Digital Culture & Education (DCE)

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http://www.digitalcultureandeducation.com/

Interests-in-motion in an informal, media-rich learning setting

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Online Publication Date: 27th January 2016

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INTERESTS-IN-MOTION IN AN INFORMAL, MEDIA-RICH LEARNING SETTING

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Abstract*: Much of the literature related to connected learning approaches youth interests as fixed on specific disciplines or activities (e.g. STEM, music production, or game design). As such, mentors design youth-focused programs to serve those interests. Through a micro-ethnographic analysis of two youth's Minecraft-centered gameplay in a public library, this article makes two primary contributions to research on learning within, and the design of, informal, media-rich settings. First, rather than approach youth interests as fixed on specific disciplines or activities (e.g. STEM, music production, or video games), this article traces youth interests as they spark and emerge among individuals and groups. Then, it follows those interests as they subsequently spread over time, becoming interests-in-motion. Second, recognition of these interests-in-motion can lead mentors to develop program designs that enable learners to work with artifacts (digital and physical) that learners can progressively configure and re-configure over time. Mentors, then, design-in-time as they harness the energy surrounding those emergent interests, creating extending learning opportunities in response.*

Keywords: Interest, mobility, mutable mobiles, temporality, Minecraft

Introduction

Together, teachers, librarians, researchers and other youth-serving coordinators continue to design and implement connected learning opportunities for youth that stretch across informal, media-rich settings like libraries, museums, and schools (Ito et al., 2013). Motivated by the Young Adult Library Services Association's promotion of connected learning, libraries are rapidly shifting from "transaction-based" entities—where reference questions are asked and answered, "books sought and found"—to digital media centers "where library staff and teens work together to learn and create and make meaning" (Wittig, Martin & Strock, p. 4). In undergoing this transformation, many libraries foster learning opportunities for youth that are "socially-embedded, interest-driven, and oriented toward educational, economic, or political opportunity" (Ito et al., 2013, p. 4). As a result, designed programs embedded within settings like libraries, especially, have become hubs for connected learning, enabling youth to pursue their interests in order to refine professional skills and dispositions affiliated with digital culture and tools (Valdivia and Subramaniam, 2014). Often designed and led by adult mentors, these programs harness participants' interests in order to create learning opportunities that enable widespread participation and continuously challenge participants through their production of both digital and physical artifacts.

In order to help youth thrive across such connected learning ecosystems, educators, mentors, and program leads have turned their attention to explicit interventions by mentors within—and across— designed programs (Ching, Santo, Hoadley & Peppler, 2015). Ching and colleagues (2015), for instance, call for mentors to "broker" future learning opportunities for youth, to connect youth to meaningful events, people, or institutions. Brokering, they argue, demands mentors' attention to "critical time points" such as when a program concludes, or the weeks following the end of the program. These

critical time points (re)direct youth toward complementary learning opportunities, resources, and people.

This intervention at "critical time points" necessitates acute attunement by mentors to the emergence of youth interests over time. But those "critical time points" do not only exist at the culmination of programs, especially in programming that often vary in terms of time and duration, with some participants dropping in for minutes or hours, while others engage for months, or even years (Ahn et al., 2014). As a result of these temporal variations, there are two important, overlapping areas of inquiry for those researchers studying connected learning: (1) How youth return to and reflect on interest-driven experiences, especially regarding the transformation of those experiences "in other time frames" (Kumpulainen & Sefton Green, 2014, p. 12) and (2) How mentors attune themselves to the moment-by-moment transformation of those experiences and subsequently alter their pedagogy in response.

Through a micro-ethnographic analysis of two youth's Minecraft-centered gameplay in a public library, this article makes two primary contributions to research on learning within—and the design of—informal, media-rich settings. First, it argues that interests—especially those nurtured within informal, media-rich settings—are not stable, solidified. Rather than approach youth interests as fixed on specific disciplines or activities (e.g. STEM, music production, or video games), this article traces youth interests as they spark and emerge among individuals and groups (Lemke, Lecusay, Cole & Michalchik, 2015); then, it follows those interests as they subsequently spread, becoming interests-in-motion. Second, this article asserts that recognition of these interests-in-motion should lead mentors to enable learners to work with digital and physical artifacts that they can progressively configure and re-configure over time. In response, mentors should attune themselves to the emergence of these flexible artifacts, orienting pedagogy—and thus designing-in-time—in response, which I further elaborate upon in the discussion.

