Promoting Engagement Through Participatory Social Practices in Next Generation Social Media Contexts

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TECHNOLOGY AS A DISRUPTIVE FORCE IN EDUCATION

In recent years we have witnessed a dramatic shift across many sectors of society as a result of the ubiquitous social interaction taking place through new and social media. These disruptions have influenced politics, commerce, and other domains while largely leaving education unchanged. There have been suggestions that online education, MOOCs, flipped classrooms, or mobile learning would dramatically alter the educational landscape, but these movements have not had as dramatic an influence as some anticipated. In fact, much of the formal educational world still operates as it did decades ago. Although there are exceptions, education is still far too commonly delivered in the same teacher centered, lecture-based, factory model context that scholars like Dewey sought to change nearly a century ago (1938). As our society has changed so dramatically in response to the socially networked world we live in, it is high time for our educational models to change as well.

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We are surrounded by compelling and authentic opportunities to engage in social practices that can support virtually any academic discipline or topic. We are also surrounded by an overwhelming amount of information that can be manipulated, conceptualized and visually represented in varied ways. This quantity of information is a great asset, but to truly benefit from it, we need to work collaboratively in these social contexts toward shared goals (Weinberger 2012). This understanding allows us to construct wholly new authentic learning experiences that encourage participation from all members of an educational community. These social contexts have the potential to engage participants by involving them directly in the co-construction of knowledge as then navigate and negotiate their learning (Kessler 2013). In fact, the participatory culture that is pervasive across social media contexts compels participants to be active contributors (Jenkins 2006). At the same time, we have new opportunities to provide participants with immediate and salient feedback that can guide them as they co-construct knowledge with other members of these social communities. Throughout this co-construction of knowledge, participants share ideas and negotiate the nature of the construction itself. Such negotiation of community behavior allows participants to contribute across a spectrum of roles allowing an individual to take the lead on one topic or aspect of a topic while another participant assumes control over another topic. This shared responsibility can motivate participants to continue to be involved. By contextualizing our instruction within the constructs of these tools and social practices, we can promote student engagement in ways that we have attempted but failed for years. Situating learning within participatory social co-construction of knowledge allows us to approach group work tasks from an authentic, compelling, and engaging perspective. Further, as trends such as big data, artificial intelligence (AI), and virtual reality (VR) expand and converge, we will certainly see greater potential for customizing intelligent social media practices that engage and compel students around educational topics. It is important to note that the point of leverage in these future educational contexts will continue to be instructors and instructional designers. While some have predicted or feared that instructors will be replaced by robots or some similar entity, tomorrow's instructors will need to be well versed in the abilities of these various technologies and will know when, how and why to introduce a particular technology at a moment in instruction when it may be most valuable and salient. Consequently, it will be necessary for teacher preparation to adapt to these demands. Rather than focusing on a

single technology, or even a category of technology, this chapter addresses the opportunities for creating varied engaging experiences upon current social media communication practices. The author anticipates developments that embrace a diversity of interconnected technologies to dramatically alter these practices, making them even more engaging and expanding their potential for instruction.

I am interested in the convergence of social and new media and the opportunities for compelling social engagement that result from the co-constructed participatory culture they promote. These practices are relatively nascent and require us to collectively negotiate as we learn to use them to their full potential. As they evolve, we will certainly need to learn to adapt. Developments in big data, AI, and virtual/AR will not only expand the potential for our engagement, they will also obligate us to engage in new ways. With the advent of texting and internet-based communication, we developed new forms of literacy that Crystal (2004) referred to as Textspeak and Netspeak, respectively. Similarly, we will develop new forms of literacy to communicate in these emerging social contexts. The influence that these combined forces will have across all social contexts is likely to be very dramatic. The communicative practices that are pervasive across social media contexts provide opportunities for varied engaging and compelling educational experiences. The ability to construct such experiences upon customized rich data creates wholly new opportunities for learning. Other opportunities to build wholly new educational experiences include the use of augmented and VR. Both of these experiential enhancements benefit greatly from AI and social media practices. AR allows us to embed various collections of extant or customized information upon the physical world around us. As a result, learners can be immersed in environments that represent authentic locales in otherwise inaccessible geographic locations as well as fully artificial contexts. These environments provide instructors and instructional designers with new opportunities to construct engaging experiences in which learners can gather information and interact with other learners, cultural and instructional informants and automated avatars toward some meaningful goal. We can anticipate virtually immersive experiences that are individualized for each of us based upon our own interests, abilities, and previous performance. We already have some early examples of these potential experiences, modest as they may be. This chapter will present some of these examples while discussing future directions that we are likely to encounter.

