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Using a studio-based pedagogy to engage students in the design of mobile-based media

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ABSTRACT: The article presents a brief overview of the Neighbourhood Game Design Project, a studio-based curriculum intervention aimed at engaging students in the design of place-based mobile games and interactive stories using geo-locative technologies (for example, GPS enabled cell phones). It describes the three curricular components that defined the project, then highlights how a studio method was used to guide students' design work and develop their design literacies. In particular, the article focuses on one of the main design activities students engaged in – collaboratively designing an Augmented Reality[1] simulation – and explores how the embedded design practices align with a socio-cultural view of literacy (Gee, 2004; Jenkins, Purushotma, Clinton, Weigel, & Robison, 2006; Lankshear and Knobel, 2007; Robison, 2009).

KEYWORDS: mobile media, place-based learning, design thinking, studio-based pedagogy

INTRODUCTION

Design and design thinking have been forwarded as central components of what it means to be literate in the 21st Century. This view of literacy does not diminish the importance of reading and writing as core literacies, but instead, emphasizes that literacy involves the active and dynamic *Design* of new meanings via the reorganisation of available resources (Kress, 2003; New London Group, 1996). From a broad perspective, a literacy rooted in design suggests that students should be capable of collaboratively and creatively designing solutions to complex, open-ended problems. In this light, design literacy implies more than simply engaging students in the production of media products. Instead, it also entails cultivating an ethos built around participation, collaboration and distributed expertise (Lanskshear & Knobel, 2007; Jenkins, Purushotma, Clinton, Weigel, & Robison, 2006), nurturing students' identity(-ies) as designers, and developing their ability to *think like designers* (Gee, 2007, Games & Squire, 2008).

Teaching students to think like designers, however, requires a reworking of traditional approaches towards literacy education, and arguably, education as a whole. Not only does it require re-conceptualizing what it means to be literate, it also requires new forms of teaching and learning, including a shift from the transmission models of instruction that dominate many schools, towards more student-centred pedagogies that

[1] AR games, which are played on GPS-equipped cell phones and handheld computers, allow students to navigate the real world, while tracking their location on a map that appears on their mobile device. When they reach specific, real-world locations, in addition to seeing what is around them, students can also use their mobile devices to view photos, videos and other documents that add to or augment reality.

allow students to participate in design communities in a way that positions them as producers of knowledge and *active designers of their own social futures* (New London Group, 1996, Kalantzis & Cope, 2005).

Research related to design education suggests that a studio-based pedagogy is one method for cultivating students' identities as designers, developing their conceptual understanding of design and the design process, and fostering their design thinking (Kuhn, 1998; Cox, Harrison, & Hoadley, 2009; Schön, 1983, Kafai, 1995). The design studio method of teaching stems from architectural education, but has more recently been applied to a range of disciplines, including game and software design (Kuhn, 1998; Cox, Harrison, & Hoadley, 2009). While there is no single model for organising a design studio, Kuhn (1998, p. 65), a proponent of using a studio pedagogy to teach design, outlines the core components of the studio method as: (1) project-based work on complex and open-ended problems; (2) rapid iteration of design solutions; (3) frequent formal and informal critique; (4) consideration of heterogeneous issues; (5) the use of precedent and thinking about the whole; (6) the creative use of constraints; and (7) the central importance of design media. In this context, a major goal is to guide students through the design process, while simultaneously teaching them *about* design.

As a secondary-level teacher who teaches in an interdisciplinary language arts and social studies classroom, I have a history of using a studio-based pedagogy to guide my students' learning. While I have applied a studio method in the past to engage students in documentary filmmaking, photography, and digital storytelling, this article presents my experience piloting the Neighbourhood Game Design Project (NGDP), a studio-based curriculum intervention aimed at engaging students in the design of place-based, mobile games and interactive stories using geo-locative technologies (for example, GPS enabled cell phones). The project is part of a larger body of research I have been conducting in collaboration with Mark Wagler and Kurt Squire at the Local Games Lab[2], that explores the use of mobile media to support place-based learning (Mathews & Squire, 2009).

