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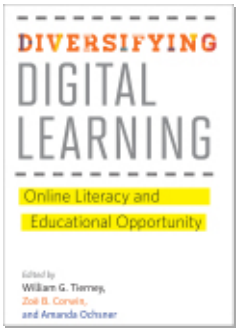
Tierney, William G., Corwin, Zoë B., Ochsner, Amanda



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CHAPTER FIVE

Reimagining STEM

Catalyzing Digital Media and Learning for Civic Engagement

S. CRAIG WATKINS

Participation in the digital world continues to evolve in ways that are difficult to predict. For example, today black and Latino youth are just as likely as their white and Asian counterparts to go online (Rideout, Foehr, & Roberts, 2010). Moreover, black and Latino youth are increasingly likely to spend more time using social or mobile media (Lenhart, 2015). These are just two of the many trends that point to the remaking of the digital landscape. But even as a greater diversity of young people are using digital media than ever before, not all forms of digital media participation are equal. The media practices of black and Hispanic teens continue to be influenced by race/ethnicity, class, and schooling.

In this chapter, I focus on a specific feature of youth digital media culture: the opportunities to learn and develop a civic voice with technology in the formal schooling environment. Since 2005, computers and the Internet in US schools have expanded significantly. As a result, the media and technology lives of students from lower-income households have changed in some noteworthy ways. By 2005, students from economically disadvantaged homes were just as likely as students from affluent homes to attend schools with Internet access (Wells & Lewis, 2006). The diffusion of technology in class-

rooms raises important questions about the learning opportunities available to students.

Future-oriented narratives about schools and learning are overwhelmingly preoccupied with the challenges of preparing young people for the formal economy. Educators typically emphasize the cultivation of STEM (science, technology, engineering, and math) literacies. This is driven in large measure by economic forecasts that predict that the most robust employment opportunities in a knowledge-driven economy are in the STEM sector (Langdon, 2011). But as Keri Facer (2011) explains, "The idea that this is all that education should be concerned with, or even that preparation for the formal economy should be the pre-eminent function of education, is highly debatable" (p. 3). This chapter shifts the focus on learning and education to a different terrain—the civic education of young people and the development of their civic voice.

More specifically, the discussion below draws from an ethnographic study of a high school game design class that attempted to construct game creation as a pathway to new learning and civic futures. In addition to leveraging digital media and learning for economic opportunity, how can digital media and learning be catalyzed for civic opportunity? I also explore the challenges that resource-constrained schools encounter when they incorporate ideas and technologies that are intended to foster student creativity, digital literacy, and civic agency and voice.

Schools and the Civic Opportunity Gap

To frame my analysis of the game design class, I consider the work of education scholar Jeannie Oakes (2005). According to Oakes, the institutional practices developed by schools structure the opportunities that students have to learn. Importantly, these institutional practices vary by schools and the resources that are available to teachers and students. As more schools embrace technology and its presumed benefits as pathways to "21st century learning," a key question emerges: how do the institutional practices of schools shape digital media and learning opportunities? Not all opportunities to learn with digital media are equal. Thus, what students actually learn in their engagement with digital media varies significantly by the kinds of resources (e.g., curriculum, technical) that schools can provide.

Oakes situates her analysis of educational inequalities this way: "What happens if different kinds of classrooms systematically provide students with different kinds of learning experiences?" Further, she asks: "Do these differences

mean that some students have greater opportunities to learn than others?" (2005, p. 94). When Oakes compared students in high-privileged and higher-track classrooms to students in low-privileged and lower-track classrooms, she found that the former benefit from many factors (i.e., high-quality instruction, more time on task) that enhance their opportunities to learn. While Oakes focuses on opportunities to learn conventional academic content, her provocations open up a space to think about other forms of learning and development that schools facilitate, such as the opportunity to cultivate the civic knowledge and competencies of students.

Among the institutions that prepare young people for civic life, none may be more important than schools (Gibson & Levine, 2003). While schools are generally viewed as places for academic training, they can also be fertile terrain for cultivating civic knowledge, civic attitudes, and civic behaviors among adolescents (McLeod, Shah, Hess, & Lee, 2010). Schools provide civic education through formal and informal learning. In the formal learning context, schools promote the development of civic education and civic attitudes through academic courses and service-learning opportunities that encourage community involvement. In the informal learning context, extracurricular activities like student government embolden students to take an active role in the life and governance of their school.