Where to Begin?

The increasing variety of technologies that are interconnected with social media are likely to be overwhelming for casual observers. Maintaining awareness of these rapidly changing domains may be even more challenging. To aid the reader, I have selected some of the most obvious developments that readers are likely to understand and encounter in the near future, but these should not be considered to be exhaustive.

Augmented Reality

Augmented reality (AR) is an interesting development that is already quite common in some educational contexts. AR presents opportunities for us to interact with one another and the physical world around us in wholly new ways. Readers will likely be familiar with the Pokemon Go craze that swept the globe recently. This experience of playfully collecting characters in the real world certainly captured the attention of many and motivated them to participate. We should strive to create similarly engaging experiences for our students. There are many other current commercial applications using AR throughout society. These include broadcasting sales and dining specials to pedestrians in busy metropolitan areas and other forms of targeted marketing. Readers may also be familiar with the short-lived Google Glass project, which was the first attempt to commercialize AR. Google Glass presented users with the ability to navigate the physical world while also gathering web-based information. Thus, the real world experience is enhanced in all the ways our access to data has changed in the past two decades, but with more immediate and transparent connections. These glasses were soon banned for drivers, business patrons, and others. While this project is no longer being supported, we will definitely see future iterations of this technology.

Educators, instructional designers, and students have the ability to create their own AR experiences. We can embed layers of digital information that enhance our understanding and perception of real world experience. This allows us to raise awareness of particular aspects of the landscape, increasing salience and redirecting attention toward educational goals. Such augmentation allows us to interact with the world around us in wholly new ways. We can design customized and individualized layers of information around any educational content in any language in a manner that allows users to select from myriad experiences. For example, in one

physical space, we can design various contexts of information that defines a given space as an office, a restaurant, a shop or a museum. We can design AR experiences to highlight desired characteristics, such as historic events, literary connections, or geologic details related to the particular location. Consequently, users are able to engage in contextualized interactions that benefit from the richness of this additional information.

There are a handful of mobile app technologies that allow us to create customized AR, including Augmented Reality Interactive Storytelling Engine (ARIS) and Aurasma. Aurasma is a free mobile app that makes it very easy for teachers and learners to design their own AR experiences. By creating links between triggers and overlays, anyone can contribute to the digital enhancement of physical space. In fact, it has become quite popular in P-12 contexts and numerous examples are shared at Aurasma.com. We can anticipate that future iterations of AR will create varied opportunities for learners to interact with one another and instructional content in compelling social ways. ARIS is another example of AR that has found its way into educational settings. ARIS makes it easy for teachers and learners to create place-based games that can support learning. By focusing on the shared physical space, these games bring participants together to solve challenges together. They co-construct the experience in a manner very similar to the participatory culture of social media. In fact, they can create their own place-based games and share experiences about the games in the context of social media. The reliance upon place can also help raise the awareness of important features within a given environment. New environments can be navigated in depth and better understood as a result. Familiar environments are transformed and seen from a new perspective based upon the intentional focus of a game design. Of course, the effectiveness and flexibility of AR are dependent upon the data that drive it. Fortunately, we are living in a time with so much data that it is often difficult for humans to sort through it and make sense of it, but computers have become very competent at this. In fact, Big Data is bringing many new opportunities to education.

Big Data

Many of the most promising emerging technologies for education are built upon the foundation of big data. This term may not be clear to many readers so it worth explaining. Big data refers to the increasingly valuable, and enormous, collections of data typically made possible through digital

networks. These enormous datasets are so large they can only be understood through the application of computer-based analytics. Together, big data and analytics have had the attention of leaders in education. In fact, there have been grandiose expectations for the myriad ways that big data would transform education. This is understandable since there is already evidence that big data has much to offer in predictive analysis. Some use these data to identify which activities will benefit different students, which group composition will best accommodate students and which students will succeed. However, all too often big data and analytics in education have been focused solely on assessment. Specifically, many have anticipated that large collections of testing data could be used to improve the test scores of future test takers and create models of successful students that can be used for predictive modeling.