THE NEIGHBOURHOOD GAME DESIGN PROJECT (NGDP)

Along with Mark Wagler, who served as a co-researcher, teacher and designer in residence, I piloted the NGDP with 12 eleventh and twelfth-grade students enrolled in my community studies course, entitled *People, Places, and Stories*. Traditionally, students in this course conduct research on local issues and design media texts (for example, photo exhibits, documentaries and digital stories) to communicate their findings and personal perspectives. The NGDP expanded on these past experiences in two important ways. One, it introduced mobile media into the learning ecology in a way that explicitly sought to leverage the unique affordances of mobile devices to support students' community investigations, and two, it engaged students in the design of mobile-based games and simulations.

The NGDP included three major curricular components that unfolded over sixty hours:

[2] The Local Games Lab is a research lab affiliated with the University of Wisconsin.

1. *a place-based inquiry component*, where students used mobile media to identify and investigate contested places and issues in their city;
2. *a game design component*, where students individually and collaboratively designed games using mobile devices; and
3. an *Augmented Reality design component*, where the entire class collaboratively researched a community issue and then designed a GPS-based simulation to teach other students and community members about the issue.

As mentioned, a key goal that cut across these components was a desire to foster students' design thinking. In part, this included developing their understanding of design by engaging them in interpreting and analyzing designs (for example, designed spaces/places and games) and engaging them in the design process. Throughout the project we attempted to cultivate a learning environment that situated students' understanding of the design process around authentic design problems and practices and cultivated a culture of participation. We also attempted to develop strategies that nurtured students' individual and collective identity(-ies) as designers and balanced individual autonomy with group interdependence and shared design goals.

Place-based inquiry component

During the *place-based inquiry workshop*, students used the built-in features of mobile devices (for example, audio recording, text messaging, GPS, cameras) and "off the shelf" software to investigate their city as a designed place. In order to introduce students to this concept and scaffold their initial investigations, we developed a simulation that invited them to role-play as consultants hired by the city to locate contested places and issues within the downtown area. As they walked around town in pairs, looking for, observing and analyzing contested places, the students used mobile devices to conduct interviews, take photos, access "just-in-time" information, and record notes. While they were given permission to explore the small downtown area on their own, without direct supervision, we remained in contact with them (and vice versa) as needed via text messages, face-to-face conversations and e-mails. While some students primarily used "pen and paper" to document their investigation, others relied more heavily on their mobile devices. For example, some students used GPS-based mapping applications on their mobile devices to geo-tag, organise and map their images and notes. Because this was not a requirement, however, students who chose this method did so based on their own interests, prior knowledge and motivation. This approach aligned with two key features of the project: (1) to develop activities that could be completed using a range of technologies – from "low-fi" (for example, paper maps) to "hi-fi" (for example, mobile-based mapping software), and (2) to provide students choice in how they decided to gather information and represent their thinking.

After spending several hours in the field, the students returned to City Hall, where they compiled their observations onto a large group map and met with the City Manager. Students then reported their findings. During their presentations the students used their mobile phones to share photos and audio interviews in order to communicate their arguments and share their evidence. The goal of these activities was multifaceted, and included: (1) exploring how the unique affordances of mobile media – particularly those related to their mobility/portability, social interactivity,

context sensitivity, and connectivity – might be used to support collaboration, communication, data collection, and documentation; (2) sparking students' interest in doing place-based investigations and introduce them to people, places, and issues they could refer back to later in the project; (3) providing students with a direct avenue for communicating with a city official whose job includes city planning; and (4) encouraging students to begin thinking of their neighbourhood, school and city as designed places and systems. The City Manager helped frame the students' thinking by discussing some of the design challenges he deals with on a daily basis. He also used the students' examples and questions to promote the idea that a major part of design is making choices based on available data, and that very often there is "no perfect solution" to a design problem.

Figure 1: Students investigating contested issues and places in their community.

Figure 2: Students discussing questions and ideas related to the redesign of the city with the City Administrator.

Mobile game design component

In the course of this component, students critiqued and redesigned mobile games that we created, and designed their own games. A major aim of these activities was to develop students' basic understanding of games as designed systems and begin to engage them in the design process. While this component was primarily organised around engaging students in the design of their own games, woven throughout this process were discussions aimed at developing students' conceptual understanding of games, design, and the design process. Specific to the design process, we focused on design constraints, iterative design cycles, and effective critique/feedback.

Figure 3: Students engaged in a game critique session

Figure 4: Students beta testing a mobile game during the game design component

From a game design perspective, we focused on developing students' understanding of games as dynamic systems of interconnected elements (for example, goals, characters, game space) that can be manipulated in order to shape game play. We also emphasized the central importance of rules and explored the relationship between rules and the different types of play they create (Salen, 2007; Salen and Zimmerman, 2004). Throughout the project, but especially during this component, we made a conscious effort to link students' prior knowledge and interest in games, with the concepts we were studying.

