Video Games, Gender, Diversity, and Learning as Cultural Practice

Implications for Equitable Learning and Computing Participation Through Games

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Games, play, and learning have a long and embedded history that outdates digital games by many years. However, video games, computing, and technology have significant and historically documented diversity issues, which privilege whites and males as content producers, computing and gaming experts, and STEM learners and employees. Many aspects of culture and formal education reinforce these dynamics, from who is supported to play to who comes to produce online content for leisure or employment. However, both supportive communities and culturally responsive pedagogies offer evidence of and strategies for equitable design and learning. Herein the author presents research demonstrating that learning is culturally situated in game playing and making, and further presents strategies for designing or integrating games for equitable and inclusive learning.

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Introduction: Games, Play, and Meaningful Learning

Learning theorists and scholars have made connections between play and learning for many years. For example, Piaget (1962) and Vygotsky (1967) are both credited with linking play to meaningful learning and development, and Montessori, Froebel, and Dewey saw play as an instrumental part of early childhood education, where scientific, mathematical, linguistic, and sociocultural learning could be fostered through construction, design, concept manipulation, and role playing (e.g., Rieber, 1996; Zuckerman, 2006). Montessori and Froebel further created physical manipulatives—such as blocks and shapes, yarn and fabric, and simple musical instruments—to help children construct their learning about the world through play. In modern times, constructionists, such as Papert, have created learning tools for computational manipulation that serve as "objects to think with" (Papert, 1980, p. 11). Through this work, we have seen the development of coding environments, such as LOGO, robotics and physical computing toolkits, such as LEGO Mindstorms, and block-based coding and game-making online communities, such as *Scratch* (Resnick *et al.*, 2009), with newer, more novice-friendly toolkits and online DIY communities continuously emerging (e.g., Grimes & Fields, 2012; Millner, 2010).

The same theoretical work that has underscored the important role of play and playful learning objects in knowledge creation and development can be linked to digital games, which have shown benefits for formal school learning and informal competencies that relate to formal learning trajectories. For example, playing digital games has been linked to increased spatial skills, understanding of history, scientific reasoning, civic engagement, and improved physical activity, when the game mechanics are well matched with the learning goals (e.g., Squire, 2011; Steinkuehler & Squire, 2014). Furthermore, most commercial games are structured around good learning principles (Gee, 2007)—albeit often unintentionally—and offer the potential for situated learning, collaboration, distributed cognition, critical thinking, problem solving, increased motivation, systematic thinking, and adaptive reasoning, which are important to 21st Century learning skills (e.g., Connolly *et al.*, 2012; Crane *et al.*, 2006; Jenkins *et al.*, 2009; Squire, 2011; Young *et al.*, 2012). In games, learners can apply knowledge beyond facts, in an environment where the cost of failure is often low, and a productive part of learning. Further, through communities of practice (Lave & Wenger, 1991), such as guilds and clans (Steinkuehler, 2004), and in affinity spaces (Gee, 2007; Hayes & Duncan, 2012), such as fan Websites and forums, players can learn with each other and serve as experts for authentic audiences.

Moreover, making games ("constructionist"), as opposed to playing already designed learning environments ("instructionist"), has been shown to benefit the learning of school curricula when learners have to construct that knowledge in their designs (Kafai, 2006). For example, Kafai (1995) found that along with curricular knowledge, designing games for learning helps children learn coding, design, art, and creativity, as well as various related skills and interests involved in software production.

