Augmented Reality and Neighborhood Narratives

LeAnne Wagner, Independent Design Consultant, leannemwagner@gmail.com
Ingrid Erickson, Rutgers University, ingrid.erickson@rutgers.edu

Abstract: An increasing number of people are utilizing their smartphones to craft mobile, geo-located stories and games. Many avail themselves of authoring tools such as 7scenes and ARIS, which allow authors to create end-user experiences that run like locative apps on most devices. While these experiences can be both novel and enjoyable, they can require specialized knowledge to use fully and are dependent on GPS-infrastructure that is not always accurate. This paper explores an alternative to crafting mobile narratives that exploits the idea of digital-physical "seams." We report on a series of design and playtest activities that build off of the augmented reality application, Aurasma, and theorize how using augmented reality in a game design curriculum can support both pedagogical as well as creative ends.

Introduction

There is no longer any contestation that technology is having a fundamental impact on the contours of learning in the 21st century. We now have decades of research that showcase the affordances of computer programming, video production, game design and play and other mediated forms on engagement on how, why and when learners learn (Kafai, 1995; Gee, 2007; Steinkuehler, et al., 2012). The advent of 'participatory culture', noted by Jenkins (2006) as the ability for people from all walks of life with a network connection to add, augment or author some type of digital data and share it with others, has altered how we think about mediated forms of learning. Much of the early work on computational thinking emphasized the move from analog to digital; yet as digital has moved to the level of invisible infrastructure, the shift in the age of participatory media is also moving from individual to social, and from user to collaborator. Digital forms of production and engagement are not only ways for individuals to tackle problems and challenges for their own knowledge acquisition, but also to air those understandings before others for comment or other forms of social uptake (e.g., Barron, et. al., 2010).

Participatory culture and its correlate forms of learning have been known to emphasize the role of narrative. Writing, filming or drawing stories allow learners many degrees of freedom to express their insights and air their inquiries. In the day and age of sharing one's productive efforts, stories are also well suited as readymade packages with which others can comprehensively engage and react. The genre of a story is recognizable and approachable, whether it is delivered as a graphic novel, a prose poem or an uploaded video. Moving stories from the desktop to the street—made possible by the advent of ubiquitous and accessible mobile technologies—need not change how stories are produced, but it greatly affects how they are consumed. Any New York subway rider will tell you that a smartphone, a good game or video app, and a pair of headphones can separate you powerfully from even the thickest crowd of straphangers. In this way, mobility provides ubiquitous accessibility—small enough to fit in your pocket and ready wherever you are.

Yet mobile-enabled stories can also be powerfully present in a different way in geographic space. Here mobility allows for the broadening of 'hybrid' possibilities, namely bringing a digital layer to physical space where none was possible (or inconvenient) before. Most hybrid forms of mobile engagement leverage a device's locative capabilities using something called Assisted GPS (aGPS), which triangulates a location based on the known spatial coordinates of a set of cell towers. The end result is a fairly accurate pinpointing of longitude and latitude, enough for a device to run and utilize map features regularly. In response to these technical capabilities, we have seen a corresponding rise in the use of cartographic visualization by apps and other media—particularly in applications that allow users to create locative stories and games, such as 7scenes or ARIS.

Locative storytelling applications share some common features. As seen in Figure 1a and 1b below, these applications generally allow a user to 'place' a storytelling element at a specific geographic location using the applications' cartographic interface. For example, if the story creator wants something to happen at the corner of Broadway and 37th Street, she need only place a story element at that location using the map interface; once the player moves into that geographic area, his device will appropriately alert him. In applications like 7scenes and ARIS, a creator can place a variety of different kinds of story elements, including digital images, videos, and user-generated instructions, such as answering a question or choosing from a set of pre-arranged activity options.

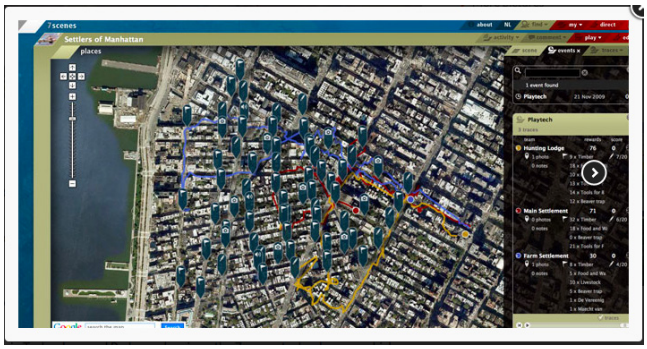

Figure 1a: Authoring screenshot from 7scenes website.