Augmented reality simulation design component

During the *Augmented Reality game design workshop* students used studio time to play several, pre-designed AR games and collaboratively and iteratively design their own AR simulation aimed at teaching others about a contested issue in the local community. As part of the design process, students brainstormed design ideas, learned how to use the required technologies (for example, handheld computers, mobile-based software tools, the AR game editor and engine), developed prototypes, engaged in critique/feedback sessions, and piloted a beta-version of their simulation.

Figure 5: Students composing and editing game text.

After first brainstorming, and then discussing potential topics, the students decided they wanted to learn more about a recent proposal to redesign the local nature conservancy. A key feature of the proposal called for paving one of the main paths that cut through the conservancy – an option that many of the students disagreed with. In addition to feeling a sense of ownership over the path, in part because it runs adjacent to the school, many students believed that the city was moving forward with the paving despite strong public opinion against it. They also felt that other students would be interested in the topic and that an AR simulation would provide an experience that would raise students' awareness about the issue and contribute to the debate. In the end, the students' intuition and timing was excellent. To begin with, their belief that other students would be interested in this issue proved insightful and accurate. In addition, because the path was near the school, it made it easier to

integrate field research into the school day. Finally, the public debate became quite heated while the project was in progress, which resulted in a flurry of newspaper articles and opinion pieces, blog postings, and robust city council meetings that students mined in order to create their final design.

Figure 6: Students designing a mock-up of the final AR simulation

To pave or not to pave: An Augmented Reality simulation

Students used what they learned from their initial place-based inquiry in combination with their emerging understanding of design and the design process to collaboratively produce an Augmented Reality simulation that can be played on Windows-based mobile devices[3]. The simulation requires players to physically walk along the path in order to learn more about the debate surrounding the redesign of the conservancy. As part of this experience, players encounter virtual characters who share different, and often competing perspectives on the issue. For example, players meet a scientist who shares some scientific data and then presents his own professional opinion, as well as bikers, runners and other recreational users, who each share their own personal stories and opinions. These virtual characters, who appear via a combination of video, audio, written text and photographic images, all represent authentic arguments and perspectives that were expressed by individuals in the community. In some cases, they are even based on real people, whom the students interviewed or read about as part of their research. In addition to meeting virtual characters, the players also use the mobile devices to gather additional data, including historical images, water quality measurements and bird migration figures that further help them frame the debate. They are also directed to make observations and interact with real people they meet along the path (for example, walkers, bikers, birders).

[3] The AR software and authoring tools they used (that is, the game engine and editor) were developed by Eric Klopfer and his colleagues at the MIT Scheller Teacher Education Program. The software can be accessed via their website, which is http://education.mit.edu/drupal/ar.

As part of the design process, students produced all of the game content (for example, game text, photos, videos, audio clips, HTML files, and so on) and organised it into a coherent narrative. To guide their design, the students (with our help) negotiated some additional design goals: (1) balance the physical space, game text, the number of virtual characters, and the amount of text in a way that allowed the simulation to flow well; (2) engage the players with the physical environment (that is, they did not simply want the player to walk around looking at the screen); and (3) present the issue in a balanced manner. This last goal resulted in a minor debate, because there was some disagreement over whether or not the simulation should be activist or persuasive in nature, particularly given that it was being designed for use in a school setting. This emergent design challenge provided an opportunity to discuss issues related to representation, the goals of schooling, forms of activism, and documentary media, and so on.

Designing the AR simulation, including learning more about the conservancy and conducting research into the multiple perspectives surrounding the redesign, required students to work across multiple modes of representation and use a range of literacies. In addition to authoring the game and the embedded media, the students also produced planning/design documents; created, distributed, and analyzed surveys; composed and read emails; wrote in their journals; conducted interviews; and did Internet and field research. In order to write the game text they also read newspaper articles, weblogs, and city council minutes, then pulled the key ideas from these texts and rewrote them as dialog events (that is, the text that the virtual characters said when players encountered them in the conservancy). As part of this process, students used a range of digital technologies, both those specific to the medium (for example, the handheld computers and AR authoring tools) and those required for collaboration, communication, and media production (for example, email, text messaging, Google Documents, photo and video editing tools). Perhaps most importantly, through all of this, the students engaged in and developed the literacy practices required to interact and learn in a participatory design community.