Culture, Context, Games, and Learning

Underscoring most of the work on constructivist and constructionist learning through game play is the idea that we all learn through cultural practice. In fact, studies of analog game play—or the playing of cards, dice or dominoes, board games, and street games or sports (e.g., Goodwin, 1995; Guberman, Rahm, & Menk, 1998; Guberman & Saxe, 2000; Nasir, 2005; Nasir, 2008; Sutton-Smith, 1995; Zagal, Rick, & Hsi, 2006)—has a longer yet closely linked history to the study of learning with digital games. While similar findings have been highlighted for learning formal school content, this work makes a more distinct argument about play as part of learning through social and cultural practice. For example, scholars have found that playing dominoes—a game prominent in African American and Latino cultures—can help developmentally and culturally-responsively scaffold the learning of language-use, strategy, and mathematical thinking (Nasir, 2005), and hopscotch—a schoolyard and street game prominent among girls—can help develop strategic argumentation, dramatic role play, and rhetorical skills (Goodwin, 1995). Furthermore, the history of the board game Monopoly in the United States helps reveal the intricate relationship games have in teaching and transmitting cultural values: Elizabeth Magie, a staunch anti-Monopolist, created the Economic Game Company and designed the "Landlord's Game"—the original version of Monopoly—to teach about the economic principles of property ownership (Pilon, 2015).*

Digital games are an extension of traditional and analog games and play activities, primarily by providing "richly designed problem spaces" (Gee, 2008, p. 28) that are goal-driven but also more constrained. In other words, the designed experience is more of a "black box" (Resnick, Berg, & Eisenberg, 2000)—or a structurally closed system—than a game of hopscotch or *Monopoly,* where it is rather easy to reshape game mechanics and renegotiate the rules of play (see Albertarelli, 2000). This is not to say that players do not cheat or exploit digital game play, nor that players cannot "mod" games with external tools and code (because many do), but that it is a bit more complex. Rich "tech-savvy" identity building (Gee, 2007, p. 138) can be fostered by understanding a digital game well-enough to exploit its weaknesses (i.e., finding unintended shortcuts or flaws that help players gain an advantage) or by learning how to use external software, systems, and code to modify ("mod") game properties and experiences. In modern times, learning how to create a professional stream of game play, on *Twitch.tv*, for example, also helps cultivate technical skills and identities because of the myriad of software, hardware, coding, design, and broadcasting skills involved. Many of these activities can be used to help others, such as when players create downloadable character outfits and skins for *The Sims* (Gee & Hayes, 2010), or teach other players gaming skills or exploits (or conversely show developers system flaws) on forums, *Twitch*, or *YouTube*.

Many educational gaming scholars have been grappling with the affordances and constraints of digital games when it comes to culture, context, and diversity. Much of this work on diversity is often understood as an important potential cultural problem or an area of social difference, instead of an integral aspect of learning and cognition. In other words, while games can serve as useful tools for teaching cultural narratives (Rieber, Smith, & Noah, 1998) about society and social systems, and some (such as strategy, simulation, or open-world games) can allow learners to actively engage with and shape those representations (Squire, 2005), there can also be limitations. For example, while *Monopoly* can provide "an opportunity to participate in the drama of capitalism" (Rieber, Smith, & Noah, 1998, para. 23) and *Civilization* can provide "opportunities for…considering hypothetical historical scenarios" (Squire, 2005, p. 2), design decisions and embedded values (e.g., Flanagan & Nissenbaum, 2014) can both help learners gain insight into different social dynamics and reinforce harmful cultural narratives.

In other words, just as games can teach about the geographic and historical realities that shaped modern civilization, they can also teach entrenched stereotypes and bias. For example, Everett and Watkins (2008) critiqued what they coined "urban/street games" (most popularly, *Grand Theft Auto*) for containing "racialized pedagogical zones," which teach about race and ethnicity in a way where "gameplay's pleasure principles of mastery, winning, and skills development are often inextricably tied to and defined by familiar racial and ethnic stereotypes" (p. 150). Further, Lisa Nakamura's work on "identity tourism," dating back to early multiplayer games, such as text-based *Multi-User Dungeons* (MUDs), found that players tended to personify glaring gendered and racial stereotypes as well as "appropriate [a]…racial identity without any of the risks associated with being a racial minority in real life" (Nakamura, 1995, p. 184) which furthered racial/ethnic stereotypes.

In addition to the problematic ways that ethnic minorities and women are represented, which tends to either be highly stereotyped or hypersexualized (e.g., Behm-

* Magie later approached Parker Bros. to publish the game, which was originally rejected but released in its *Monopoly*-friendly version by Charles Darrow, who is now largely credited with stealing the idea.