Unfortunately, not all students have access to learning opportunities that support civic-mindedness and civic engagement (Corporation for National and Community Service, 2005). The educational disparities in the US educational system are well documented (National Commission on Excellence in Education, 1983). These disparities, however, stretch far beyond the traditional academic achievement gaps such as standardized test scores, enrollment in advanced classes, graduation rates, or four-year college enrollment. These disparities also limit the opportunities for many students to cultivate a wider variety of skills such as twenty-first-century literacies (Partnership for 21st Century Skills, 2008), new media literacies (Jenkins, 2009), and civic literacies (Youniss & Levine, 2009).

In their study of high schools, Joseph Kahne and Ellen Middaugh (2009) found that students who are academically successful and those with parents of higher social and economic status receive more classroom-based civic learning opportunities. Kahne and Middaugh write that, "rather than helping to equalize the capacity and commitments needed for democratic participation, [schools] appear to be . . . providing more preparation for those who are already likely to attain a disproportionate amount of civic and po-

litical voice" (2009, p. 43). In addition to lacking access to high-quality instruction (US Department of Education, 2002), rich curricula, and meaningful opportunities for academic-oriented learning, lower-income students may also lack access to the classes and extracurricular opportunities that develop civic competencies (Levinson, 2010). Researchers call this the "civic opportunity gap."

The effects of the civic opportunity gap are significant. Most measures of civic and political activity suggest that groups from higher social and economic standing are more likely to participate in civic and political activities (Levinson, 2010). Young people who participate in civic and community-related activities are more likely to participate in civic and political life as adults (Flanagan & Levine, 2010). They are also more likely to develop a greater sense of political efficacy, a key predictor of civic engagement (Levinson, 2010).

Youth from resource-constrained communities are not disinterested in civic life. A survey of older teens and young adults by Cathy Cohen and Joseph Kahne (2012) provides evidence that youth from diverse racial and ethnic backgrounds are involved in what they describe as "participatory politics." This is a reference to "interactive, peer-based acts through which individuals and groups seek to exert both voice and influence on issues of public concern" (Cohen & Kahne, 2012, p. vi). Examples of participatory politics include starting a new political group online, circulating political or civic-related information via a website, or forwarding a political video to one's social network.

Black youth, Cohen and Kahne report, were much more likely than their white, Asian, or Latino counterparts to have engaged in some form of civic activity in the form of online politics, institutional politics, or voting. While Latino youth may vote less than their counterparts, they may be especially engaged in informal civic activities related to improving their communities (Cohen & Kahne, 2012). Recent youth-driven civic initiatives like the DREAMers (Zimmerman, 2012) and Black Lives Matter (Kang, 2015) illuminate how Latino and African Americans are identifying alternative spaces and resources for catalyzing their civic voices and imagination beyond more conventional civic pathways.

Still, sustained forms of youth civic engagement usually occur in the context of institutions—schools, faith-based organizations, and youth groups (Eccles & Gootman, 2002). Schools, for example, are a unique and vital institution in the lives of resource-constrained communities. Schools connect

students to an assortment of resources that may be difficult for them to access, such as technology, institutional forms of social capital, and enrichment activities (Watkins et al., forthcoming).

Schools and Youth Civic Voice

In this chapter, I consider some of the specific challenges that schools face in developing the civic voices of young people. Peter Levine defines political voice as "behavior that expresses a point of view" (2007, p. 50). A key aspect of this type of expression, Levine notes, is to assert some type of influence in the political or public sphere. Nick Couldry describes voice as the ability of humans to "give an account of themselves and of their place in the world" (2010, p. 1). But, Couldry warns, being able to speak or give an account of your life is not enough. In addition, how voice is valued or not valued is important. Couldry maintains that the landscape in which people speak also matters. Thus the sociology of voice, that is, the social structures and institutional practices that shape the making and recognition or unmaking and misrecognition of voices is important to understand.

