



Chapter 4

OVERCOMING THE BARRIERS

In recent years, educators have witnessed an unprecedented acceleration of new and innovative technologies. It is not uncommon for educators to have differing opinions about which tools are helpful in their classrooms and which may bring unnecessary complications.

—Howard & Howard, 2014

Overcoming the barriers in pursuit of digital equity does not occur overnight, nor does it happen in isolation. There is no shame in acknowledging the challenges, or even collaborating with faculty and colleagues, to tackle the ones that seem to be the most insurmountable. In this chapter, we will outline several of the challenges and share stories from the field that offer practical examples of how to best support preservice and in-service teachers in their acquisition of new technology knowledge and their pursuit of digital equity for their future and current K-12 students.

Diversity and Digital Equity

What are the connections between diversity and technology when seeking digital equity? According to Rafranz Davis, “Diversity matters in EdTech because not all tools, devices, apps, and ideas are created equally—nor are the learners” (2015, p. 5).

Inevitably there comes a moment when teacher educators must unpack their own biases and should continue to do so when evaluating digital tools for teaching and learning. The most obvious quality to look for is whether the tool is user-friendly and the less obvious includes issues related to diversity. As educators explore ways to enhance the learning potential for all students, it is imperative to remember that certain populations of students have different needs. These needs will have to be addressed if educators are to increase the possibility of students benefiting from technologies that will impact their learning process (Chen, 2007). Gender and racial bias, as well as subtle and overt visual misrepresentations and stereotypes, contribute to the diversity and technology issue we will address in this chapter.



An Open Letter

from Technology Specialist Patricia Brown

Dear Teacher Educator,

Is diversity just a buzzword?

Diversity has become a buzzword and a commonly discussed ed tech topic in Twitter chats, educational conferences, and PD sessions around the world. At this point, we should be going beyond surface-level diversity

chats, and instead have deeper conversations on how we can create diverse *and* inclusive educational spaces where educators are equitable in their mindset, and practice, and are willing to gain the skills they need to embody and live out the idea that all kids can learn. These conversations are important because in this world there are too many ways that bias creeps into our lives: the media, our community, our families, our friends, and our experiences.

How do we move beyond these biases?

How do we identify our own biases and address them in a healthy way?

It starts with you as an individual with an understanding that you need to decenter yourself—ego aside ... and reflect. There are many resources available to begin this very personal work, but we all can begin very simply by reflecting on these questions:

- How does my own social location (race, class, gender, religion) shape my mindset about teaching and learning, the students I am serving, and the practices I act out?
- What more do I need to learn about the things I don't know related to culture, power, and difference?
- Where can I learn that material?
- How can I be a more critically conscious educator?

Creating diverse and inclusive spaces allow for people to gain so much. Learning from each other is what makes us grow. How do you look internally and unpack your own implicit or overt biases?

Gender Differences and Racial Bias

Since the 1980s, studies have shown that the advertising images of computers have been predominately male-oriented (Cox, 2009), and people of color have been less represented or depicted in less empowered roles. Concerns about gender stereotypes in children's literature have also been reported, dating back to the 1960s. Motivated by an interest in examining whether these same stereotypes appeared in digital imagery, Bradshaw, Clegg, and Trayburn (1995) investigated gender bias in educational applications used in elementary schools and explored the messages young children were receiving from computer screens. They discovered that similar biases exist in the use of computers, as well as the imagery deployed in the educational software. There was some evidence that when “androgynous” humanoid figures were used, students most often defined the characters as male, further suggesting that gender bias exists in the design of educational software.

Another study by Sheldon (2004) almost a decade later, indicated that significantly more male characters than female characters were seen in educational software, making it difficult for teachers to address gender diversity when programs suggest boys are more valued than girls. Additionally, research in several countries, including the U.S., has shown that girls have less computer experience and have less comfortable attitudes toward computers than boys (Hanson, 1997; Sanders, 2005). Besides girls exhibiting less comfortable attitudes toward computers, a study by Howard, Saucedo Curwen, Howard, and Colón-Muñiz (2015) revealed that girls were significantly more uncomfortable than boys with using social networking sites as a communication tool in school. Exercises related to the critical analysis of new programs and apps need to be integrated into educator preparation (including professional development) in order to raise the level of awareness of gender bias that can potentially influence damaging subtle or overt stereotypes.