Morawitz & Mastro, 2009; Dill & Burgess, 2013; Williams *et al.*, 2009), they are also underrepresented in digital games. Research finds that women and ethnic minorities make up less than 20% of playable characters, respectively (Williams *et al.*, 2009), even in games where players can choose their own ethnicity and gender (Waddell *et al.*, 2014). And the statistics for women of color are even worse, with most being secondary or non-playable characters, if they are represented at all (Children Now, 2001).

The Pipeline Problem?

Statistics on the gaming, computing, and technology industries paint a similar picture of underrepresentation. For example, African Americans and Latinos, respectively, make up 2.5% and 7.3% of the game-development industry (Weststar & Legault, 2015), though they tend to play games more than Whites (Rideout, Foehr, & Roberts, 2010), whereas East Asians and women make up 9% and 22%, respectively. While statistics are slightly better in Silicon Valley in general, all groups (except Asians) are still underrepresented compared to their population, especially in leadership and tech roles (Bui & Miller, 2016).

Many have characterized this as a pipeline issue. Statistics show that women and non-Asian ethnic minorities are less likely to take the high school AP computer science exam in the United States. For example, in 2013—the most recent year for which data has been provided by the College Board—20% of adolescent women, 3% of African Americans, and 8% of Latinos took the AP computer science exam, and many states had no representation at all (Heitin, 2014). These figures are somewhat on par with bachelor degree attainment in computing and engineering, where 20% of women and 20% of all non-Asian ethnic minorities are represented (NSF, 2015). However, reports indicate that more non-Asian ethnic minorities graduate with a tech degree than are actually hired; on the other hand, Asians are conversely overrepresented and Whites are close to equally represented compared to their degree attainment (Bui & Miller, 2016).

Educational scholars have long argued that schools differentiate resources and support along sociocultural and economic lines. For example, women and girls are less likely to be supported in STEM education at all levels (Hill, Corbett, & St. Rose, 2010; Margolis & Fisher, 2003), and African Americans and Latinos are more likely to attend schools with basic computer literacy curriculum as opposed to advanced computing and mathematics courses (Margolis *et al.*, 2010). In fact, Barbara Ericson, a senior research scientist at Georgia Tech who compiled the high school AP computer science exam data, noted that private schools and public schools in higher-income school districts, which tended to be suburban, were more likely to have AP computer science courses and administer the exam (Heitin, 2014). Furthermore, and paradoxically, Asian American students are more likely to be nurtured by teachers and peers in educational opportunities and success, and placed in the high-achieving track, regardless of past performance (though the "model minority" stereotype can also be limiting and isolating, particularly for struggling or nonconventional students) (Lee & Zhou, 2015). As explained by Ladson-Billings (1998) our implicit preconceptions continue to constitute "access to what is deemed 'enriched' curriculum" (p. 18), which is often disproportionately distributed along racial, ethnic, and socioeconomic lines.

Social Identities, Digital Identities, and Stereotype Threat in Gaming and Computing

Beyond simply a pipeline issue, research points to the prevalence of a digital identity divide (Goode, 2010). What was once a digital divide with a significant number of lower-income and ethnic-minority Americans without Internet access and high-powered computing technology has become a divide along social identity lines. For example, disparities in computer access and equipment historically made it more challenging for African Americans compared to Whites to engage in a variety of computing practices that can be fostered through games, such as modding (DiSalvo, Crowley, & Norwood, 2008). In other words, while some have had access to constructionist gaming activities, others have been mostly isolated to instructionist (or consumptive) gaming practices. Playful experimentation that can be fostered through digital games has been seen as important for building confidence and capability in computing and related careers (Kiesler, Sproull, & Eccles, 1985). And the social "culture of computing" (Kiesler, Sproull, & Eccles, 1985, p. 459) as male-oriented has long roots that continue to influence who is seen as knowledgeable and capable with computing, technology, and video games (e.g., Bryce & Rutter, 2003; Fron *et al.*, 2007), which occurs as early as kindergarten (AAUW, 2000; Cassell & Jenkins, 1998; Wilder *et al.*, 1985).