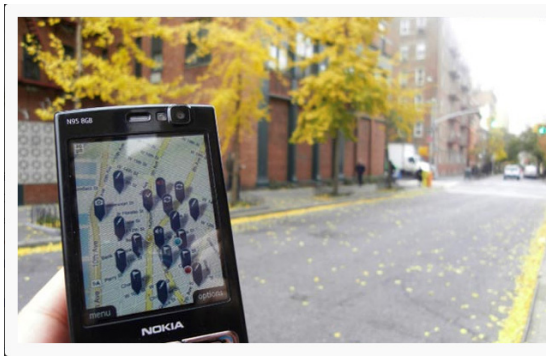

Figure 1b: Play screen from older version of 7scenes application.

The application 7scenes, designed by the Waag Society in the Netherlands, allows users to build their own stories with the use of set of genre templates such as tours (i.e., discovery, guided tour, and mystery search) and games (i.e., adventure, collect & trade, secret trail, and free play) so that the story's designer can spend less time on the technical detail and more time with narrative generation. University of Wisconsin-Madison's ENGAGE (http://engage.wisc.edu/) program has produced a similar product called ARIS, which has similar functionality to 7scenes but is notably distinct for being open source. ARIS's designers tout heir tool to be a "user-friendly, open source platform for creating and playing mobile games, tours and interactive stories" (http://arisgames.org/). Like its cousin application, ARIS also allows users to build their locative narratives by using a map interface (see Figure 2), but does not leverage existing narrative categories to guide the user. In keeping with its commitment to openness, users creating stories using ARIS have a fair degree of freedom to create game or story elements from scratch and to program their functionality with the application's story editor.

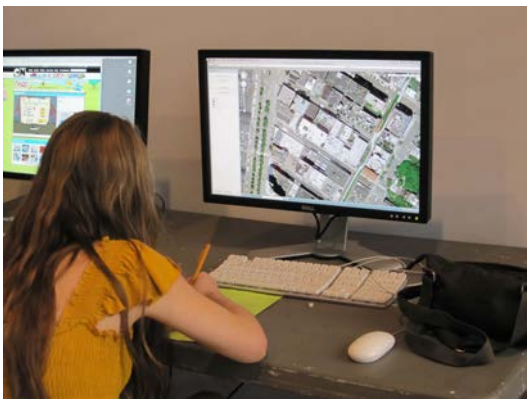

Fig. 2: Map-based interface of ARIS authoring tool.

Both of these applications, as well as the other similar applications that have recently entered the market, exemplify the potential for mobile learning to be an embodied, situated experience in geographic space as mentioned above. Each of these tools brings an aspect of digital media into context when it is 'played': what might otherwise be salient but abstract information when read or experienced on a computer screen can become something potentially more impactful when consumed or engaged with on location.

Despite this potential, we contend that the zeal for new forms of mobile learning might be eclipsing the need for learners to translate abstract spatial dimensions in order to use the standard cartographic interfaces of many available applications. Our research suggests that youth today have little familiarity with maps and cartographic ways of thinking, despite the seeming ubiquity of this form of information nowadays. This lack of spatial and/or navigational literacy, while notable as a goal for future pedagogical initiatives, inspired us to find a workaround for youth that could enable them to leverage their storytelling and game design enthusiasm without the need for abstract spatial translation. We report there on early playtests with the application Aurasma in an informal learning context in urban Cincinnati.

Playing the Neighborhood with Augmented Reality

The hallmark of a great situated game or narrative is that it transforms the street or neighborhood into a three-dimensional game board. Exemplars of this genre abound, ranging from big urban games such as Human PacMan and Pac-Manhattan to more bounded learning experiences focused on the ecology of a city (e.g., Mannahatta) or the simulation of a rampant virus (e.g., Humans vs. Zombies). In addition to being immersive, interest-driven experiences, successful mobile narratives also encourage situated forms of learning (Klopfer, 2008; Squire, 2013), as mentioned above.