Recent data and research suggest that today's students bring culturally and ethnically diverse backgrounds into classrooms. In addition to gender differences and prevalent stereotypes in the design and use of technology, racial bias also exists. Historically people of color have been the victim of negative imagery; the remnants of these constructions continue to have contemporary influences in schooling experiences in the U.S. (Howard, Flenbaugh, & Terry, 2012). For example, educational apps have been designed in recent years without all of the faces and hues that represent the students or teachers of color in today's diverse classrooms. Additionally, certain imagery used in online and app simulations depicting the lives and experiences of enslaved people of color often misrepresent their important histories. Within the context of digital equity, racial bias can be seen in the representation, lack of representation, or misrepresentation of students of color in educational software and apps.

Addressing the challenges that exist when educating our increasingly diverse learner population is a priority in K–12 and educator preparation. Likewise, an awareness of cultural and ethnic backgrounds of both K–12 students and preservice teachers is an important step in this process. In response to the obvious concerns related to gender and racial biases and the impact on digital equity, as well as the fact that students are increasingly exposed to educational technology in schools, the International Society for Technology in Education drafted an updated version of the ISTE Standards for Educators in 2017. These standards should be used not only by current K–12 teachers, but also by educator preparation faculty and instructors if for no other reason than to model digital equity practices. Navigating the challenge of minimizing gender and racial bias begins in educator preparation not only with pedagogy, but also with a change in the selection of digital content and applications.

Assumptions About Teacher Tech Knowledge

Dynamics in K–12 classrooms have changed radically over the years with students from diverse backgrounds and varying levels of knowledge about technology. Educator preparation must change as well in order to better support preservice teachers in their development of the necessary skills required to meet the needs of students today. There is a great deal of enthusiasm about the adoption of new and innovative technologies to aid in teaching and learning, hence educator preparation programs would be remiss not to include the same technologies used in K–12 classrooms. Likewise, faculty in such programs must be sensitive to and avoid assumptions about the technology skill and knowledge levels of preservice teachers (just as teachers must avoid assumptions about students in their K–12 classrooms). To adequately prepare future teachers and disseminate new information to current teachers, we must be aware of their true technology knowledge-base. Furthermore, it is imperative to remember that using technology efficiently for personal use does not equate to an expert ability to teach K–12 students how (and when) to use technology.

Reflect & Consider

Avoiding Making Assumptions

Simply because a preservice teacher is a millennial or from the iGen, their professors should not assume that the student possesses a vast amount of knowledge about how to use technology for teaching and learning. How will you avoid making these assumptions? Here are a few thoughts to consider:

- Anonymously survey your class on day one using an app, such as Poll Everywhere, or Kahoot!, to determine your

students' level of technology knowledge. Consider asking questions on scales (from 1 to 5). For example, you could ask, "On a scale of 1 to 5 (with 5 being most), how comfortable are you with creating a Google Slides presentation?"

- Differentiate the questions you ask to give preservice teachers a chance to indicate how well they know a particular tool or their confidence levels in learning a new tool. You may ask a question similar to the one in the previous bullet to determine how well they know a tool. A good question to ask related to confidence level may be, "On a scale of 1 to 5, how comfortable are you with learning new web-based tools?"
- In addition to asking questions on the first day, consider periodic check-points where you ask for feedback on your technology-rich lessons to ensure you aren't leaving anyone behind.
- Observe your preservice teachers while working on projects to determine how well they know certain tools and how comfortable they are with using these same tools. Survey responses often can be optimistic views of our true capabilities or underestimates of our confidence.



Quality Teaching

Quality teaching is imperative today (and forever) as it ensures that all students have access to the same learning opportunities, the same information, and the same chances to create, collaborate, and achieve (Burton, 2016). Learners, even in educator preparation programs, should be offered an environment where digital resources and technologies are integrated into their formal and informal learning experiences beyond

direct instruction. An environment such as this can open the door for innovation and lead future teachers to a better understanding about how to facilitate similar learning experiences for their own K-12 students. For example, preservice teachers can be offered opportunities to explore new technologies with follow-up conversations about how to integrate those tools into future classrooms (Figure 4.1).



Figure 4.1 Preservice teachers explore Lego Mindstorms for the first time, before discussing how and where to integrate robotics into K-12 instruction.

