Technology as a Tool for Collaboration, Understanding & Engagement

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Recommended Citation

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Reimagining a Progressive Classroom in the 21st century

Picture a small classroom filled with morning light. Students are spread around the room: huddled in pairs, sprawled on the carpet, perched on the edge of their chairs, lying across tables. Copies of *Harry Potter and the Sorcerer's Stone* lie open next to iPads. A quiet hum of conversation and finger taps on glass screens fills the room. This is how I remember my classroom one morning in mid-May two years ago. It was the end of my first year as a teacher in an independent school in New York City. This moment sticks out in my mind even today because it was the first time I truly understood what "progressive education" meant. Encouraged by a demonstration I had seen at Bank Street College of Education, I had asked my language arts students to use the GarageBand app on the iPad to compose a musical score for a scene in *Harry Potter*. I hoped it would be a fun way for students to immerse themselves in the text. Quickly, however, the task became a learning opportunity for me as much as for them, one that proved to be a catalyst for conducting more extended research into the potential of digital and online technology to encourage student-centered learning.

Dewey (1938) describes certain "common principles" of progressive schools: they are environments that nurture and cultivate individuality, encourage free activity, help children learn through experience, and open up children to a "changing world" (pp. 19–20). Progressive practitioners focus attention on the student, in the belief that learners develop and grow with the freedom to pursue individual interests. As life is in a constant state of flux, it is essential to expose children to a variety of changing experiences. Education cannot be rooted in the static, but must echo dynamic changes in society. Schools must equip children with the skills and abilities to adapt to the technological and societal changes they will experience. Through investigation and inquiry, students learn to solve problems and grapple directly with concepts (Wagner, 2012). Now more than ever, the most important question for teachers is not *what* students learn but *how* they learn.

I am convinced that students learn most and best by actively constructing meaning each day as they question, interpret, confuse, connect, rethink, revise, and then try again. Developmental psychology research offers a clear sense of how children learn. They innately seek to build meaning out of the world. Piaget demonstrated the stages of childhood cognitive development, and at every stage, it was through active engagement with materials that students internalized meaning (Miller, 2001). Constructivist education, in my experience, is centered around the interests and learning of the child. The basic tenets of progressive education and constructivism are simple: students are firmly in charge of building their own understanding through active work, critical thinking, and engagement in real-world issues and questions.

A recent study by Bonawitz et al. (2011) examined how direct instruction influences exploratory play and learning for young children. The researchers found that toddlers left simply to play and explore with a novel toy discovered a greater number of features (e.g., pull levers and buttons that produce a squeak) compared to children who received explicit modeling of how to use one feature of the toy. As the researchers summarize, "These results suggest that teaching constrains children's exploration and discovery" (Bonawitz et al., 2011, p. 325). There are advantages to seeing what a learner learns through spontaneous discovery. By investigating on their own, children devise solutions and develop analysis skills beyond those that are explicitly taught or modeled. My anecdotal experience with older students in the classroom indicates that they also benefit from opportunities for exploration and discovery. Given carefully chosen tools, including online resources and digital technology, students will explore and hypothesize on their own, testing out theories and ideas as part of their own discovery process.

In 2013, I conducted research on how technology influenced my practices as teacher of a 5th grade social studies class.

In addition to observation and reflection on student work, I videotaped and recorded audio throughout the year.

My focus was to examine how digital online tools enhanced my own progressive teaching practice.

My experience helped me shift the responsibility of learning to students, and in the process I saw greater student engagement, deepened understanding and stronger collaboration between students.

Central to this learning are physical materials that help students build understanding of concepts and relationships through exploration. Of course, most digital technology today exists only on a screen. So what does actively constructing understanding look like in the 21st century? Progressive practitioners can work to integrate real-world, physical materials and online technology to organize and communicate information in new, expanded ways. Even in an era when teachers feel pressured to prioritize high-stakes test preparation (Ravitch, 2013), schools must still encourage students to explore and question and do. There is tremendous potential for online technologies to broaden student perspectives about the world. As I outline below, the active construction of knowledge continues, but when online technology is introduced, learning occurs simultaneously between "real life" and on a screen. As more content resources—text, audio, and video—become available online, educators and students must collaborate to sort and sift through information sources and then explore, question, and analyze in small groups and individually.