One way to understand how these social identities relate to digital identities is social identity theory, which posits that social context influences individuals' goal orientations (Tajfel, 2010). Implicit biases and stereotypes can have an effect on how parents, educators, peers, and others support or discourage women and ethnic minorities from pursuing different competencies and careers. For example, Ladson-Billings (1998) argues that non-Asian ethnic minorities are more likely to be tracked into remedial education, where critical thinking, creativity, and access to specialized skills—of which K–12 computing often falls—are lacking.

In educational activities, the impact of bias and stereotyped expectations on learning and persistence has been studied as "stereotype threat" (Steele & Aronson, 1995); stereotype threat occurs when a negative stereotype about your sociocultural group's performance is elicited ambiguously (i.e., lack of people like you in a classroom or field) or overtly (i.e., negative feedback about your group's abilities in that field or subject). The stress elicited by the negative stereotype causes short-term yet significant performance declines, and long-term distancing from the stressful field or subject. Conversely, positive stereotypes associated with social identities in different achievement areas can serve to increase achievement. For example, research has found that for Asian American women and girls in math, priming Asian identities positively impacted performance, whereas priming a female identity negatively impacted it (Ambady, Shih, Kim, & Pittinsky, 2001; Shih, Pittinsky, & Ambady, 1999). This has also been shown to benefit men, whose gender is positively associated with STEM achievement (McGlone & Aronson, 2006). In other words, for some, being able to attach to the positively stereotyped identity in a field or subject can serve to increase performance and persistence. However, overall, research has historically found stereotype threat to significantly impact women and people of color in most non-biomedical STEM subjects and fields, from K–12 and beyond (Spencer, Logel, & Davies, 2016).

Once stereotype threat is applied to gaming, similar disenfranchisement is apparent across gender and race/ethnicity. In order to investigate whether stereotype threat occurred in gaming, I conducted a multi-year participant ethnography in game culture more broadly, but also in the largest female-supportive gaming community in North America (with international membership), coined "PMS Clan," more specifically. I also interviewed and statistically measured diverse players inside and outside of various gaming communities. In my research (see Richard, 2013), I found that women and non-Asian ethnic minorities were significantly more vulnerable to stereotype threat in gaming, and that it had measurable effects on their gaming self-concept (or confidence) and gaming identification. (While Asian ethnic minorities were not statistically significantly vulnerable to stereotype threat, compared to African Americans and Latinos, they scored higher on vulnerability than Whites.) Both domain identification and self-concept affect how one sees themselves in a field or subject and their likelihood to persist. In other words, those stereotyped to underachieve would be less likely to identify with gaming, would perform more poorly, and that continued lack of mastery would cause them to leave gaming altogether.

Further, both groups were more likely to discuss in-game harassment, based on their gender or race/ethnicity, which was discerned through their use of voice chat (coined "linguistic profiling" by Gray, 2012) or by looking up their avatars or online biographies (coined "avatar or profile stalking" by Richard (2014). Studies have similarly found that women are three times as likely to experience harassment (Kuznekoff & Rose, 2013), and my own work supports that racial/ethnic minorities are significantly more likely to experience harassment than their White peers (Richard, 2013; Richard, 2016). For women, in general, harassment tended to focus on presumed appearance, rigid gender roles (i.e., "go back to the kitchen"), and sexual availability; for male players of color, it was almost universally racist in nature, with prolific use of racial slurs; and for female players of color, gendered harassment was more salient, though racial harassment was reported by those with strong linguistic signifiers or racially diverse avatars (Richard, 2013; Richard, 2016). Players I interviewed described harassing behaviors as limiting their gaming participation, by not socializing in play (affecting collaboration and learning), or, by causing them to stop playing if even for a short while. Given these prevalent practices, it is not a stretch to assume that many more have abandoned gaming altogether. However, harassment alone is not the only barrier, since the lack of gender and racial diversity in online virtual environments has been shown to limit diverse participation as well (Lee & Park, 2011).