All of that said, poor teaching is an obvious barrier in pursuit of digital equity. “Tech is an accelerator ... If you apply it to bad, ineffective practices, you get faster, bad, ineffective practices. If you apply it to good, high-quality teaching practices, you get faster, higher-quality teaching practices” (Culatta in Molnar, 2014). Teacher education professors should reflect on their own

practices to ensure quality teaching, while encouraging preservice teachers to do the same. So, where does quality teaching today start exactly? With all of us; we must strive to:

- **Employ strong pedagogical practices** that support the content knowledge and development of all learners regardless of race, ethnicity, national origin, gender identity, disability, English language ability, religion, socioeconomic status, or geographic location.
- **Recognize the nuanced needs of learners** related to digital citizenship.
- **Ensure sufficient access to devices and the internet** in your classroom, and effectively plan instruction so that all learners have opportunities to innovate using digital resources at key points throughout the academic year.
- **Select user-friendly tools inclusive of diverse figures or icons** that represent the demographics of all learners.
- **Offer personalized learning opportunities** that are inclusive of rich technologies for innovation.

A critical component of teacher preparation is the consistent modeling of quality teaching by faculty. When speaking of quality teaching in the context of digital equity, faculty should also consistently model the use of technology as this influences preservice teachers' perceptions of using technology for their own teaching (Albee, 2003; Darling-Hammond, Meyerson, LaPointe, & Orr, 2009; Hsu, 2012; Mills, 2014). *Why is this important?* According to the ISTE Standards for Educators (Leader, indicator 2b; 2017b), it is essential that educators advocate for equitable access to technology, digital content, and learning opportunities that support the learning of all students.



DE Stories

Dr. Betina Hsieh's Perspective

I've always thought it was essential to support teacher candidates in integrating technology, multi-modal and digital literacies, and critical thinking into their practice, beginning with preservice teacher education. At first, this integration came through a "21st centuries literacy project" in my secondary reading and writing preservice course, in which teacher candidates themselves created digital products (e.g. blogs, digital stories) or engaged in digital interactions (e.g. Twitter chats) relevant to their future professional contexts. This was based on the philosophy that teacher candidates would benefit from engaging with technology in professional ways that could directly apply to their classrooms. Although this experience proved powerful for many of my teacher candidates, many others didn't really seem to see connections between their reflections or professional conversations and their future classrooms.

Because of this, I wanted to more directly connect technology integration with the central focus of the course: lesson planning. To do this, initially, I just required students to embed technology into their lesson plans, however, the technology integration I received ranged from the use of PowerPoint presentations by the teacher to various uses of the Google Suite to students creating digital stories. Given this range, I chose to integrate use of the ISTE Standards for Educators or ISTE Standards for Students as part of the lesson plan requirements. Credential candidates first chose focal ISTE Standards (as well as their content standards and language objectives), then they designed content that integrated technology more intentionally. For each use

of technology, candidates were required to relate their pedagogical choices to the ISTE Standards, with the option to integrate a secondary framework, such as the Substitution Augmentation Modification Redefinition (SAMR) Model or P21's Framework for 21st Century Learning, in their rationale.

Since integrating the ISTE Standards for Educators and for Students as part of this lesson planning assignment, candidates have demonstrated a deeper understanding of the uses of technology, both as a tool that can substitute for traditional paper and pencil tasks, *and*, more importantly, as a tool that can transform the learning opportunities and educational spaces of the classroom, for themselves as professionals and for their students. They've done this through the integration of online labs into their curriculum, engaged collaborative opportunities that empower students to create their own digital products, increasingly multimodal instruction and assessments, and general engagement with new tools themselves through a pedagogical lens. The integration of the ISTE Standards to ground these lesson plans has allowed abstract concepts to become real, and it has led to real technology integration and implementation in classrooms. Once in their own classrooms, several of my former students Tweet me to describe the ways that they are using technology powerfully in their instruction, assessment, and communication with students and families.

Reflect & Consider

Key Questions About Quality Teaching

- Do your technology choices support your pedagogical practices and the development of all future (or current) teachers you are preparing for the field?
- Does your use of technology model digital citizenship and support the nuanced needs of your learners' potential (or current) K-12 students?
- Do you ensure sufficient access to devices and the internet in your classroom?
- Do you model the selection of user-friendly tools inclusive of diverse representations, imagery, or icons that represent the demographics of all learners?
- Do you encourage future (or current) teachers to innovate using multiple technologies?