Actively Constructing Understanding with New Tools

As I think back to the GarageBand activity, the role that exploration played in its initial success is clear. I started the lesson by modeling aspects of the app: how to begin a new project and pick an instrument. As I began to demonstrate a few ways to "play" the various instruments, the fifth graders immediately lost interest in my explanation and began investigating independently. As the students continued to experiment, I abandoned my plans for the rest of the lesson and took a step back to observe. What I found was that simply giving students unstructured time to explore and tinker with the app gave them insights into its potential and about the ensuing activity connected to the work of literature we were studying, in ways that direct-instruction lessons do not. This mirrored my own experience of learning to use technology: trying things out to see what works, often discovering something new in the process.

What struck me most about that day was the incredible level of engagement and depth of thinking I observed. The students took the idea far beyond what I ever could have imagined. And most importantly, the digital tools deepened the literacy. Kids began carefully rereading chapters and skimming back through their annotations to find the perfect moment in the book that would highlight the right note of drama or terror or levity. Students recorded dialogue numerous times, which helped improve fluency, articulation, and pace. Student ingenuity emerged immediately. One group placed their iPad near the entrance to the classroom to record the door swooshing and creaking and then used the sounds to highlight a particularly suspenseful moment in the corridors of Hogwarts. Two boys asked to go into a quiet room so they could record a dramatic reading. Their presentation to the class later revealed their keen sense of humor through faux-British accents. Another student composed an original piano melody for her selection of Harry's first trip to Hogwarts: contrasting sweeping arpeggios and tender lyrical notes captured the mix of excitement and anxiety that children know so well when starting a new year at school. Students worked collaboratively, with focus and energy, motivated entirely by their own interests, passions, and understandings, rather than by my external prodding.
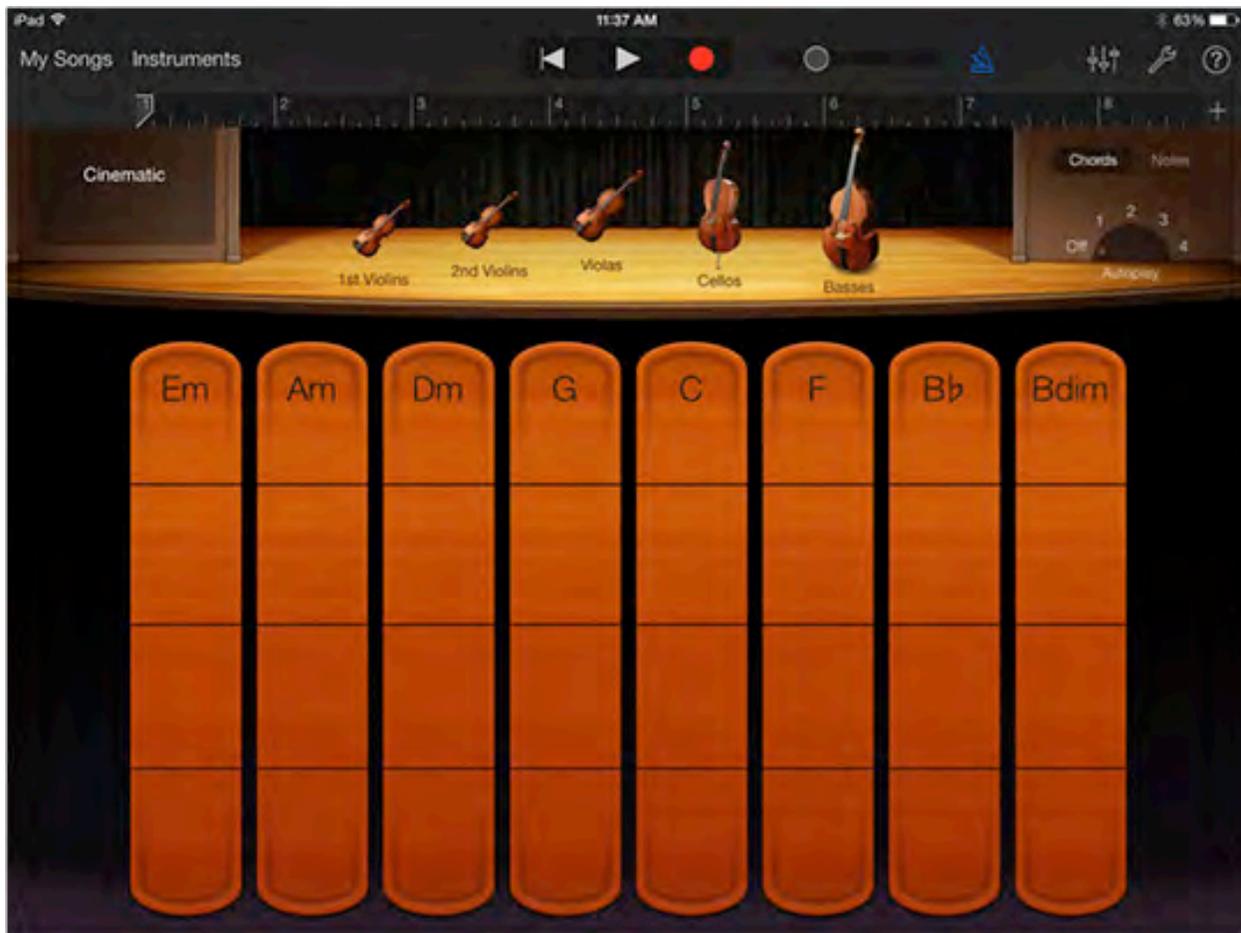
Figure 1: A screenshot of the GarageBand app, including the Autoplay feature (upper right-hand corner) that allows students to play a prerecorded melody or chord progression on a variety of instruments.