Among the institutions that give both form and recognition to the voices of teens, none may be more important than school. In addition to teaching students basic literacy skills, schools are a laboratory for the cultivation of other kinds of skills, including civic. Schools can play a powerful role in fostering or inhibiting student voices. Historically, schools have rarely recognized the voices of students or the accounts that they give of themselves and of their place in the world. Students have typically been socialized to be quiet and acquiescent, and schools expect students to mute their voices in deference to institutional norms and authority. People's voices tend to count only when their bodies matter and are valued (Butler, 1990). Consequently, the institutional constraints that schools impose may be even more severe for those students who are stigmatized, for example, as "lower-income," "disadvantaged," or "at-risk." Students who are designated as "English language learners" may literally be rendered voiceless because of cultural and linguistic barriers.

One way of thinking about the implications of the civic opportunity gap in schools is how this specific institution recognizes and, as a result, enables and validates certain voices and not others. Couldry adds, "Having a voice is never enough. I need to know that my voice matters" (2010, p. 1). In our discussions with students who resided on the academic edge at Freeway High School, there was a sense that teachers did not believe that they were capable of high-level achievement or value their voice. Moreover, these students were

not active in traditional school leadership organizations like student government or journalism. As I discuss below, our work with students was a unique effort to find a space (the games class) and a resource (digital media) to have their civic voice heard and recognized.

The Study Site and Research Methods: Freeway High School

This chapter is based on a yearlong ethnographic study that was conducted at Freeway High School, located in the suburban fringes of Austin's growing entrepreneurial and technology-driven economy (Straubhaar, 2012).[1] During our fieldwork more than 2,200 students attended Freeway. The student population was predominantly Latino (48%) and African American (24%), but Asian (13%) and white (11%) students were also represented. English language learners represented about 11% of the student population.[2]

The racial and ethnic academic achievement gaps at Freeway were consistent with longstanding patterns. For example, Asian (57%) and white (43%) students were more than twice as likely than Hispanic (20%) or black (15%) students to have taken at least one Advanced Placement or International Baccalaureate examination. White (71%) and Asian (66%) students were substantially more likely than Hispanic (39%) or black (38%) students to be college ready in English language arts and mathematics. English language learners (71%), Hispanic (83%), and black (88%) students were less likely to complete high school in four years than their Asian (93%) and white (91%) counterparts.

Our yearlong immersion in the school provided an opportunity to gain better perspective of the role that digital media plays in the formal and informal learning environments of teens in underresourced schools. Similar to a large percentage of schools across the United States, Freeway and its students had access to technology. Despite broader access to technology in US schools, the learning outcomes associated with technology vary. For example, students in lower-income schools are less likely to experience instructors and curricula that provide access to more cognitively rigorous tasks and computer-based skills (Margolis, Estrella, Goode, Holme, & Nao, 2008).

Our research team received approval to study three classes, which included two Advanced Game Design courses and a technology applications course. We used mixed-method ethnography that included participant observations, stakeholder interviews (e.g., educators, administrators, and parents), and in-depth interviews with students throughout the course of the academic year on a variety of topics, including, for example, use of social

media, academic disposition, civic engagement, and home life (Hatch, 2002). In this chapter I focus on the field research that we conducted with one of the game design courses.[3] Finally, our research team asked for and received permission to get involved with the classes by coordinating a game design project that allowed us to work side by side with students. As a result, we were not simply onlookers in the classroom; we were also participants.

Doing Civic Engagement: Rethinking the Games and Learning Model

The interest in games as a viable resource for deeper and more engaged forms of learning is growing (Squire & Jenkins, 2004). A number of learning principles have been identified in the architecture of games. These include the ability of games to foster situated learning (Gee, 2004), engagement, experiential learning, hypothesis testing, and problem solving (Gee, 2007). As a result, games are perceived as a catalyst for the development of "21st century skills" such as critical thinking, communication, and innovation (Partnership for 21st Century Skills, 2008).

The growing emphasis on STEM encourages K–12 educators to embrace more future-oriented curricula, including the adoption of games. There are many definitions of game-based learning, but this definition by the Institute of Play (2014) is clear-eyed and consistent with the approach that we took with Freeway students: "A learning approach that emphasizes engagement, learning by doing, collaboration, reflection, iteration, frequent feedback and sharing. The approach structures learning activities around real-world or fictional challenges that compel learners to take on a variety of roles as they actively identify and seek out the tools and multi-disciplinary information they need to generate solutions."