Yet, there is evidence that socioculturally-supportive gaming communities, in a similar vein to gender-supportive schools (Picho & Stephens, 2012) and tech conferences (Alvarado & Judson, 2014), can mitigate stereotype threat (Richard, 2013; Richard, 2014; Richard & Hoadley, 2013; Richard & Hoadley, 2015). *PMS Clan,* the female supportive gaming community, has historical anecdotal evidence of its positive effects for women in gaming, including providing training and resources for—as well as having significant representation of—women in professional gaming tournaments and industry jobs. While the community has membership across gender, its main orientation is female support in an environment where women are underrepresented. Through practices and supportive community structures, members are reinforced in their role as competent players who can learn strategies and skills to improve their play, as well as deal with and cope with harassment.

What I found when I studied the female-supportive gaming community was that supportive community structures did indeed produce measurably significant, positive results across gender. Women in the community had significantly higher gaming identification and self-concept than those in other communities—to the point that they were on par with male gamers in general—and were more likely to play competitively or socially online compared to those not in a community, who spent significantly more time playing alone (see Richard, 2013; Richard & Hoadley, 2013). Furthermore, male members in the community also significantly increased in their identification and agency. In other words, there was strong support that the female-supportive community diminished the effects of stereotype threat for women across ethnicity and sexuality* and allowed them to fully participate both in-game

* However, there were limitations for individuals for which race, ethnicity, or sexuality were their main sociocultural identities—see Richard (2016)—who, evidence indicates, would be best supported in communities oriented around those identities.

and in social and collaborative learning around games, in ways that have largely been reserved for men. However, it was mutually beneficial for male members as well. In other words, female-supportive communities can help mitigate threat by providing counter-stereotypical role models, focusing on training in a supportive environment, and providing resources to understand and manage bias and harassment in game culture.

Educational Equity in Games, Making, and Learning

As discussed herein, there have been major efforts to rectify the gaming and computing participation gap in educational research and practice. A major tenet of constructionist learning activities—in game making, coding, design, and maker activities—has been that lowering the barrier to accessing technology will, in turn, create more equitable opportunities in computing and technology. In other words, efforts have tried to move youth from consumers to producers of media, which is seen as more meaningful and empowering to learning (Jenkins *et al.*, 2009; Ito *et al.*, 2009). Though constructionist tools and associated formal and informal educational initiatives have been around for decades (many of which were implemented in ethnically diverse schools or out-of-school workshops or clubhouses), not much has changed to reverse the persistent underrepresentation of women and ethnic minorities in STEM throughout the pipeline (Scott, Sheridan, & Clark, 2015). For example, White youth and economically-advantaged youth are more likely to create and produce content (Hargittai & Walejko, 2008).

Some researchers have argued that an underlying problem in addressing equity is the continuing practice of designing technology and environments that assume a content agnostic stance, or the idea that technologies are value-free (Lachney, Babbitt, & Englash, 2016). However, in a culture where consumption influences production, this is hard to disentangle. For example, researchers have found that many of the practices in commercial gaming influence constructionist learning around games and computing (Kafai, Cook, & Fields, 2010; Lachney, Babbitt, & Englash, 2016; Richard & Kafai, 2016). In other words, youth are more likely to make commercial games as *Scratch* projects (Lachney, Babbitt, & Englash, 2016), and many of the problematic practices in commercial gaming—such as lack of racial/ethnic awareness, lack of disclosure of diversity, and gender and racial harassment—show up in youth-based content creation and game-oriented online learning communities, such as *Scratch* (Richard & Kafai, 2016) and *Whyville* (Kafai, Cook, & Fields, 2010).

Research demonstrates that more effort needs to be made not only to make content creation accessible to youth, but also culturally responsive in its structure. Culturally-responsive teaching has long been seen as necessary and instrumental for underrepresented ethnic minorities in formal schooling (Ladson-Billings, 1995). Thus, intervention efforts and platforms need to be reflective in the ways they support and reproduce sociocultural context, and find ways to meaningfully connect and validate diverse cultures and learners through communities of practice. In other words, there needs to be more reflection around and efforts to create and sustain inclusive communities of practice (Richard, 2015; Richard & Gray, forthcoming) both online and in the classroom.