Crucially, the audience for their work widened. Their ideas were no longer meant to be presented only to the teacher; now they could be easily shared with peers and families. Students now communicated through voice and audio as well as through the written word, which benefited English language learners and students with different learning styles. The GarageBand app itself differentiates between levels of musical ability, and all students, with or without a music background, could compose their own soundtrack. The lasting impression I have from this activity, however, is not the technology. Rather, it is that students were intrinsically motivated to reread the text and think more deeply about it. The activity demanded that students demonstrate their understanding of the book through multimedia. It revealed much about their strengths and weaknesses as readers and communicators and also offered an outlet for creative expression and collaborative problem solving through small-group work.

How Online Technologies Transform Visual Thinking

One by-product of the explosion in social media and technology in the past few decades is the growth in the number of visual images that people see on a daily basis. Young people increasingly view the

world through images: graphic novels are more and more popular with many readers; Instagram is a constant presence in the lives of adults and teenagers alike; television continues to evolve as a source of sophisticated cultural discourse; fourth graders ask me whether a writing assignment can include emoji symbols. Photography is increasingly important not just for its aesthetic qualities but also for its capacity for educating people about refugee crises or environmental destruction. Of course, the ability to observe, interpret, and critique imagery is nothing new. Museum educators, in particular, have a history of working with students to develop sophisticated thinking about visual imagery. Yet the Internet dramatically increases the number of images that young people see each day. As educators, it is essential to work with students to develop visual thinking strategies. In my experience, images are one of the most powerful ways to spark discussion and analysis in a classroom.