THE LEARNING ENVIRONMENT

A normal class period during the project (90-minute block) included a combination of the following:

1. *Large-group (face-to-face) check-in* at the start of class. This usually occurred at the school, but on occasion took place in a community setting. This time was used for large-group presentations and discussions related to the concepts we were studying and as an avenue for sharing individual and group progress;
2. *Individual and small group research* where students either left the school building to conduct field work that was relevant to their design(s) (for example, conducting interviews, taking photos, making observations, testing prototypes) or worked in the studio space. During field excursions, students used mobile devices (both their own and ones supplied by the project) to receive additional quests, collaborate, gather and share data, and report on their progress;
3. *Large and small-group critique and debriefing sessions* where students shared works in progress and participated in formal critiques.

As mentioned previously, these curricular activities were implemented using a studio-based pedagogy. It is important to note that, despite our emphasis on mobility and the use of mobile devices, a central design space and consistent design rituals (for example, journaling, group discussion, critiques) were core to the studio/learning experience. Table 1 highlights some of the key components of the studio method as we applied it in this context.

Physical studio space	The flexible and modular design of the studio space allowed for fluid movement between large- and small-group work configurations. Additionally, the technological resources students needed (for example, laptops, digital cameras, and mobile devices) were easily accessible, so they could be used to access "just in time" information or complete emergent design tasks. Because students were often dispersed across physical space (for example, during their community-based fieldwork), face-to-face meetings provided opportunities to maintain group cohesion, disseminate information, and answer questions.
Opening circles	These large-group openings served as project meetings where we shared our progress, asked and answered questions, discussed challenges and successes, and so on.
Physical design board	The design board served as a central location where students posted and collectively organised their individual work into a coherent whole. We also used the design board to share resources and ideas with each other and keep track of design tasks that needed to be completed. The design board also served as a site for emergent design conversations (Cox, Harrison, & Hoadley, 2009)
Design task cards	In order to help manage the workflow, we kept track of tasks that needed to be completed via *Design Task Cards*. As new design needs emerged we developed cards and posted them to the design board. For example, when students authoring the final version of an AR game via the game editor realised they needed a new photograph or video clip, someone wrote up a design task ticket and posted it to the *Design Order Board*. Other students, in turn, grabbed the ticket, completed the design task, and delivered the final product to the editors. This system helped us balance the need for differentiated scaffolding and the desire to provide students with opportunities to generate their own learning trajectories. Within this system, students who preferred a specific task could select a card, while those who wanted to follow a particular interest or needed less structure could more autonomously organise and manage their own learning. The mobile devices helped with this process in that students could easily share images, audio recordings and so on, via the phones. In addition, they allowed communication back and forth between the designers in the studio and the students doing fieldwork.
Distributed knowledge	While all of the students were expected to develop an understanding of the core concepts we were studying (for example, contested places, iterative design, and so on), not all of them were expected to develop the same knowledge or progress at the same rate. Instead, we cultivated islands of expertise (Crowley & Jacobs, 2002) where individual students developed expertise around a particular concept or skill as the need arose. This helped cultivate a collaborative learning environment, where students not only helped teach each other, but also became dependent on one another for the success of their individual and collective designs (Squire, DeVane, & Durga, 2008). It also opened up space for students to follow their own interests and design their own learning trajectories.
Design journals	In addition to text messages, emails, and face-to-face conversations, we used design journals as an avenue for maintaining an ongoing dialog with students. Design journals proved important in that they allowed us to gauge students' conceptual understanding, check-in on their progress, and answer emergent questions. They also provided a space for students to reflect on