Discussion: Toward Inclusive and Equitable Game-Based Learning

Decades of research on gaming, computing, and STEM underscore an interrelated divide between social expectations and digital identities. In other words, implicit preconceptions continue to impact who is supported and who receives social capital to engage in technology in a playful and productive way. While there was a time we could trivialize gaming as simply a leisure-time activity that has limited effect on what we deemed more constructive pursuits, now, however, research points to the importance of such activities in influential and instrumental learning and workforce activities. We have reached a critical point in our need to understand the importance of play as part of learning through cultural practice, and the need to make culturally-responsive and inclusive learning a critical part of learning environments.

A challenge for formal and informal, interest-driven education is creating more inclusive and sustainable game-based learning for all. Research indicates that two primary strategies can help mitigate the disparities: culturally-responsive teaching (CRT) (Ladson-Billings, 1995) or computing (CRC) (Scott, Sheridan, & Clark, 2015) and inclusive communities of practice (ICoP) (Richard, 2015; Richard & Gray, forthcoming). Both CRT and CRC emphasize the importance of validating and integrating learners' cultural histories, experiences, and perspectives, while ICoP foregrounds social and contextual structures that impact identities and participation.

Lessons learned from socioculturally-supportive STEM learning climates and online communities demonstrate that inclusive communities of practice have certain attributes. For example, effective female-supportive schools, tech conferences, hackathons, and online communities all recognize that social context and climate strongly influence learning and identity, and that positive learning climates are instrumental to learning (Richard, Kafai, Adleberg, & Telhan, 2015). Within these environments, female role models defy stereotypes by not only being represented in the learning context, but also by demonstrating accomplishment and modeling successful strategies. Furthermore, the focus on learning mastery (as opposed to a fixed sense of ability, which is tied to stereotypes) is key. However, actively recruiting women, having promotional material with gender and racial diversity, educating the community about inclusive practices, providing for diverse skills, interests, and experience, and offering an accessible space are also key components. While most of the work on tech inclusivity focuses on gender, many of these same structures would be instrumental for racial and ethnic diversity.

Culturally-responsive computing emphasizes the importance of fostering a learning environment where all learners are seen as capable, encouraging learners to not just learn new technologies but to utilize them as part of a toolkit for innovation and creativity, integrating learner reflection on their intersecting social and cultural identities as part of learning activities, and making reflection, critique, and redesign of commercial designs central to learning activities. In other words, media literacy and empowerment over their own representation is central to learning, as is being able to articulate their intersecting identities with their peers. Many activities, such as remixing—which has been seen as a crucial and instrumental step in learning coding (Dasgupta, Hale, Monroy-Hernández, & Hill, 2016)—can be incorporated as part of reflection and redesign work. What CRC foregrounds is the importance of not only redefining identities in relation to computing, but also allowing learners to have a central role in that process.

Unlike past efforts to increase diversity in tech, which tended to just focus on access and skills, newer efforts are attempting to create supportive spaces that nurture identities in STEM. Several promising, growing initiatives and collaborations to increase women and ethnic minority education and job attainment in coding, computing, and making—such as Project Include, the Hidden Genius Project, Code 2040, and Black Girls Code (Brown, 2015; Isaac, 2016)—have emerged more recently along with inclusive conferences, hackathons, and formal educational efforts (Richard *et al.*, 2015). While the effects of such initiatives on tech workforce figures remains to be seen, and each has varying models for understanding inclusivity and culturally-responsive learning, they present a formidable model for reshaping education that is alert to the complex and entrenched disparities in gaming and computing. However, our classrooms and communities are important places to start seeing and reshaping how we understand learning, who is supported to participate, and how they see themselves in relation to learning, gaming, and computing; in other words, as educators, industry leaders, mentors, and parents, we have the ability to positively shape our own communities of practice, and our challenge is to see that come to fruition. □

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