Related Literature and Theoretic Orientation

Mobilizing Interest

Youth interest constitutes the core of connected learning. As such, connected learning is "interest-driven," or "interest-powered." At its most general, connected learning is "realized when a young person is able to pursue a personal interest or passion with the support of friends and caring adults" (Ito et al., p. 4). Peers and adults within institutions like libraries and museums facilitate important dialogs and practices that can extend these pursuits. This process of "building connections to other areas of expertise from the base of an area of deep interest is core to the connected learning model" (p. 57).

The interests advanced by connected learning and its practitioners, however, while robust, are often static (Martin, 2014; Larson, Bradley, Leslie, Rosenberg, Reimer, 2014). Designed programs, both within and beyond libraries, tend to anchor designs on participants' interests. When youth have numerous pathways into participation, however, those pathways do not necessarily converge under the auspices of one, solidified interest (e.g. *Minecraft, Harry Potter, Starcraft*); rather, those pathways peel off in multiple directions as youth encounter critical moments, materials, and collaborators. Thus, in this paper, I work to mobilize interest, to follow interests-in-motion as they emerge through participation in a library setting that sought to, initially, harness local teen's interest in *Minecraft*.

Mobilizing interest necessitates following the contours of interest rather than plotting it along individual phases (i.e. Hidi & Renninger, 2006). Recent explorations of interest and engagement in formal settings have begun to tease out the processes supporting the progression of student interests (Azevedo et al., 2012). For instance, Azevedo and colleagues argue that educational research has been unable to capture the realities—and

complexities—of interest and engagement in learning settings, both formal and informal. As such, the literature has been unable to provide answers for questions such as: How do interest and engagement

> develop over periods typical of lessons or whole units (e.g., days or weeks)? How does engagement emerge from the interactions among participants in a classroom? How does the material infrastructure available to students, analyzed in a moment-by-moment fashion, affect their ability to engage classroom material? (p. 59)

While Azevedo and colleagues' questions suggest a direction toward understanding the emergence of interests, these questions continue to promote an approach to interest that is bound, contained by the temporal containers affiliated with formal learning settings: lessons and units, for example, as well as the spatial confines of classrooms. In loosening those confines of when—and where—learning occurs, it is critical to open up the container, to recognize how dynamic, moving elements of social systems (e.g. people, resources) are "configured and reconfigured across space and time to create opportunities to learn" (Leander, Phillips & Taylor, 2010, p. 331). The questions posed by Azevedo and colleagues hint at how interests and engagement become infused within these dynamically moving elements. They wonder, for instance, how those engagements spread among "participants in a classroom," how the very materiality of infrastructure and tools ("interest objects") impacts engagement and interest. Importantly, Azevedo and colleagues call attention to the emergent qualities of interest and engagement, how interests and engagement can develop in a "moment-by-moment" fashion.

To follow interests as they develop, moment-by-moment, I draw on theoretic perspectives from the new mobilities paradigm (Hannam et al., 2006). For educational research, a mobilities perspective offers a means to explore the dynamic, moving elements within (and beyond) a setting, therefore expanding educational research from an overt focus on learning environments and toward "geographies of learning" or "mobilities of learning" (Leander, Phillips & Taylor, 2010, p. 331). In the following, I first link mobilities perspectives to literature of spatiality and learning, before underscoring the relationship between mobility, materiality, and, finally, mutability.

Mobilities

Educational research has primarily focused on mobility through its relationship to spatiality (Burnett, 2011 Comber, Nixon, Ashmore, Loo, & Cook, 2006; Kostogriz, 2006; Leander & Sheehy, 2004; Vadeboncoeur, Hirst, & Kostogriz, 2006). Spatial approaches assert that educational spaces are not bound systems; rather, they are multi-layered, complex. Nespor (1997), for example, suggests that a nuanced exploration of educational spaces will "peel back its walls and inspect the strings...linking it to the outside world (which is no longer outside)" (p. xi). Mobilities, according to spatial perspectives, then, consider what is moving in-and-out of a given setting, from students, materials, and policies to the "circulation of paper in classrooms and media practices" (Leander & Sheehy, 2004, p. 3)