	their progress and set design goals.
Critique sessions	The critique sessions were attached to redesign activities that reinforced the concept and practice of iterative design cycles. Because they made transparent students' understanding of design and the design process, critique sessions also provided an opportunity to assess students' understanding of the underlying concepts we were studying. These sessions also helped cultivate collaboration between students and provided an opportunity to discuss and practise different types of critique.
Authentic practices and designs	While the studio was not meant to mirror a professional design studio, the students' work revolved around authentic tasks – for example, they investigated authentic issues in their community, engaged in authentic design activities and Discourses (Gee, 2004), and designed media that was, and will continue to be, shared beyond the classroom. Perhaps more importantly, the students themselves perceived the project as an authentic experience because: (1) they felt their investigations and design work were relevant to the community, (2) there was a "real audience", (3) they felt it prepared them for both future learning endeavors and more closely resembled a work environment than a school environment, and (4) they got to leave the school building and take on different identities (for example, consultant, photographers) as they interacted with the community.
Dispersed community	We made efforts to facilitate and encourage students to make connections to people and resources outside of the classroom. In some cases, we brought people into the classroom, and at other times students located their own resources, via online and face-to-face networks. The ability to cultivate these networks is consistent with Gee's (2004) argument that there are "three types of design that reap large rewards in the New Capitalism: the ability to design new identities, affinity spaces, and networks" (p. 97).
Design charettes	Short design charettes were utilised throughout the project as a way to explore a particular concept (for example, iterative design, design constraints). They were also used to break up the flow of the class and provide avenues for teambuilding.

Table 1: Key components of the NGDP design studio

Figure 7: Student adding content to the design board

Figure 8: Students alpha testing the final AR simulation in the field

REFLECTIONS ON THE PILOT

As our first implementation of the NGDP, this pilot allowed us to experience *in situ* some of the unique challenges and opportunities that might (and in our case did) emerge when a studio-based pedagogy is used to engage students in the design of mobile-based media. The following discussion points, which are based on observations, analysis of students' designed artifacts, and post interviews, highlight some of the initial themes that emerged during the implementation. They are intended as discussion points to guide the design of our next iteration of the project and should be viewed as preliminary observations, rather than formal research results.

Design studio pedagogy

As mentioned previously, the studio setting, in combination with the complex, distributed nature of the design tasks led to the development of particular areas of expertise (related to both content, design and technology use) within the group. These *centres of expertise* (Squire, DeVane, & Durga, 2008), which were built around students' interests and prior experiences, helped cultivate a collaborative learning environment, and provided opportunities for students to use and develop pre-existing literacies within a new context.

- Students were motivated by the fact that others used/played their designs. Designing for an authentic audience deepened the design experience, increased students' engagement levels, and motivated them to care about the quality of their work. While they expressed this sentiment in their post interviews, it was also evident in their conversations and behaviours leading up to the initial pilot of their AR simulation.
- As expected, a major balancing act throughout the project was maintaining a steady workflow that allowed students to work semi-autonomously, while providing enough support to those who needed additional guidance and

feedback. For example, some of the students initially struggled to conceptualise, organise and manage their own projects. Because most of the students adapted quickly to the environment, we were able to spend additional time working with those who needed additional support.

- Because the studio method presented a learning ecology that differed from their typical school experience, many students initially found it difficult to acclimatise to the studio setting. This is not surprising considering that inhabiting the studio (at least as we envisioned it) required new behaviours, practices, identities, and so on. Engaging students in dialogue about these changes served as an avenue for discussing the design of the class on a meta-level, and as a way for us to explicitly state our expectations. Importantly, as the project progressed, students demonstrated more autonomous learning behaviours, worked more collaboratively, took more responsibility for the success of the learning environment, and both exhibited and reported higher levels of self-efficacy.

Mobile media

- Using mobile media as tools for inquiry and developing mobile games provided opportunities for students to engage in a range of new media practices. It also provided opportunities for students to use mobile media as investigative tools and develop the literacies required to use geo-locative technologies for learning, gaming and storytelling.
- Inviting students to use mobile media allowed us to more easily engage them in meaningful dialogue about the use of these devices, both in and outside of school. These conversations ranged from concerns over the increased ability of mobile service providers to collect personal data to school policies regarding cell phone use.
- Using mobile media supported our goal of getting students out of the physical classroom in order to engage in place-based learning activities. In doing so, students engaged in new literacy practices, took on new identities, and thought more broadly about how mobile technologies might be used to alter the way people interact with each other and their local community.

Design

- Consistent with previous research related to students designing games (Cox, Harrison, & Hoadley, 2009; Games & Squire, 2008; Kafai, 1995; Kuhn, 1998; Shelton, 2009), we found that studying and developing mobile games and simulations recruited students' experience and expertise as gamers and increased their motivation to engage in the design process. This was important in that it increased the likelihood that they would sustain their involvement in the project and "fight through" some of the less interesting tasks associated with designing media. For many of the students this included doing more reading (of written language texts) and more writing than usual. With that said, students were more motivated to write and edit game text, than to write planning documents, such as outlines and proposals.