Staying Current, Connected, and Curious

Keeping current and connected is a challenge in educator preparation. The true barriers in doing so are related to the fast-paced evolution of technologies and time management concerns when it comes to planning and facilitating instruction. Connecting with other faculty in local educator preparation classrooms, or even classrooms across time zones, is also a daunting task. It takes time to identify faculty who teach similar courses or content, as well as to determine the appropriate technologies and develop shared tasks for preservice teachers to complete. If,

or when, a collaborating faculty and classroom are identified, the following tips may help overcome potential barriers:

- If there are conflicting lengths or durations of your courses, use an asynchronous form of communication, such as Flipgrid, to connect locally or globally.
- When connecting synchronously using such tools as Skype, Zoom, or YouTube Live, be prepared for the unexpected (e.g., poor connectivity). Setting up a free LMS or content management system, such as a Google Classroom or free Canvas account, with a discussion board that includes prompts specific to what you plan to discuss live, is one workaround. Or consider having your preservice teachers write drafts of their posts off-line while waiting for connectivity to be restored.
- In the event that one class has more preservice teachers than another, consider innovative grouping strategies between your collaborating classes when attempting to partner students. For example, a class of twenty-six may assign two students to work with one student from another class with only thirteen students.

More often than not, remaining curious is the less difficult task in pursuit of digital equity in educator preparation programs. According to Howard (2015), to keep your teaching fresh and effective you should learn about colleagues, build community, expect the unexpected, remain current, and, most importantly, stay curious. Curiosity has the power to keep individuals motivated, and to help new discoveries emerge.

Yes, preservice teachers should be encouraged to remain current, connected, and curious. Due to the nature of emerging technologies, this is just as important for professors in educator preparation programs in order for them to effectively guide preservice teachers in their future pursuit of digital equity.



DE Stories

Dr. Marialice Curran's Perspective

Early in my higher education career, I noticed a pattern that connected educators were K–12 teachers, not teacher educators. Understanding that learning is mobile, immediate, social and collaborative in nature, I knew that teacher preparation programs must model this approach in educating teacher candidates for the reality of connected classrooms in K–12 schools.

Connected educators were embracing these changes and incorporating this new reality into the classroom. In the early 2000s they were using digital technologies and social media, such as Twitter, as an asset to help enrich their pedagogy. As Cooke explained, “The power of Twitter is not Twitter itself; it’s the connections it facilitates. Those connections can break the sense of professional isolation that many teachers feel within the walls of their own schools while invigorating their lesson plans by exposing them to a daily global exchange” (2012).

Personally, I became connected in 2010, and I noticed that connected educators were redefining the traditional role of the teacher and student in the classroom into a co-learner model where the focus was on learning collaboratively side by side. In stark contrast, I felt like I was on a deserted island on my university campus. I had one *colleague* who was a connected teacher educator and other than that, we felt alienated by the majority of faculty. Innovative programs, such as my iMentor research, went unnoticed and publications for tenure counted only in peer-reviewed journals.

The iMentor (www.irma-international.org/viewtitle/74916) research happened in my elementary methods course during the fall 2011 semester. I reached out to my PLN (<https://mbfxc.wordpress.com/2011/07/11/looking-for-virtual-elementary-teachers-to-be-science-social-studies-mentors>) and asked for virtual mentors for my teacher candidates, writing:

I would love to connect my graduate students with virtual mentors on how to teach science and social studies in PK–6 classrooms this fall semester. It will be a great opportunity for teacher candidates to see the power of global collaboration, as well as an opportunity to learn with you and your students. I envision Skype sessions, virtual science experiments, and social studies projects happening together! If interested, please let me know how I can best contact you. I see higher education changing. Please consider being a part of this exciting virtual mentoring program!

The results (<https://mbfxc.wordpress.com/2011/12/15/thank-you-pln-for-changing-teacher-preparation>) were fantastic! Teachers around the world volunteered and each week we had a connected educator Skype in to share with our class. Plus, each teacher candidate had to schedule a time for virtual field experience with his or her iMentor. Making these connections was a game changer for teacher education because there was never a guarantee that these teacher candidates would have experienced what a connected classroom looks like during their local field experiences.