The definition above suggests that game-based learning is not simply about mastering a specific technical (e.g., coding) or creative (e.g., art design) skill. Moreover, the definition suggests that making a playable game is not necessarily a main goal of game-based learning. Instead, robust game-based learning settings situate opportunities for the development of a wide range of competencies, including the ability to seek out the appropriate information, tools, expertise, and skills necessary to address challenges through innovation. Our team took a similar approach to game-based learning. While it was important that students developed media assets that could be translated into a game, the learning outcomes that we emphasized stretched beyond producing a game artifact.

In the discussion below I focus on one aspect of the Institute of Play definition: "the structuring of learning activities around real-world challenges that compel learners to take on a variety of roles as they actively identify and seek out the tools and multi-disciplinary information they need to generate solutions."

For instance, we believed that game design presented the opportunity to situate thinking about a real-world problem—we chose childhood obesity—in a unique context that invited students to develop a probing mind and take on multiple identities such as researcher, artist, and designer. Our goal, in many ways, was not so much about cultivating game makers but critical thinkers and civic innovators. The project was an opportunity for students to establish a point of view or "give an account of themselves and of their place in the world" on matters related to food and social justice.

The approach that we took to games and learning in our work with Freeway students emphasized community engagement and, further, reflects the medium's ability to engage a variety of social and human experiences. Game designer and scholar, Ian Bogost (2011) urges us to begin thinking about the many different uses of video games and, in his words, "how together they make the medium broader, richer, and more relevant" (p. 7). Games, Bogost claims, "have seeped out of our computers and become enmeshed in our lives" (p. 3). Bogost offers this intriguing probe: how to do things with video games. Accordingly, as games become more enmeshed in our schools, educators must carefully consider how to do education—academic and civic—in more dynamic ways with the medium.

There is growing consensus that games can serve as a pathway to engaging core academic literacies in STEM, but games also present unique opportunities to reimagine how young people develop civic voices and new ways to enact those voices. Insofar as game creation encourages designers to create distinct stories and storyworlds, it also establishes the opportunity to think about alternative civic futures.

At Freeway we established a learning environment that encouraged students to *do something* with games, such as using the game creation process to think deeply and critically about the health and well-being of their community through the design and production of civic media. Researchers at Emerson University's Engagement Lab define civic media as follows: "the technologies, designs, and practices that produce and reproduce the sense of being in the world with others toward a common good . . . the civic in civic media is not merely about outcomes, but about process and potential"

(Gordon & Mihailidis, 2016, p. 2). This definition captures key aspects of our work with students. First, our goal was for them to create game-based media that provided an instrumental benefit to their community such as greater cognitive awareness of their food environment. Second, the game-based assets that they created were not the end goals of the project. Finally, we viewed game creation in this instance as an opportunity for students to express their civic voice and also be heard in the context of an influential institution like school.

The Civic-Centered Design Classroom

As part of our work with Freeway students we decided to introduce them to some of the principles and techniques associated with design thinking to spark inquiry-driven and civically engaged game making. A growing number of design professionals and educators are making a case for bringing design thinking into the K–12 environment (IDEO, 2012). Chris Pacione, director of the LUMA Institute in Pittsburgh, believes that design should be as pervasive in our schools as reading, writing, and arithmetic. Pacione (2010) lays out the case for how design literacy or "pervasive competency in the collaborative and iterative skills of 'looking' and 'making' to understand and advance our world" could represent a breakthrough moment in the history of common literacy.

While the naming of the core design principles may vary across practitioners and educators, there are three main elements that best characterize the insertion of design thinking into the K–12 setting: Looking, Understanding, and Making (LUMA Institute, 2012). *Looking* involves a series of methods intended to facilitate the observation of some aspect of human behavior or experience. In our project with Freeway students, for example, we asked students to take a thorough look at their food environment. *Understanding* represents methods for synthesizing and summarizing knowledge through identifying patterns. After looking at their food environment we asked students to identify some of the salient trends and their impact on community health. Finally, *Making* is an especially important element and typically involves building prototypes that manifest ideas and future possibilities in tangible forms. We asked students to translate their understanding of the food environment into media content for their game that also met compelling community needs such as awareness, education, and behavioral change.