- Design and inquiry were both recurring and consistent themes throughout the project. In fact, we often reflected on the design studio itself (and the

embedded curriculum) as a designed environment that was open to critique and iterative refinement. For example, we openly talked about the design choices we made as facilitators when designing the studio experience and associated learning activities. In turn, the students critiqued these designs and made suggestions for future iterations. By inviting students to critique *our* designs (including the learning environment as a whole), we hoped to model the design process, engage students in design discourses, cultivate a culture of experimentation and critique, and responsively alter and improve the design of the studio and curriculum to better meet their needs. Many students referenced this goal in their journals and exit interviews and said that these ongoing discussions made them feel like they had some control over creating the learning environment and determining the learning activities.

- The students entered the project with limited *formal* design experiences. As a result, most of them were new to using design vocabulary and basic design strategies (such as mock-ups, rapid prototyping, and iterative design cycles) to plan and evaluate their designs. However, engaging students in "professional-like" design practices helped develop their situated understanding of the academic varieties of language that designers use. This also provided them with design experiences that fostered an embodied understanding of design and the design process (Gee, 2004). For many of the students, this was their first experience designing something as an entire class. As such, the design studio also served as an initial model for engaging in a design community.

- The AR design experience provided a space for students to investigate local issues and share their own perspectives. By making a game about an issue that was important to them and included their voices, the students felt like they were able to "push back" against the city. It also gave them an opportunity to perform new identities and interact with their community in new ways. At the same time, by engaging in the design process, students also realised that the issue was much more complex than they had originally thought. In the end, many of them softened their position, developed more nuanced arguments, and were more able to see the issue from multiple perspectives.

- Thinking about design and engaging in the design process encouraged students to begin thinking more consciously about the world around them as an integrated system of designed spaces and places, and gave them new lenses for making transparent the social processes that shape these designs – both in relation to how they are designed and how they are used or inhabited by people. Looking at design across multiple contexts helped with this transformation.

- Because their design work focused on multimodal design, students developed a better understanding of the affordances of particular modes of representation and their appropriateness within specific contexts. For example, students had to consider the difference between video designed for use on a mobile device versus a television. While part of this implies a technical understanding of the differences, it also requires consideration of the different contexts in which people consume video via these two distinctly different mediums.

FINAL THOUGHTS

The rapid growth in mobile technologies presents many new possibilities for interacting with each other and the world around us. Mobile media allow for new forms of social interaction and provide new avenues for participating in the design and distribution of media content. They also provide new opportunities for teaching and learning across physical, digital and social spaces (Rogers & Price, 2009; Sharples, Taylor, & Vavoula, 2005; Squire, 2009). Helping students navigate and fully participate in this new media landscape, however, requires more than simply allowing mobile devices into schools. Instead, it requires developing learning experiences that allow students to use and develop the multiliteracy practices associated with mobile media. Unfortunately, while there are many examples of young people using mobile media to engage in these types of literacy practices outside of school, there are far fewer examples of these devices being used to develop and expand students' literacy practices in school (Norris & Soloway, 2009; Squire, 2009).

Developing rich, mobile-based learning experiences within a school setting is no easy task. While we understand that simply introducing mobile media into schools will not result in transformational learning experiences, the Neighbourhood Game Design Project stems from the following premises: (1) the potential of mobile media to support new forms of teaching and learning warrants meaningful consideration, and (2) shifts in the social, cultural and technological landscape will place implicit pressure on schools to seek new ways to integrate mobile media into the classroom (Norris & Soloway, 2009; Sharples, 2002). The challenge remains, however, for members of the educational community to develop meaningful learning experiences that use mobile media in a way that does more than simply reify the traditional culture of school.

Examining controversial issues from multiple perspectives and learning how to collaboratively design solutions to complex social problems is necessary for participation in a pluralistic society (Barton & Levstik, 2004; Hess, 2009). We hope that the NGDP provides one model for how mobile media might be used to support this vision. In following the lead of the New London Group (1996), our interests lie in exploring how mobile media might be used to engage students in new civic and social activities and literacy practices that allow them to more actively participate in and shape the future of their communities. As such, we believe in a form of mobile learning that not only aligns with the rapid changes occurring in the technological landscape, but also leverages new research around literacy and literacy pedagogy – a form of mobile-based learning that emphasises participatory design, mulililiteracies, and local, as well as global civic engagement.