That same semester, I had blogged (<https://mbfxc.wordpress.com/2011/05/13/high-school-skype-and-twitter-project-request>) looking for volunteers to collaborate on my

first-year seminar course for incoming college freshmen in Connecticut called, Pleased to Tweet You: Are You a Socially Responsible Digital Citizen? This course which we referred to as #FYS11, taught me more than I could have ever imagined. The course description included the following:

Schools across the country promise to provide a safe environment for learning, but so many students are afraid and embarrassed to come to school. In today's globally diverse and digital world, a bully's reach goes far beyond the playground. As more teens use computers, cell phones and other electronic devices they will experience being harassed, threatened and humiliated publicly online at greater rates. Cyberbullying is the biggest hazard our young people face today and will continue to face in the future as more teens consume and produce digital media. An interactive multimedia approach to this course will provide students an opportunity to explore the problem and extent of cyberbullying through readings both on and offline. Using a reflective lens, students will create an action plan to help others navigate the Internet as responsible digital citizens.

The collaboration between college freshmen in West Hartford, Connecticut and high-school juniors in Birmingham, Alabama began as an idea for students to have the opportunity, despite geographical limitations, to connect, communicate, think critically, and act creatively via social media to address issues around cyberbullying. As the project evolved, its scope expanded to encompass a holistic approach to digital citizenship in local, global, and digital communities that developed into the iCitizen Project (<https://www.mbfxc.com/the-icitizen-project.html>).

The iCitizen Project became more than just a school project; it was a transformative experience for both the college freshmen and high-school juniors and developed into an opportunity to change minds, attitudes, and hearts. Through Skype and Twitter, the students collectively defined an *iCitizen* as an individual who is aware, empathetic, socially responsible, and someone who believes in social justice and models being a citizen of the world both on- and offline.

The final multimedia project promoted consciousness and empathy in a digital world. Both classes bridged the gap between two schools separated by geography and created an online iCitizen community. The participants concluded:

We initially put a lot of emphasis and focus on the issues of bullying and cyberbullying, and while it does remain a large problem both on- and offline, we felt that teaching empathy first is more effective than trying to stop bullying later. Together we learned what it means to be an active citizen instead of just a resident, an enabler of change, and not just a bystander. We learned to humanize the person next to us, around the world, and across the screen. For a generation who has grown up around computers, it's hard to think there's anything new that you could possibly learn about the Internet. But this project has shown us that there is always room to grow, connections to forge, and communities to contribute to, both in your backyard and behind a computer screen. And the tools we've acquired by working together on this project will be used to benefit and educate others to create a much more rewarding online experience for everyone. (Curran, 2012)

What Would You Do?

You are teaching a new course in your program that has never been taught before. You've developed the syllabus and considered both your state credentialing requirements for utilizing technology, as well as the ISTE Standards for Educators.

Although you have addressed collaboration through face-to-face activities, you are curious about integrating online collaboration opportunities. *What would you do?* How would you identify other university classrooms to collaborate with on activities?

You might consider reaching out to your professional network to ask for ideas of recommendations of others with whom to connect. If you have a social media presence with a robust educational following, you might consider your personal/professional learning network (PLN) to identify local or international professors willing to collaborate on one activity.

Join the conversation on Twitter using #DigEquityBook, and tell us what you would do.

DE Wisdom

As you connect (physically and virtually) to your content, colleagues, and curated resources, remember to remain curious and keep it current. We have made some powerful shifts in education over the years, and it is frightening to feel lost or left behind. As a child, my curiosity motivated me to move in a positive direction. Reflect on the times that your curiosity and imagination took you on an amazing journey, and allow that same spirit into your classroom—for you and for your students. When we are curious, we learn and discover new innovations. Allow your curiosity to drive your connections.

—Nicol Howard, 2015

We encourage preservice teachers and those who educate them to remain current by reading about innovations from multiple resources including, but not limited to, the books, blogs, and publications of the International Society for Technology in Education (<https://www.iste.org>). Bring these resources into your courses and allow your preservice teachers to do the same.

Please share what you're currently reading, and your new discoveries, on Twitter using #DigEquityBook.

