. Further, most parents (60%) of students in K-12 education would like their child to be in a class that allows students to use one's own mobile device.[15]

K-12 educators are exploring the possibilities of these shifts, particularly students' growing demand for "untethered learning," defined as learning that occurs from anywhere at anytime and it's directly correlated with the widespread use of mobile devices. Online classes are now offered at more than 40% of high schools to provide remediation, provide an alternative pathway to stay in school, and provide options for credit recovery. Teachers of these online classes note that technology can help students understand how to apply academic concepts to real world problems, take ownership of their learning, and hone problem solving and critical

thinking skills. Considering these K-12 trends provides college educators with a new lens through which to consider poor student engagement in higher education.

The Engagement Problem

Back in 2006, a student of mine approached me after class one day and asked if I had heard of a website called YouTube. When I said no, she went on to explain to me that it's a website that allows people to upload videos and share them with each other. I can remember thinking, "So? Why on earth would people want to watch other people's videos? How is that revolutionary?"

At the time of this writing, YouTube has more than a billion users. Every day people around the world watch hundreds of millions of hours of video on YouTube. More than half of all Youtube views come from users on mobile devices and the average viewing session on mobile is more than 40 minutes.[16] I guess it's safe to say I was wrong.

Outside the walls of the classroom, most college students learn through connected, and highly personalized experiences. Millennials are accustomed to learning from their peers in a virtual community in which their opinions and ideas matter. This model dramatically contradicts the traditional, hierarchic, top-down model imposed in most college classrooms. If technology can deliver the same message in a better, more personalized, convenient way—that meets not only the preferences of a student, but also his/her individualized learning needs—then why are we not exploring or at least contemplating this as an opportunity to transform teaching and learning?

Howard Rheingold, professor at Stanford and Berkeley, author of several books including *Smartmobs*, and the creator of the *Social Media Classroom*, has influenced my thinking about the significance of teaching with social media. I had the opportunity to meet Rheingold at a conference in 2010 but he influenced me long before that through the videos he openly shares

on YouTube. I have enjoyed listening to his presentations on my iPhone during my routine walks through my neighborhood. Early on, his messages about the importance of cultivating a "crap detector" in our students resonated with me. To summarize Rheingold, a "crap detector" is the ability to discern valid digital content from meaningless, well, crap. He's right—and, yet, where are our students learning this skill?

The other Rheingold message that has stuck with me most is his willingness to be blunt about the purpose of a face-to-face college class. Rheingold says, "I ask [my students] on the first day of class, why are we standing here? Why do we all come to this physical place? Do you rush home at 7:00 at night to watch your favorite TV show or do you record it?" Rheingold is reshaping his teaching paradigm to align with the expectations of his students but also to make the time he spends with them more effective and productive. He continues, "[I]f I have an hour's worth of lecture, as teachers have had for the past thousand years, I'll put it on YouTube which has not existed for a thousand years."[17] By recording his lecture content (with a simple webcam and a free YouTube account) and sharing it with his students prior to class, he "flips" his classroom from a passive to an active experience. Rheingold is, by no means, the first or only educator to use the flipped classroom model—he's one of the many experimenting with the concept. In a flipped classroom, coming to class on Tuesday and Thursday for an hour and a half becomes an active experience that is grounded in discussion, debate, and analysis, rather than 90 minutes of passive listening.

If you have felt like your students do the minimal work they can just to get by and get a good (or decent) grade, you're right. But this is partly because we have constructed a model that enables them to do so. Imagine a different paradigm—one like Rheingold's that uses emerging technologies to have students watch your lectures online (from a laptop, phone or tablet) and complete a formative assessment before coming to class. One in which you could review the results of the formative assessment and then make a list of proficiencies that have

not been mastered and use class time to work through them actively with your students. *Why do we not do this?*

Michael Wesch, an anthropology professor at Kansas State University who was named 2008 U.S. Professor of the Year by the Carnegie Foundation for the Advancement of Teaching, is, perhaps, best known for his 2007 video "Visions of Students Today" (which, at the time of writing this, has received 4.5 million views on YouTube). The video pans through a large lecture hall and zooms in on the wall which reveals a hand-written question, "If these walls could talk, what would they say?" Then individual students reveal brief written messages to the camera. One says, "My average class size is 115." Others reveal, "18% of my teachers know my name," "I buy $100 text books that I never open," and, "When I graduate, I will have a job that doesn't exist today." The five-minute video paints a picture of college learning as irrelevant and ineffective at meeting the future goals of 21st-century students.

Both Rheingold and Wesch see the possibilities that emerging technologies hold in reshaping college into an experience that actively engages students in their learning, puts them in the driving seat, and fosters the critical thinking skills necessary for 21st-century success.

Brain-Friendly Learning

Another benefit of teaching with emerging technologies is the potential they hold for crafting multisensory learning experiences, which are more akin to the way the brain is wired to learn. Teaching to support the way the human brain works? What a concept! John Medina, an affiliate Professor of Bioengineering at the University of Washington School of Medicine and director of the Brain Center for Applied Learning Research at Seattle Pacific University, has extracted the essentials of decades of brain research and compiled what we know about how the brain

learns into twelve concise rules. Published in text format as a book titled, *Brain Rules*, and communicated in true multisensory fashion online at http://brainrules.net, Medina's modules serve as a clear, concise guide to illuminate just what's so backwards about formal education. Medina argues that, as a society, we "ignore how the brain works" and the only scandal is "why we're not fixing it." In fact, if you were to envision a large group of students sitting passively in a classroom listening or writing for long periods of time, you would be picturing an "almost perfect anti-brain learning environment," according to Medina.

Here are three of Medina's "brain rules" that are relevant for 21st-century college educators and a few of my own thoughts about how emerging technologies can assist us with developing more brain-friendly learning.

Notes

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