REFERENCES

Barton, K., & Levtstik, L. (2004). *Teaching history for the common good*. Mahwah, NJ: Lawrence Erlbaum Associates.

Cox, C. D., Harrison, S., & Hoadley, C. (2009). Applying the "studio model" to learning technology design. In C. DiGano, S. Goldman, M. Chorost (Eds.),

Educating learning technology designers (pp. 145-164). New York, NY: Routledge.

Crowley, K., & Jacobs, M. (2002). Building islands of expertise in everyday family activities. In G. Leinhardt, K. Crowley, & K. Knutson (Eds.), *Learning conversations in museums* (pp. 401–423). Mahwah, NJ: Lawrence Erlbaum Associates.

Games, I. A., & Squire, K. (2008). Design thinking in gamestar mechanic: The role of gamer experience on the appropriation of the discourse practices of game designers. In *Proceedings of the International Society of the Learning Sciences*. The Netherlands: Utrecht University.

Gee, J. P. (2004). *Situated language and learning: A critique of traditional schooling*. New York, NY: Routledge.

Gee, J. P. (2007, July). *Getting young people to think like game designers*. Retrieved March 12, 2009, from http://spotlight.macfound.org/main/entry/gee_think_like_game_designers/

Hess, D. (2009). *Controversy in the classroom: The democratic power of discussion*. New York, NY: Routledge.

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, *66*(1), 60-92.

Jenkins, H., Purushotma, R., Clinton, K., Weigel, M., and Robison, A. (2006). *Confronting the challenges of participatory culture: Media education for the 21st Century*. Chicago, IL: The MacArthur Foundation.

Kalantzis, M., & Cope, B. (2005). *Learning by design.* Melbourne, Australia: Victorian Schools Innovation Commission.

Kafai, Y. B. (1995). *Minds in play: Computer game design as a context for children's learning*. Mahwah, NJ: Lawrence Erlbaum.

Kress, G. (2003). *Literacy in the New Media age*. New York: Routledge.

Kuhn, S. (1998). The software design studio: An exploration. *IEEE Software, 15*(2), 65-71.

Lankshear, C., & Knobel, M. (2007). Sampling "the new" in new literacies. In M. Knobel & C. Lankshear (Eds.), *A new literacies sampler* (pp. 1-24). New York, NY: Peter Lang.

Mathews, J., & Squire, K. (2009). Augmented Reality gaming and game design as a new literacy practice. In K. Tyner (Ed.), *Media literacy: New agendas in communication* (pp. 209-232). New York, NY: Routledge.

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, *66*(1), 60-92.

Norris, C., & Soloway, E. (2009). A disruption is coming: A primer for educators on the mobile technology revolution. In A. Durin (Ed.), *Mobile technology for children: Designing for interaction and learning* (pp. 83-98). Burlington, MA: Morgan Kaufman.

Robison, A. (2009). New media literacies by design: The game school. In K. Tyner (Ed.), *Media literacy: New agendas in communication* (192-208). New York, NY: Routledge.

Rogers, Y., & Price, S. (2009). How mobile technologies are changing the way children learn. In A. Durin (Ed.), *Mobile technology for children: Designing for interaction and learning* (pp. 3-22). Burlington, MA: Morgan Kaufman.

Salen, K. (2007). Gaming literacies: A game design study in action. *Journal of Educational Multimedia and Hypermedia, 16*(3), 301-322.

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. Cambridge, Massachusetts: MIT Press.

Schön, D. (1983). *The reflective practitioner: How professionals think in action.* New York, NY: Basic Books.

Sharples, M. (2002). Disruptive devices: Mobile technology for conversational learning. *International Journal of Continuing Engineering Education and Life Long Learning, 12*(5/6), 504-520.

Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a theory of mobile learning. *Paper presented at mLearn 2005.* Cape Town, South Africa.

Shelton, B. (2009). Teaching educational design through computer game design: Balancing expectations, abilities, and outcomes. In C. DiGano, S. Goldman & M. Chorost (Eds.), *Educating learning technology designers* (pp. 182-202). New York, NY: Routledge.

Squire, K. (2009). Mobile media learning: multiplicities of place. *On The Horizon, 17*(1), 70-80.

Squire, K. D., DeVane, B., & Durga, S. (2008). Designing centers of expertise for academic learning through video games. *Theory Into Practice, 47*(3), 240-251.

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