Mobilities perspectives feel out the textures of those "strings" that link disparate settings. Naive approaches to mobilities assert that everything is on the move, that contemporary culture is one of rapidity, speed. But this mobility occurs at different paces and intensities for different people, having varying impacts and consequences. Moreover, mobility is "acknowledged as part of the energetic buzz of the everyday (even while banal, or humdrum, or even stilled) and seen as a set of highly meaningful social practices that make up social, cultural, and political life" (Adey, Bissell, Hannam, Merriman, Sheller, 2013, p. 3). As a result, geographers, historians, and anthropologist have shifted from fixing their work on "the field" to following "routes," tracing sets of relations across sites.

Thus, the new mobilities paradigm challenges social science research that is a-mobile—both theoretically and methodologically. It seeks out fluidity as opposed to fixed, contained, territories.

Materialities—both human and non-human— are also a dominant component of these new mobilities. Humans and non-humans produce hybrid geographies. The social, as Law (1994) writes, is materially heterogeneous: "talk, bodies, texts, machines, architectures, all of these and many more are implicated in and perform the social" (p. 2). In fact, Law's depiction of a Portuguese man-o'-war ship has become the exemplar of a human-nonhuman assemblage: more than simply people working together to sail the ship, men and women, ropes and masts, timber and rigging become a unified, pulsing assemblage. The ship-human assemblage is what Latour (1986) would call an immutable mobile: despite its mobility, it still maintains its essential configuration (e.g. it does not become a submarine) as it moves across space-time.

de Laet and Mol (2000) contrast the immutable mobile with the mutable mobile. Mutable mobiles are fluid. Their boundaries are vague and moving. There are "many grades and shades of working," they write. "[T]here are adaptations and variants" (p. 225). Mutable mobiles are strong because of their adaptability, flexibility, and responsiveness. Furthermore, mutable mobiles challenge what it means to be an actor, allowing that category to "include non-human, and non-rational entities" (p. 227). de Laet and Mol pursue the notion of a mutable mobile through their description of a Zimbabawean bush pump, how it not only acts as water-producing device but also as sanitation and hydraulic device. It takes on a new state depending on the actors using it, the materials with which it combines, and the needs of a particular setting. This is not to say that the pump is "everywhere and anything," they write. Rather, its "various boundaries define a limited set of configurations" (p. 237). In the ensuing section, I focus my analysis with the following research question driven by this mobile perspective: How do learners move and circulate mutable mobiles in service of their interest-driven learning? Addressing this overarching research question, I focus particularly on how participants configured and re-configured specific objects, over time. In other words, I follow along with the mutable mobiles that participants installed and then circulated throughout their participation in the program.

Methods

Metro: Building Blocks
Data are drawn from a six-month study of *Minecraft* gameplay in a program called Metro: Building Blocks (MBB). Designed and facilitated by the author, MBB was the initial connected learning program operating out of the Metro Public Library's new digital media learning lab, The Foundry. Adopting the principles of connected learning, the program was intentionally production-centered and openly-networked, and joined participants through a shared purpose. More specifically, with the goal of developing participants' commitment to socially-just urban planning, MBB challenged teen participants to build authentic areas in the city of Metro within the video game *Minecraft*—a video game that, at its most basic, is about placing and breaking blocks, much like a version of digital Lego. The author facilitated all sessions, regularly playing alongside participants and introducing them to current urban planning initiatives throughout the city of Metro. In response, participants became budding city planners as they imagined, designed, and built components of Metro's neighborhoods—including parks, urban gardens, single-family homes, and more.

Participants

Thirteen teenagers participated in MBB for at least one month. Others (approximately 10) dropped in on sessions over time, playing anywhere from 15 minutes to 2 hours. Long-term participants ranged in age from 12-16 and were predominantly male, much like the overall demographic of teen center patrons. The number of participants in any given session varied: some days, teens filled all available computers; other days, one youth would log-on to the server while others trickled in over time.