Drawing from a series of interviews with executives from the LUMA Institute, I modify their definition of human-centered design to propose what

our team calls *civic-centered design* (LUMA Institute, 2012). More specifically, civic-centered design is "the discipline of generating solutions to community-based problems and opportunities through the act of making 'something' new, where the activity is driven by the needs, desires and context of the people for whom the design is intended to support or empower in some meaningful way."

The core elements of civic-centered design align with the idea that robust academic and civic outcomes are possible when civic education is inquiry-based not rote, hands-on rather than abstract, production-oriented rather than test and memorization heavy, and situated in a broader universe of experience and expertise rather than the four walls of a classroom. Many researchers in the domain of youth and civic engagement agree that young people best develop civic-mindedness through action-oriented activities (Eccles & Gootman, 2002). We subscribed to the view that by connecting game creation to their everyday lives the learning experiences of students would be more relevant and impactful.

The civic-centered design classroom differs from more traditional classrooms in several ways. In the traditional classroom learning is vertical and memory-driven. More specifically, knowledge and information are dispensed in a top-down fashion, insofar as teachers are positioned as the exclusive source of expertise in the classroom. By contrast, learning in the civic-centered design classroom is horizontal and inquiry-driven. That is, knowledge and information flow in multiple directions from teacher-to-student, student-to-student, and even student-to-teacher. In the traditional classroom learning is memory-driven. As a result, assessment is typically based on how well students can memorize classroom facts. In the civic-centered design classroom learning is inquiry-driven. Assessment is based on how well a student can probe a community-based challenge and develop innovative solutions. Whereas the traditional classroom situates learning as a linear path to mastering already established facts, the civic-centered design classroom situates learning as a messy journey to discovering knowledge and the capacity for change.

The civic-centered design classroom also establishes the conditions for the formation *and* recognition of student voice. The very design of the traditional classroom—teacher-driven, top-down, and memorization of facts—closes down the opportunities for most students to cultivate a distinct voice or point of view. Indeed, there can be no voice if students are not able to engage in inquiry, discovery, and knowledge production. In the case of our

project, student voice emerges in the form of giving a unique account of food and social justice issues in their community through the medium of game design.

Predictably, we found ourselves bumping up against the tensions between these competing notions of schooling. At Freeway, like most schools, the civic-centered design model opposed virtually every definition of schooling and learning familiar to students and teachers alike. As a result, the integration of civic-centered design techniques was not easy.

The Design Challenge

One way of addressing the civic opportunity gap is to create environments that elicit civic behavior (Hart & Kirshner, 2009; Levinson, 2010). What kinds of community institutions promote youth civic knowledge, mindedness, and voice? We experimented with a studio space that provided students access to computers, cameras, tablets, and various software. In addition, the space offered access to learning and media production activities that were social, collaborative, and intentionally designed to engage the local community. We aspired to help students develop the skills and disposition to see themselves much like designers see themselves: as agents capable of imagining and creating change. From a research perspective we wanted to explore how civic-centered design helps catalyze new ways of recognizing youth voice and doing community engagement.

In the game design class students were expected to create simple games with the classroom software. The instructor gave students the option to work with our project or pursue their own individual game design project in the class. Among the 21 students, roughly half, 10, chose to work on our project. Our design challenge required students to build a game that addressed the issue of childhood obesity. We chose this topic for three reasons. First, Freeway was located among a list of zip codes populated by youth from lower-income Hispanic, African American, and immigrant households. Children and teens from these areas were disproportionately more likely than teens from white, Asian, and affluent zip codes to be obese for a variety of reasons, including geography, income inequality, and food desert conditions (Centers for Disease Control and Prevention, 2013). Second, because childhood obesity intersects with a mix of academic subject areas including science (e.g., biology), health (e.g., nutrition), and social studies (e.g., social inequality), we concluded that the project could support the development of academic skills

such as inquiry, writing, and analysis. A series of prior discussions with the teacher and the district officials led us to select a project that could model how game creation could intersect with more traditional academic courses and learning activities.