The central aspect of the visual literacy experience lies in harnessing the power of close observation to enhance learning. Ritchhart, Church, and Morrison (2011) describe such an activity, "See-Think-Wonder," in *Making Thinking Visible*: "This routine was designed to draw on students' close looking and intent observation as the foundation for greater insights, grounded interpretations, evidence-based theory building, and broad-reaching curiosity" (p. 55). This research inspired me to use visual thinking activities in my social studies class, where we learn how Dutch principles of commerce and tolerance influenced early New York history (Shorto, 2004), and students develop a more complex understanding of the influence of economic and political forces on "New World" exploration of that time. In 2013 the class also began an exploration of the larger geopolitical considerations and the movement toward empire of many of the European powers during that period. That fall, the Metropolitan Museum of Art had an exhibit entitled *Interwoven Globe*, which examined the international textile trade beginning in the 17th century. Learning about the explosion of globalization through the discovery of distant lands and the drive for shareholders and governments alike to expand into new markets provided an interesting layer of thinking about the world we were creating in our class. One room in the exhibition was especially striking: four tapestries, each of which is about 50 feet high and 70 feet wide and represents one of the "four continents": Africa, Asia, Europe, and the Americas. Each was rich in imagery and symbolism that pertained not just to trade, but to European ethnocentrism (Metropolitan Museum of Art, n.d.).

In order to prepare for a class field trip, I used the Metropolitan Museum of Art's website to preview the images of the four tapestries. Our class discussed the history of the tapestries and anticipated what we would see at the exhibit. Students developed a solid understanding of the general time period and its art. When we arrived at the museum, the exhibit was nearly empty and students were able to sit in small groups for an hour in the room with the four tapestries, scrutinizing every detail of them, further developing theories, and sharing interpretations. Although no virtual experience could replicate the feeling of sitting beneath these gargantuan masterpieces, technology played a crucial role in preparing students for it. The level of student thinking was much higher because in the classroom we had already built background knowledge about what we would be seeing. Students focused on delving into the meaning of each image and its historical context. Back in the classroom the next day, we

deconstructed our notes and impressions, referring back to the tapestries with the aid of the museum website. The students then each chose a tapestry and acted as the curator for it, providing text about the origin, history, and meaning of the art to accompany the image. Afterward, we printed and displayed their work, creating our own little museum in the classroom.

As teachers merge aspects of experiences in the classroom and digital technology, learning today can be more powerful. Because they attend a school in New York City, my class is fortunate to be ten minutes by bus from one of the premier artistic and cultural institutions in the world. Yet the remarkable power of online technology is that with a projector and an Internet connection, a classroom in another state can experience something similar, even if not precisely as powerful. Having access to visual images on museum websites or library databases means that students, regardless of their location, can actively construct their understanding about history in new ways as they discuss and interpret artworks, maps, and photographs. The transformation is that a global repository of images can be called upon at a moment's notice.

Visual Thinking: Historical Critiques Through Image

Before a school trip to Boston in the spring of 2013, our class transitioned from studying New York City history to learning about the American Revolution. Many students were fascinated by the series of battles fought by George Washington in the winter of 1776. During class, we examined Emanuel Leutze's *George Washington Crossing the Delaware*. Although this painting hangs in the Metropolitan Museum of Art, a student saw a reproduction of it in a reading I had assigned and wanted to pull up

Students "turn and talk" about the image.

the full image online to share in class the next day. In preparation for that, I read a few posts about the painting. If the students did not point it out themselves, I planned to highlight the presence of an African American soldier in the boat as well as raise a few questions about the canonizing portrait of George Washington. Art tells a story and often contains a particular perspective. I hoped students would engage in critical thinking about this well-known painting of America's founding father and the symbolism of the image as it relates to American history.

I brought up the image on my computer and projected it onto a large whiteboard in our classroom. We began by observing the painting silently for one minute—a practice I picked up from museum educators at Bank Street. After about 30 seconds, nearly every student had a hand in the air; many of them were wriggling and jumping around, ready to explode with an insight. When the timer hit one minute, I asked the students to turn around and talk with a partner, and the class reverberated with exclamations. Students jumped off the carpet and ran to the board to point out a specific detail. After a few minutes of intense partner discussion, we shared our insights. The students' observations far surpassed my expectations, as is so often the case with kids.