This article analyzes mutable mobiles produced by two participants, Martin and Arthur. Other participants—like Artie, Ricky, Eddy, Tom, and Doug—often played alongside Martin and Arthur: they appear in the background of the ensuing narratives revolving around Martin and Arthur. Martin was a fifteen year-old Caucasian student at Rosa Parks, a local magnet school. He was one of the longest-tenured participants, coming to MBB nearly every Tuesday and Wednesday throughout the program's six-month duration. Upon learning about the program, Martin cautioned the author that he "might get obsessed with playing" and was worried that it would "distract from [his] homework." Like Martin, Arthur, a fifteen year-old African-American student at Liberty Charter, entered the program because of his initial interest in *Minecraft*. Arthur, however, began to attend the final two months of MBB, having heard about it from a friend who frequently hung out after school at the teen center. Arthur often participated in MBB from home when he could not come to the library, joining the server throughout the week to add to and complete his builds, including statues, transit systems, and a school. For the purposes of this article, I focus on Martin and Arthur because of how they continually returned to their projects—a lighting system and a transit station, respectively—over time.

Redstone

Martin and Arthur's respective projects each feature a particular aspect of *Minecraft* called redstone. Briefly, redstone—a specific block in *Minecraft*, just like cobblestone or sandstone—is the only block that can carry the equivalent of an electric charge. For instance, when redstone lamps are linked with redstone dust and a redstone torch an electric charge can travel, lighting up lamps, for example (Figure 1). Beyond lighting lamps, however, redstone can also operate specific objects, like doors, automatically opening them at the press of a button, or rails, sending carts up a hill, for instance, once they have run out of momentum.

Figure 1. Redstone demonstration. Redstone torches activate circuit and illuminate lamps (center and right). Lamp on left is thus not illuminated.

Data Collection and Analysis: Moving Alongside Interests-in-Motion

MBB sessions typically lasted three hours, Tuesdays and Wednesdays, and ran from January to June. As a result, data includes nearly 90 hours of gameplay, including video capture of both in-room and in-game play, field notes, and semi-structured interviews conducted with participants throughout the program. Given the imbricated digital-physical setting of MBB, analysis was particularly targeted toward how participants' interests were emergent and mutually constituted amongst agentive human, (im)material, and environmental actors (Barad, 2007; Burnett, 2013; Hollett & Ehret, 2014). Thus, data collection and analysis were guided by advances in mobile methods (Hannam, Sheller & Urry, 2006) that moved alongside participants' interests-in-motion—specifically the configuration and re-configuration of mutable mobiles—over time. Such an approach challenges existing methods that "slow down and freeze experiences (the interview, the focus group, the survey)" (Fincham, McGuinness and Murray 2010, p. 2). To do so, mobile methods aim to develop new ways to "capture, track, simulate, mimic, parallel and 'go along' with the kinds of moving systems and experiences that seem to characterize the contemporary world" (Büscher et al., 2011) To move alongside participants' gameplay, I employed the analytical software ChronoViz. ChronoViz was important because of its ability to sync—and then watch—multiple videos at once, including in-room and in-game. Thus, if Eddy, Tom, and Arthur were playing together on one day, I would sync all of their videos to watch them simultaneously, working to re-experience the data as authentically as possible. Within ChronoViz, I first logged the content of each group of synced videos, noting particular strips of activity— participants' synchronous, if not collaborative, activity around a particular set of materials (physical maps, in-game blocks, etc.). Within the software, I described each strip briefly. These strips were "categorized" according to color. General strips of activity (e.g. broadly what was happening at each moment) were blue (Figure 2).
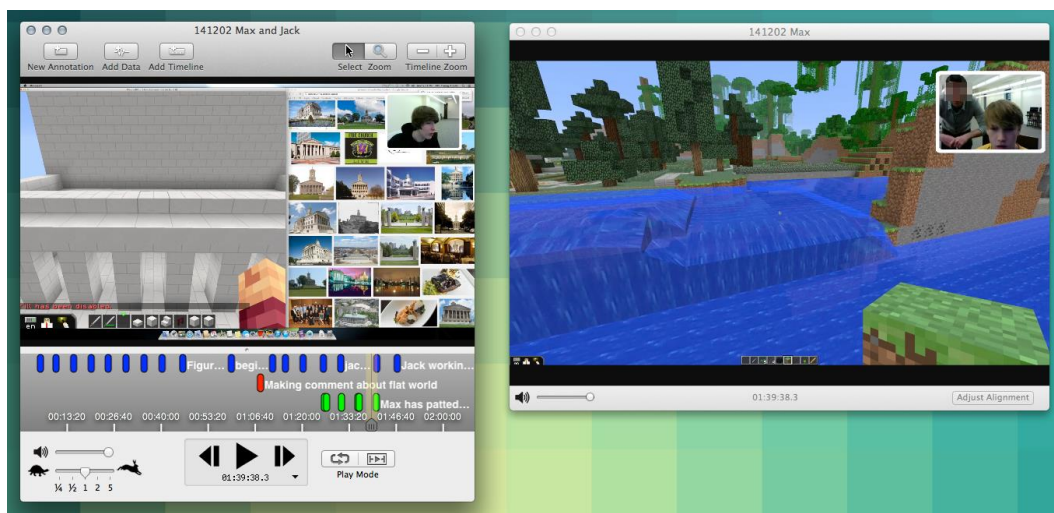