Finally, we wanted to select a topic that facilitated an opportunity for students to experience real-world engagement with their community in the design of their game. The very neighborhood that students lived in could serve as an effective setting for catalyzing youth civic engagement, media making, and voice. As Hart and Kirshner (2009) explain, "clear, present, and compelling issues are more likely to engage adolescents in civic and political activity than are complex concerns" (p. 107). Thus, we hypothesized that students could see how issues of food, social inequality, and childhood obesity converged with social justice issues to affect their community.

While game creation was an aspect of the challenge, the primary aim was to encourage students to see games as a medium for cultivating greater knowledge and a more audible voice in their school and in their community. From our perspective the game design process was as much about developing a disposition for critical thinking, civic media making, and community engagement than it was for creating a playable game. As a result of these expectations our learning outcomes included some nontraditional metrics such as:

- the ability to give a critical account of their food environment and of their place in it
- the ability to translate ideas about their food environment into creative content and civic media
- the ability to integrate aspects of their world into the game and story that they created
- the ability to advocate for a healthier food environment

Next, I discuss two specific civic-centered design techniques that we introduced to the students and how the techniques established opportunities for civic education, creative action, and civic voice. The first example illustrates the possibilities of civic-centered design to tap the creative and critical thinking capacities of students from lower-income schools. The second example illustrates the perils that resource-constrained schools face when educators tinker with nonconventional learning techniques. The implication for developing and recognizing student voice are also considered.

Pathways to Youth Civic Voice: Leveraging Student Expertise

One of the first civic-centered design exercises that we adopted was affinity mapping, a graphic technique that allows designers to sort seemingly disparate ideas into ordered patterns and categories (Gray, Brown, & Macanufo, 2010, pp. 56–58). We chose this technique because it encouraged students to reflect on their environment and to identify several factors related to childhood obesity, which is a complex social and public health problem. Further, affinity mapping allowed students to organize a lot of information and ideas quickly and into categories that could facilitate understanding and making. The maps identified emergent patterns and themes that could become the building blocks of their game. The exercise was also an opportunity for students to, quite literally, form a decidedly civic voice.

We divided the students into two teams and prompted them with this question: what factors contribute to the childhood obesity epidemic? Each student received several post-it notes to write or draw their ideas. It took them a few minutes to get started, but once they gained momentum the students generated several ideas. Group One had a fast food motif. Several team members drew McDonald's arches or identified the fast food giant as a major factor in childhood obesity trends. Some of the students referenced how pervasive fast food is in their neighborhood and around the school. "They are everywhere," one student quipped.

The group made a number of thoughtful connections. For instance, one student noted that "video games are a reason for obesity." Another student responded, "but wait there's a difference between button-mashers and Wii Fit, so that might not be exactly true." During the exercise students became quite vocal as they proceeded to identify many factors related to childhood obesity.

Group Two also generated several responses to the prompt. They drew pictures of food and restaurant chain logos. McDonald's was also a prominent topic of conversation in Group Two. One student remarked, "Not lovin' it!" which was a play on the hip-hop-inspired jingle "Lovin' It" that was widely used in McDonald's global marketing and branding campaigns.

After ten minutes we asked each team to post all of their notes on a large board that was visible to both groups. The students produced a long list of factors, generating enough sticky notes to fill four large poster sheets. Next, we asked them to find patterns and to discuss the relationships among the ideas that they captured. Then we asked them to sort the notes into clusters.

TABLE 5.1.
Results from Affinity Mapping Exercise

Group 1	Group 2
Fast food	Family
Society	Media
Family	Lifestyle
Lifestyle	Food
Technology / Video games	Psychological
Bullying	
Conspiracy	

The idea was to begin mapping patterns that could be organized into distinct themes and related groupings.

What patterns emerged from the students, and what did these patterns suggest about their understanding of childhood obesity? Moreover, how did this exercise create a different kind of landscape for valuing and recognizing student voice? After some additional sorting and negotiating with their fellow team members, the teams generated two clusters.