My interest in the use of big data is somewhat different as it is more focused on using these large datasets of authentic human behavior, student learning, and real world communication to create improved learning experiences. I prefer to use the big data of social experience and language production, particularly the digital reflection of social and learning communities as a means of creating new authentic, compelling, and meaningful social experiences for learners to engage with others around the subjects they are studying. Big data, particularly when designed to be open, presents us with opportunities to adapt, archive and curate open educational resources for various applications. These resources are increasingly recognized as invaluable authentic content that can be modified for specific groups or individual learners at specific moments in their learning process (West 2012). Utilizing various extant datasets can help us to provide automated and differentiated information to students at moments in their educational experience when it is most useful and effective. Further, as we recognize the potential for such experiences, we can create customized datasets for particular groups of students that can even better address their unique needs. Such projects could ideally incorporate student-produced information, promoting student engagement through both involvements in a meaningful creation of materials as well as increased relevance of instructional materials. The more data we are able to collect and manage effectively, the more we will be able to create engaging and individualized instructional materials and experiences. The use of big data allows us to contextualize these social experiences, particularly when these large datasets are coupled with AI.

Artificial Intelligence

Perhaps the one technology that will transform education is another term that warrants explanation. AI involves computing that behaves in a manner that seems like human thinking. For our purposes, AI is the technology that allows robots, and other automated devices, to do tasks that we tend to associate with human performance, typically without our awareness. AI has become pervasive throughout our daily lives. In fact, when AI works effectively it is transparent and not obvious to the end user. We have become accustomed to getting general information from digital assistants like Apple's Siri and Amazon Alexa or seeking predictions about music we will like based on the music we listen to through Pandora or Spotify. We rely on AI embedded in email sorting at both the server and device level to quarantine spam, junk mail, and other suspicious messages. Watson, the AI created by IBM that beat the best human participants on Jeopardy, is now being used to help cure cancer. The AI is able to sort through all the medical trials and journals in ways no human or even group of humans can possibly do. With 8000 papers published a day, only an AI can manage this task. In an analysis of 1000 cases, Watson arrived at the same intervention as a human physician. In 30% of the cases, Watson identified issues that no team of humans had recognized. Watson also scanned through the raw data from the CT scans of the studies to successfully identify overseen cancerous growths (Rose 2017). If such technology can help medical professionals in this way, we can certainly apply similar technologies to assist educators. In education we have recently witnessed some significant developments in AI, including automated essay scoring that has performed at 92% reliability compared to humans (McNamara et al. 2015), and spaced interval learning that presents information to students repeatedly when it is most salient (Reddy et al. 2016). Many observers hope that these applications free instructors up to focus on more demanding abilities such as problem-solving and critical thinking. One of the most basic manifestations of AI is the bot.

Bots in Social Media

Bots have become so commonplace in social media that many are likely to have interacted with them without knowing. In April 2017, Facebook released chat extensions that included the ability to create group bots and discover existing bots. Readers can find collections of existing bots and

bot creation tools across the internet. In fact, anyone can create a simple bot in a matter of seconds that will react to chat messages with basic stock responses. Some observers have expressed great concern about the role that bots may play in society. According to a report in the Atlantic, during the 2016 US presidential election, there was a significant presence of automated, or bot, accounts which appeared as if they represented actual individual people (Guilbeault and Wolley 2016). They suggest that one-third of tweets supporting Donald Trump and almost one-fifth of tweets supporting Hillary Clinton came from such automated accounts. There have been similar reports about the 2017 French presidential election as well. It is highly unlikely that individuals who observed and interacted with these contributions recognized that these were posted by non-human bots. Further, it is unlikely that most individuals understood the potential for such bots to engage in this manner. Researchers have found that people engaged in social media practices tend to treat bots as if they are actual people even when their automated nature may be fairly obvious. This observation is commonly referred to as the "Eliza effect" and attributed to research based upon an early chatbot. Further, bots have become so effective and commonplace that a number of recent studies have addressed the challenge of distinguishing them from actual human interlocutors (Varvello and Voelker 2010). There is great potential for using bots in education to identify, gather, and disseminate information and relevant digital artifacts in a manner that is salient and conducive to specific learning situations and needs. Bots could be used to identify authentic linguistic samples from the vast corpus of language available across the internet. This data can be used to model ideal interlocutors for a variety of interactive automated experiences that could be used by bots. They could also be used to identify characteristics of these linguistic samples that may serve as ideal feedback for students in specific moments in their learning process. The use of individualized bots or other digital assistants can take meaningful and engaging social experiences to new territory where learners interact in extensive exchanges around content and highly salient feedback in a manner that is socially compelling. Such experiences can also be customized to incorporate individual interests and needs of learners. In order to understand how learners will interact with technology when engaged in these experiences, it is important to observe them using it. The field of human-computer interaction (HCI) can help us gain perspective on this.