We first began to experiment with mobile alternatives to ARIS and 7scene by using QR codes—the increasingly ubiquitous two-dimensional barcodes that enable a smartphone user to unlock a piece of digital information such as a photograph, text message or hyperlink in a particular location. Our experience with youth revealed that QR codes are somewhat irresistible in a “bright, shiny object” sort of way; they beckon to be unlocked and their secrets to be revealed. They also function independently of GPS, which in many urban contexts is less accurate than in more open spaces, while still marrying information to place. The downside of QR codes in urban contexts is their lack of durability. They are typically printed on paper or a sticker and, as such, are prone to defilement, theft or removal, or—most typically—inclement weather.

Similar to the functioning of a QR code, Aurasma (http://www.aurasma.com/) is a mobile, augmented reality application that allows a storyteller or game designer to attach a digital piece of content to a real world marker. This is similar functionality to Layar and Google Goggles. A storyteller need only identify something in the physical world to act as a trigger for her narrative, and when a player views this trigger through the mobile device, a video or image appears on screen. The marker/trigger can be anything the user photographs and assigns ahead of time. (See Figure 3 for an example.)

Figure 3: Using Aurasma app to add augmented reality elements to embodied interactions. Here Big Ben acts as the trigger to reveal a flying car in the London sky.

Over two successive weekends in May 2013, we ran a workshop to playtest a modified version Aurasma with 10 kids from an urban Cincinnati afterschool program. We followed a game design curriculum that progressively moved the participants from playing board games to designing neighborhood-based narratives. Narratives were based on the concept of urban legends, and all participants readily identified 5 locations in the immediate neighborhood across which they wanted their situated experience to unfold.

Implementation was challenging due to infrastructure unpredictability (not atypical and not something that can ever be wholly relied on), but nevertheless participating youth teams produced two games. One team focused on writing elaborate clues and story integration, while the other team concentrated on making a seamless digital prototype. Under time constraints, neither team achieved full integration of their game, but nevertheless both reached a stage where they could play test one another’s creations. Play testing allowed the design teams to identify successful design choices as well as areas for improvement.

Our preliminary findings using Aurasma to scaffold narrative game design and situated learning experiences suggests that augmented reality has a strong affordance for supporting creative expression *in situ*. To our participants, the ability to create digital content—as well as the unique trigger for initiating that content—appears to provide strong authorial agency. Our game designers and storytellers seemed to see spatialized opportunities for engagement in a direct way that required little two- to three-dimensional translation. Using augmented reality required kids to not only think about how to move a player to the next location, but also forced them to think through what actions were needed to help the player locate the pre-identified AR trigger. This area of engagement is rich with further questions regarding the links between creative agency, situated learning, and geo-spatial literacy—a trajectory our future work on this project will hopefully begin to disambiguate.

While we are certainly not the first to claim a link between learning and augmented reality (e. g., Klopfer, 2008 being an important contribution in this space), we less often see either QR codes or augmented reality used in the service of mobile game design *by youth* instead of mobile game design *for youth*. As we complete this research, we will look to open up a more substantive discussion regarding how digital augmentation can support youth-led forms of situated engagement, social interaction and creative expression.

References

Barron, B., Levinson, A., Martin, C. K., Mertl, V., Stringer, D., Austin, K. & Gomez, K. (2010). Supporting young new media producers across learning spaces: A longitudinal study of the digital youth network. In *Proceedings of the 9th International Conference of the Learning Sciences-Volume 2* (pp. 203-210). International Society of the Learning Sciences.

Gee, J. P. (2007). *Good video games+ good learning: Collected essays on video games, learning, and literacy* (Vol. 27). New York, NY: Peter Lang Pub Incorporated.

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York NY: New York University Press.

Kafai, Y. B. (1995). *Minds in Play: Computer Game Design As a Context for Children's Learning*. New York, NY: Routledge.

Klopfer, E. (2008). *Augmented learning: Research and design of mobile educational games*. Cambridge, MA: MIT Press.

Squire, K. D. (2013). Mobile Media Learning: Ubiquitous Computing Environments for the Mobile. *Emerging Technologies for the Classroom*, 187-202.

Steinkuehler, C., K. Squire, S. Barab (2012) *Games, Learning, and Society: Learning and Media in a Digital Age*. New York, NY: Cambridge University Press.

Acknowledgments

This research is supported by NSF Grant #1002850. In addition to our own insights, we wish to acknowledge the efforts and contributions our collaborators and advisors throughout the course of this project: Kaho Abe, Richard Arum, Caroline Haythornthwaite, Hillary Kolos, Kyle Li, and Katie Salen.