The students noticed things I had missed. One pointed out that from the reading, we'd learned that it had been snowing and raining when Washington crossed the Delaware, but that that was not portrayed at all in the painting. Another noted that considering that the soldiers were supposed to have crossed the river in the dead of night, the scene looked awfully well lit. One student wondered how the boats kept from sinking with so many people packed aboard. Another student, pointing out the hairstyle of one of the figures, asked if that soldier was a woman. This comment ignited a long discussion—not for the first time—about the role of women in the war and whether or not it might have been possible for a woman to cut her hair a bit shorter and join the fight. Another related traveling through large ice floes to the terrible hardship the company of fighters had faced during a harsh winter and contrasted that to the tremendous resolve that imbued the faces of those immortal actors.

One student had not engaged in the discussion. He instead sat quietly, studying his laptop screen with intense focus. It turned out that he had pulled up a high-resolution image and was madly scanning the painting at an extremely close range. He noticed a signature on the lower right-hand corner of the work and was excited to share his finding. We pulled up the high-resolution image for everyone to see, and he took the lead in analyzing the work of the German-born mid-19th century artist who had created the painting. A student whose family is German noticed that "Dusseldorf" was written under the signature and remarked that perhaps the painter had, like them, moved from Germany to the United States. This, in turn, sparked a conversation about the role of immigrants in American society, especially in the creation of one of the more quintessentially "American" works of art.

I later did more research and learned that the students had been correct, from an art historian's point of view, about each and every critique they had made about the painting. But regardless of the accuracy of their observations, it was the students' active construction of knowledge—their thinking, inferring, and questioning—that made the work of art come alive for them. They made their own

interpretations, synthesizing their ideas with their background knowledge from prior readings and understandings. The visual image unified many aspects of the curriculum: the image analysis was a way for all students in the class to coalesce their disparate ideas about specific events, historical inaccuracies, and perspectives and connect them to this one interpretation of a key moment in United States history.

Consider the simple yet powerful role that the Internet had played in the lesson. The most valuable aspects of the experience—the thinking, the collaboration, the exchange of ideas, the background knowledge—all came from the students and the possibility of interacting with one another, extending their thinking, and building on each other's observations and connections to readings. Yet the anchor was the looming image of the painting, easily accessible at a moment's notice and available for viewing in tremendous detail. To me, this activity encapsulates the idea of "constructivism with online tools."

How Online Inquiry Can Increase Collaboration

Before our trip to Boston, the fifth graders researched a few of the documents that illuminate how societies grappled with changing notions of liberty and government prior to 1776. One of the activities was having small groups research the Magna Carta. After providing a brief introduction to it, I gave students time to investigate the document online. Rather than asking the students to answer a narrow set of questions, I hoped to encourage discovery and exploration. The students' goal was to use kid-friendly online resources to explain why the Magna Carta was important. Central to the task was that students would use what they knew about both collaboration and online research. Throughout the year, we had built up our skills in these areas. We had practiced evaluating website content, bias, and word choice to determine if a site was appropriate for a fifth grader. We also had practiced reading to sift through and sort information from various sources, both print and digital (Harvey and Goudvis, 2007). We had discussed how to take one bit of information and confirm it or connect it with other ideas or with our own background knowledge. We had also frequently talked about and reflected on how to work cooperatively in small groups. Central to student development in this area was the language and method described by Johnston (2012) as part of the "dialogic process" in which kids interact, question, reason, reflect, rethink, and analyze.

I recorded one group's conversation with my iPhone. When I listened to it later that evening, I was surprised at just how direct the students were with one another. They traded arguments about sources they deemed too difficult to read and engaged fully in Johnston's (2012) aspects of the dialogic process. Halfway through the recording, my voice is audible. I am checking in on the students' progress; at that point, they had already discussed their main ideas. The recording captured a key interaction: one of the students who was quiet early on eventually offered a quite salient point that tied together a few of the different ideas the groups had come up with about the Magna Carta. My presence was an opportunity for this student to consolidate his understanding and communicate his idea to someone new for the benefit of the group.