Human-Computer Interaction

The field of HCI has taught us much about how we use technology in various social and educational contexts (Berg 2000). This knowledge contributes to increased awareness as well as increased need to study more about the roles of individuals in specific language learning contexts. For example, we can observe learners as they use various functions to communicate with different interlocuters to better understand how they negotiate and navigate these spaces. This enhanced understanding will help us to design better software as well as better learning experiences. We can anticipate great improvements in this area in the future.

However, HCI currently only captures a fraction of the activity that is beneficial for those of us interested in understanding the future of educational technology. There are many aspects of human behavior that relate specifically to language learning, learning environments, learning tasks, and other characteristics that inform language pedagogy. These are beginning to be addressed by educational technology researchers across a wide spectrum. Our future applications of educational technology will be informed by a more sophisticated understanding of HCI focused upon specific teaching and learning contexts. Perhaps the environment that is most dependent on a thorough understanding of HCI is VR.

Virtual Reality

One of the most obvious future trends in social media is the integration of VR. Ever since the Occulus Rift first generation 3D goggle company was purchased by Facebook, observers have anticipated a dramatic shift in this direction. Of course, many other 3D goggles have been released since and these devices are becoming fairly commonplace. While many developments in VR are constructed around the use of goggles such as this, others are constructed within customized VR spaces that can be utilized simultaneously by multiple participants. Reshad et al. (2017) describe a simulation experience that engages students in virtual business experiences. Such projects allow participants to be immersed in any actual or imagined environment that may provide contextual support the subject of instruction. For example, students preparing to be medical professionals can be immersed in an operating theater, emergency room or other contextually specific and demanding context. This immersion creates a sense of locus

that engages participants in authentic activities, including authentic social practices. Similarly, those studying a foreign language can immerse themselves in the target language context, resulting in demanding contextual social expectations that support authentic motivating opportunities. Yeh and Kessler (2015) outlined a number of pedagogical scenarios in which the use of social media can be greatly enhanced when used in conjunction with mapping software such as Google Earth, customized maps, geolocation, and big data aggregation. Designing lessons that rely heavily upon location using these tools adds depth and help contextualize the experience. While these current technologies offer much to educators, there is also much more to look forward to.

A Future of Possibilities

Throughout the history of educational technology, we have witnessed technological advances and identified ways to adapt or adopt these technologies for educational purposes. While the use of social media is already well established in educational contexts, largely due to the compelling social nature of the experiences associated with the participatory culture that it promotes, the integration of big data, AI, and other automated tools are likely to be much less familiar to educators and those who prepare them to teach. Readers may be surprised to learn how commonplace these technologies are in our daily experiences since they tend to function transparently for most users. As we have seen, the use of social media practices within academic contexts can promote greater engagement and motivation. Through the addition of big data, AI and VR-based simulation experiences we can customize materials to individualize and differentiate feedback while maintaining the sense of compelling engagement associated with participatory culture. Such participatory culture promotes more active engagement as well as a sense of belonging and increased motivation. Such practices have already become commonplace in the practices of social media-savvy organizations. Numerous examples across political and commercial domains may help us identify the potential for applications of such bots in education. There is a long history of automation seen as a threat to teachers, but this is consistently proven to be an exaggerated reaction. Nearly every day I come across another story of robots that will take over the jobs of teaching. At the time of writing this. a Google search with the words, "Fear robots teaching" resulted in 645,000 results. As you might assume, this indicates that we are on the

verge of significant developments in automation, including robots and a variety of digital instructional assistants. Future teachers should not fear losing their jobs to robots, but they will need to understand these devices and how they can use them to target changing individual student needs.