The affinity mapping exercise accomplished three things. First, the clusters provoked conversation and recognition of some of the factors that impact childhood obesity trends. Students were encouraged to begin making connections to their own lives, homes, and community. In other words, the exercise was an opportunity for students to articulate their understanding of the world. Second, the exercise reaffirmed our belief that the civic-centered design classroom can provoke a questioning disposition among students. The exercise sparked several questions: Should this be a game about fast food? Is this a game about the home food environment? Should the story encourage players to think about family, behavioral, and lifestyle issues? This was precisely what we wanted to achieve, that is, for students to use civic-centered design to interrogate the possible causes of childhood obesity and build a game-based story that expresses a point of view regarding the health of their community.

Finally, the affinity mapping exercise offered powerful insight into the mindset of the students and their thoughts about childhood obesity. We discovered that these were issues that some of them had thought about previously. Many of the students demonstrated a critical disposition in their consideration of childhood obesity. Some of them mentioned films like *Fast Food Nation* and *Food, Inc.* Health researchers in the United States consistently connect childhood obesity trends to class, education, geography, and race and ethnicity. When prompted to identify factors associated with the

health epidemic, our students identified many of the same factors and made specific connections to their neighborhood.

The affinity mapping technique underscores an important element in initiatives designed to spark youth civic voice and engagement: the need to move from a "deficit model" to an "asset model." In the former, youth community engagement programs are designed to address certain problems associated with "at-risk" youth, whereas programs in the latter, asset model, are designed to build on young people's strengths and capabilities (Eccles & Gootman, 2002). The asset model invites young people to share their skills and expertise to benefit the learning environment. In addition, the asset model leverages the unique perspectives and insights that students develop and highlights their capacity for making unique and substantive community contributions.

Barriers to Youth Civic Voice: Navigating Complex Social Lives

A key element in the civic-centered design classroom is the idea that learning can and should happen in the community. It is critical, then, to create environments that empower students to engage academic content in nonacademic settings including the home, neighborhood, and peer ecology. Because we wanted students to incorporate aspects of their world into the game that they created, we decided that it would be important for them to document their world. To execute this aspect of the project we asked students to use Google Docs, a free collaborative software tool, to share any ideas, reflections, or media that commented on their wider food environment. In addition, we wanted to establish an environment in which student learning, voice, and game creation was social, networked, and community-based.

From our perspective, this element of the project would create an opportunity for students to share ideas, collaborate away from school, and incorporate aspects of their world into the design of their game. For example, we believed that students could capture photos of their home and local food environment or interview peers and family members to inform their understanding of childhood obesity. However, we quickly discovered that the idea of working with collaborative online documents outside of class was essentially off-limits for many Freeway students.

The task wrongly assumed that all students have reliable broadband home Internet access and upgraded computers to participate in this form of net-

worked learning and academic engagement. Despite the broader adoption of Internet-based technologies, especially via mobile devices, youth from lower-income homes are much more likely than their counterparts in higher-income homes to live in households that do not offer access to broadband Internet (Horrigan, 2015). If only a few students live in homes that are equipped to support networked learning, then the opportunities to grow their knowledge through out-of-class engagement are severely weakened. Some researchers refer to this as the "homework gap" (Horrigan, 2015). Many of the students, we discovered, did not have experience with online and collaborative software applications.

Second, the assignment assumed that all students lived in a home environment that supported out-of-school engagement with school assignments. In several cases familial and financial reasons thwarted students' ability to expand formal learning beyond the classroom. Some students, for example, were expected to watch over younger siblings after school, while others took on jobs that provided their families much-needed financial assistance. The home lives of children vary across race, ethnicity, and class. These differences have serious implications for student lives and the opportunities available to them (Lareau, 2003). Children from lower-income or immigrant households may take on the role of brokers or adult-like responsibilities that help maintain familial stability (Katz, 2014). Consequently, their capacity for participating in out-of-school or extracurricular activities may be limited.

In order for community-engaged forms of learning to thrive, the conditions must be established across multiple settings, including, for instance, school, home, and the local community. When one or more of these nodes fails to effectively provide the resources and the opportunities for academic engagement, the prospects for cultivating more dynamic forms of learning, civic engagement, and civic voice are undermined.