This brief anecdote demonstrates a different aspect of constructivism with online tools than I dis-

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Transcript from Collaborative Activity:
Find a "Kid-Friendly" Site Explaining the Magna Carta

Context: after an introduction to the activity, a group of four students are around a table. Two are working with Chromebooks, two on iPads. The transcript picks up after a few minutes of reading and exploring. Student names have been changed.

Sarah: I'm just looking at Wikipedia.
Marvin: I'm just reading through one...
Sarah: Is there anything about where [the Magna Carta] came from or anything about the document that it was to limit the rights...
Marvin: Limit the rights of the king to like do stuff?
Stephen: Magna Carta for Dummies!
Anthony: Keep working!
Stephen: I'm going to narrow down.
Sarah: I'm gonna go 'Archives Government'...
Stephen: I looked at that, it wasn't that helpful...you can look at it, it kind of just tells you who it's by...
Sarah: [reading] The Magna Carta, what are human rights?
Anthony: Guys, what I found interesting is the Magna Carta limits the king's rights, but guess what, you know who signed it?! King John signed it!
Marvin: Well, King John signed it because the nobles would have beheaded him anyway, they had a whole...a very large group of nobles could go against him, and without nobles he would have no one to defend the king, if the nobles and the knights were against him he would have no one defend him.
Anthony: Yeah, that's a good point.
Marvin: And so he had to sign it, or else...
[Teacher arrives at the group's table]
Teacher: How's it going?
Sarah: You guys, freedom of religion!
Stephen: [reading] "The Magna Carta, the charter of English liberties granted by King John in 1215, under the threat of civil war."

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cussed previously: its role in research and exploration in an online environment. During the activity, students sifted through multiple websites—some of which were more appropriate for fifth graders than others—encouraged one another, and ultimately critically analyzed the Magna Carta as a document; the students wanted to know who the rights enumerated in the Magna Carta were really for. The Internet, in this instance, served as a resource—a way to access a large amount of information, determine its accuracy, and connect ideas about the emergence of rights in European society. In my experience, an activity where each student sits alone reading an article online or in a book simply does not have the same effect. The value of the activity comes from the discussion, from having multiple minds sharing their thinking as the group constructs understanding together. Online tools were part of what made this a successful learning activity, but there was more to it than that. This was a powerful activity—one that students remembered months later on our trip to Boston when the Magna Carta came up on a tour—because it involved constructed understanding, not teacher-directed instruction. I feel confident that had I approached the lesson differently, only one or two students might have recalled in any detail the important features of the Magna Carta.

How Online Tools Transformed My Teaching

Online technology transformed my teaching. In a fundamental way, the focus of the classroom shifted from me to the students. Instead of leading the class in discussion, I spent my time roaming the room and conferring with kids. I offered points of clarification. I altered activities to accommodate the different learning styles I observed among my students. As a beginning teacher, I was suddenly able to spend time doing all the things I knew I had to do—converse, observe, assess, guide—but had had such trouble finding a way to do before, when my focus and energy were on management and content delivery. The students were not looking to me to solve their every problem. Instead they were creating, revising, and reflecting on their own work. I began guiding and scaffolding lessons rather than controlling them. As time went on, my emphasis changed from altering the daily lesson to altering my curriculum. I began to adjust my lessons and activities to align more fully with my progressive educational philosophy. I took tools that I used in my own life and reimagined how apps and online sources could be used with my students. Encouraging activities where students created maps, narrated movies, and interacted on online forums meant that the focus of each class shifted from teacher to student.

Teaching is, in its essence, a relational art. No invention changes this simple truth. I have worked with many families who remain skeptical and concerned about the encroachment of technology in the classroom. Yet the experiences I outlined here demonstrate just what teaching with online tools can entail. It does not have to mean simply that each student works in isolation on a computer. If teachers maintain a commitment to constructivist principles and design activities that involve discussion, collaboration, and critical thinking, students using online tools can engage in work in which there is more interaction than in the traditional model of instruction. The inclusion of digital tools in my classroom unlocked my potential as a progressive educator and profoundly impacted the nature of learning in my classroom. In the end, it made me a better teacher and helped students take even greater ownership of their own learning.

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