Such engagement is likely to lead to conversations that are deep, meaningful, and rewarding and encourage participants to explore different perspectives. Students and instructors are likely to get more involved in the discussion and address aspects that would otherwise be overlooked, ignored or even avoided. Of course, such meaningful discussion will not always be easy, safe, or comfortable. This is reflected in these authentic online communities as well. Thus, it is important that participants be aware of the potential for disagreement, frustration, and even flaming behaviors. These are realities that all educated and involved citizens should be familiar with already so it is a valuable aspect of this kind of educational practice. Rather than avoiding conflict in the classroom, we can benefit from addressing it directly and discussing how to effectively deal with such circumstances in other domains of our lives. After all, some have suggested that meaningful and transformational learning is most likely to take place when we engage in such discussion (Sidorkin 1996). Such practice can take place in these familiar online contexts or institutional sites that mimic these contexts. The associated tasks, practices, activities, and forms of social interaction can also take place in non-technology face-to-face contexts. The design of these contexts will certainly improve as we learn to use automation more effectively with our educational contexts.

More Sophisticated Automation

We have seen a variety of impressive developments in educational automation in recent years. Automation in education is often the result of AI, big data, and other advances in computing. It is logical to begin with text-based tools since they are so common. The ability to aggregate and mine textual data is growing exponentially as this area becomes more commercially successful. Companies such as Google, Facebook, and Apple are both envied and reviled for their impressive developments in these areas. Many of the same capabilities upon which these technologies are supported can be repurposed or adapted for teaching and learning circumstances. Such repurposing is a critical aspect of understanding the true potential of emerging educational technology practices. We can anticipate many new opportunities to automate aspects of the design of educational

experiences. Recognizing the opportunities and avoiding pitfalls as we navigate these new domains will be critical for teachers. Teachers will need to develop a basic literacy of instructional automation so they can make informed decisions about implementation. This awareness should help us to focus on the role of technology as a leveraging force within a system of learning. Within such a system, instructors, designers, and technology work in tandem. As our understanding and incorporation of these practices become more familiar and expected in educational contexts, we can anticipate that instructors and designers will begin to customize tools, materials, and experiences that harness a dramatically improved potential for learning. As these technologies become increasingly sophisticated and complex, the systems within which they exist will also become more complex. Thus, we will need to be able to develop a critical ability to navigate these new landscapes.

Future developments involving greater advances in big data gathering, more sophisticated methods of sorting through that data with AI, and the expansion of open educational resources will certainly challenge the profession. Those who are prepared for this future will find it much more navigable. They will also be likely to learn to take control over the design and function of the emerging technologies that best align with their context and approach to teaching. It will continue to be important to focus on social practices that support the exposure to and engagement with educational information, discussions, and engaging experiences. It will also be important to focus on the role of automation to increase access to information and refine results to better meet the interests or unique needs of specific individuals or groups. This teacher preparation will certainly be aided by the development of more accessible tools and resources to support these emerging technologies as they mature. This is a trend that we have witnessed repeatedly in educational technology. The teachers who embrace these new paradigms will likely be the educational leaders of tomorrow.

As we embrace these technologies and social practices that they support, we will certainly encounter ongoing developments that present new opportunities. These are likely to be even more dramatic than what has been presented in this chapter. Thus, teacher preparation needs to establish and maintain awareness of these developments and those who prepare teachers need to stay abreast of the potential of these changes. We should anticipate that there will be great demand for teachers who understand this landscape and the potential of these current and emerging technologies.

The current disparate and distinct educational technology preparation that teacher education majors are receiving is not adequate for the future we will face. This chapter outlines one path that we may follow. All other possible paths will also require that we do more to prepare future teachers for this emerging world. Such a focus does not need to be techno-centric. Rather, the focus should be on the social and experiential opportunities that these emerging technologies offer. Ideally, such preparation would strive to integrate technology use within extant teacher preparation contexts, allowing future teachers to develop their understanding and experience within a domain that is increasingly familiar and relevant to their ambitions. Integrating this preparation within these programs may help support teachers to experiment more with this rich and complex emerging world. One example on the horizon is the internet of things (IoT).