The effort to link the students' learning and game creation practices to activities outside of the classroom via more informal modes of information gathering and knowledge production is, in theory, a good idea. However, for many of the students that we worked with, engagement with academic learning was primarily a school-based activity. Hence, the idea that they would work on the game project at home, on the weekend, or via online networks was largely outside the scope of the learning norms and habits that had been established at school or at home. It is crucial to note that learning

norms and habits are social, not inevitable. It is not that Freeway students were incapable of more distributed forms of academic engagement; they simply had never been expected to do so. Additionally, financial and familial circumstances made this form of academic and civic engagement difficult to achieve.

This particular obstacle underscores the challenges that schools in resource-constrained communities face when they adopt civic-centered design techniques. In addition to grappling with internal challenges such as inadequate instructional and curriculum materials, schools are challenged by external factors such as home environments that struggle to sustain the resources that support academic engagement outside the classroom. Economic disparities are consistently identified as a major influence on academic outcomes (Duncan & Murnane, 2011). As we learned, economic disparities also influence the academic opportunities available to students, including the opportunities for civic-related educational experiences and the making and recognition of student voice.

Conclusion

In the example discussed above, Freeway students embraced the opportunity to pursue more creative and academically oriented pathways to civic education. They identified a number of factors related to childhood obesity, including many that are frequently cited by research and medical professionals. Their openness to civic-centered design suggests that students who are labeled as "disadvantaged" or "at-risk," for example, are capable of more rigorous creative and cognitive tasks when provided the opportunity. This was one of the few opportunities in the context of formal schooling in which students were encouraged to express their voice *and* be recognized for doing so. Schools, generally speaking, are not designed to recognize, empower, and validate student efforts to "give an account of themselves and of their place in the world." This is especially true when the voice is from bodies that, historically, have been marginalized and seldom valued by educational institutions.

These same students struggled to engage the design challenge outside of the classroom. This was evident in the inability of students to use collaborative software to generate and share ideas related to their project when they were away from the classroom. The constraints that we encountered underscore the challenges that resource-constrained schools face in their adoption of new learning futures and their ability to close the civic opportunity gap.

As technologies like games are established as a part of the schooling environment, educators must think carefully about how learning can be transformed and student voice amplified. When media technologies like games are adopted primarily to teach students technical skills or as preparation for entry into the paid labor force, the prospects for expanding learning to other domains of competency—civic learning, critical thinking—are overlooked. Along with the adoption of technologies in the classroom, teachers and administrators must be more creative and purposeful in the design of the curriculum and the learning outcomes that they establish for students.

One of the conclusions from our yearlong ethnography is that schools tend to invest in a limited vision of digital media and learning. The very adoption of new technologies—games, the Internet, mobile devices—is often viewed as a sign of progress and new learning futures. This, in our view, is a mistake. In other words, progress should not be measured in terms of how much technology schools acquire but rather how technology is used as a platform for critical thinking, media making, and civic voice.

Based on our work with Freeway students, we strongly believe that civic-centered design can inspire learning that is experiential, production-oriented, and connected to the everyday lives of students. Civic-centered design requires students to exhibit greater agency in their own academic development and opens up the classroom to richer and more meaningful opportunities to do community engagement. Students are encouraged to ask questions and to speak. The creation of civic media, for example, reflects the innovative use of technology to mobilize and validate youth civic voices.

Typically, the incorporation of technologies like games or disciplines like design into the K–12 curriculum reflects the broad push to develop the STEM literacies of students. The emphasis on STEM is a response to several factors, including a changing occupational landscape (Levy & Murnane, 2004), skill bias technical changes in the labor market (Goldin & Katz, 2008), and concerns about America losing ground in the global race for supremacy in education, technology, and innovation. However, the focus on STEM comes at the risk of eclipsing the consideration of other kinds of skills, including, for example, the development of civic knowledge and civic behaviors. In addition to leveraging digital media and learning to expand the economic opportunities available to young people, schools must address how digital media and learning can expand the opportunities for students to participate in the civic life of their communities and be heard.

NOTES

1. Freeway High School is a pseudonym for the school where we conducted our ethnographic study.

2. All school demographics were collected from the school district and the Texas Education Agency and are based on the year that we conducted our study.

3. Two members of our research team attended the game design classes weekly for an entire year and kept meticulous fieldnotes. In addition to the in-depth interviews, the duration of the fieldwork established the opportunity to conduct participant observations and analyze the artifacts that students produced.

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