Internet of Things

Another emerging area of interest that is very connected to social technology practices is the IoT. Digital assistant devices such as the Amazon Echo, Google Home, and Apple Homepod represent the first generation of these devices, along with a variety of smart outlets, wall switches, lights, and thermostats with which these assistants are designed to interface. These devices allow us to expand our network beyond humans and bots to include the objects that surround us. We should expect to be deeply immersed in the use of these devices in the near future. Currently, manufacturers are embedding these devices in household refrigerators, thermostats, and automobiles. Of course, we already have the first generation of this on our smart phones in the form of Siri and OK Google. However, these offer only limited functionality. As we have already seen with the Amazon Echo and Google Home, we should anticipate that future iterations will be much more robust with many more options. Research into the use of IoT technologies is nascent, but some preliminary findings indicate that teachers are comfortable with these devices in the classroom and feel the IoT devices could allow them to access information more easily and have more time to focus on other important tasks (Incerti et al. 2017). We will definitely see improved functionality across the use of IoT tools that can access this data. We can also expect to have an increased ability to construct our own customized subsets of data that support specific activities, tasks, or needs of individualized students.

Conclusion

The Future Role of Educational Technology and Teacher Preparation

Perhaps the most important consideration when preparing for the future of education involves the evolution of teacher preparation. To make the most of these established and emerging technologies in educational domains, we need instructors and instructional designers who recognize the potential of these technologies and can apply them to specific teaching and learning contexts. There is a rich and diverse history in educational technology. Throughout this history, there has been an evolution of technologies, as well as pedagogical methods, materials, and practices. Recently, we have witnessed the emergence of social media and the participatory culture that has become so ubiquitous throughout society. Other trends such as crowdsourcing, data aggregation, and the use of geo-location technologies have created a variety of interesting and wholly unique opportunities for teaching and learning. There are also numerous automated tools that provide feedback and opportunities for interaction in varied and meaningful ways. In some cases, the interpretation of this feedback requires the intervention of instructors, but some can be utilized directly by learners. In some cases, these emerging technologies and the social practices they support are influencing how we communicate across society. The author believes these changes have been so dramatic (and we should anticipate this trend will continue) that they warrant significant alterations to the way that we design learning materials, activities, and spaces. We are only beginning to witness this evolution and it is not obvious how these tools and practices will change in the future. We should be conscious of these developments and reflect on how to prepare teachers to best integrate them into their instruction. We need to be rethinking how we prepare teachers to thrive within these emerging learning contexts.

We should also prepare for a future with much more active integration between teacher preparation programs and educational technology preparation. Currently, there is a very limited amount of exposure for those preparing to be teachers. With the extent and diversity of technological developments happening today and the pedagogical demands they present, it is critical that teachers are prepared more thoroughly and thoughtfully. We cannot simply expect them to recognize the role of these emerging technologies. We also cannot simply prepare them to be consumers of technology. To truly realize

the potential, teachers must be prepared to take charge of the technologies mentioned in this chapter. They need to be able to apply practical applications based on big data and AI to create instruction that specifically targets their students' unique needs. They need to be able to design experiences that integrate the richness of this data in ways that the students find to be relevant. They need to be able to experience learning within these contexts themselves in order to develop and empathy for the experience of their students. Most of all, they need to be prepared to understand, evaluate, and integrate future iterations of technology that will emerge throughout their careers. After all, they will be teaching decades after they leave our teacher preparation programs, and the rate of technological advancement is only accelerating. In short, we need to prepare teachers for the future not for today. Such preparation will be invaluable. Hopefully, the field of education will recognize the need to embrace these various developments. Other disciplines are already embracing these trends. For example, political science professional organizations are hosting events such as the 2017 University of Sheffield event titled, "Automated social media bots and the non-human: opening a dialogue between political communication and science and technology studies." Hopefully, we will see similar events in the near future with a focus on the realm of education.

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