Figure 2. Initial strips of activity in ChronoViz while experiencing two separate players' synced videos.

In addition, because of my initial interest in how I, as a mentor, attuned myself to activity within and beyond our setting, I also used another categorization (red) for my own pedagogical moves. Depending on the number of other participants on a given day, I would use other categorizations (e.g. orange, green) accordingly, especially to follow surprising, interesting, or aberrant developments. I then exported all of these strips into a spreadsheet. Within my expanded spreadsheet, I not only summarized the general activity from the day, but also noted timestamps of other strips, questions, aberrations for further

analysis. Additionally, I would hone in on individual videos as necessary, transcribing them more fully in Inqscribe.

This analytical experience of my data through ChronozViz, led me to trace and follow the configuration and re-configuration of specific projects by participants. Thus, to analyze mutable mobiles, I attuned myself to, and thereby reduced my data to, *returns*. That is, upon re-experiencing my data, I targeted participants' returns to specific, self-generated, projects that persisted over time. Oftentimes, these projects were participants' own individual endeavors, personal projects that spun-off from—and thus related to—overarching group projects. For example, Martin's lighting system spun-off from the group's production of a riverside park; Arthur's transit system spun-off from the group's production of a mixed-use neighborhood.

This reduction of data is essential to addressing my research question related to the movement and circulation of mutable mobiles over time. Participants often shuttled between collaborating with others on a group project and their own personal builds. Not all builds, however, persisted over time; participants frequently completed them quickly, moving from one large group-build to the next (e.g. Bridges, downtown apartments). An emphasis on individual returns contributes an examination of the nuances of interest, the ways in which interests emerge given various socio-material engagements. Thus, I recognize that returns—and the mutable mobiles produced through those returns—were always embedded in the real virtual, sociocultural milieu of MBB as opposed to isolated, alienated experiences for Martin and Arthur.

Following Interests-In-Motion: Mutable Mobiles

In the ensuing analysis, I follow two mutable mobiles. The first focuses on Martin's production of, what he called, a "lighting schematic," a mechanism to produce different lighting effects. Specifically, I describe Martin as he configures and reconfigures the schematic across space-time. In other words, I illustrate the mutability of this lighting schematic. The second focuses on Arthur's production of a transit system. In contrast to Martin's individual development of a lighting schematic, Arthur's transit system became a collective effort, taking shape and expanding its boundaries as new participants joined alongside Arthur to build it. Each analysis begins with an initial narration to contextualize participants' production. Then, I analyze each entity as a mutable mobile, noting, in particular, how Martin and Arthur infuse their projects with a fluidity they incorporate themselves, which subsequently fuels their interest (de Laet & Mol, 2000, p. 252).

Martin's Mutable Lighting Schematic
Narration. Our initial production of Metro began on the Columbia Riverfront Park—a large family-friendly greenspace that the city recently developed next to Corporate Stadium. The park includes a play area for youth, including climbing walls and waterspouts, as well as a nearby walking trail. A small stage sits in the middle of the park, a flat green space in front providing seating for an audience. The pedestrian bridge looms over the park, making travel to the other side of the river easily accessible. Next to the Pedestrian Bridge sits the Bridge Building, a small structure often used for celebratory events because of its proximity to the riverfront, large windows, and rooftop view. An elevator stands along the southern side of the building, making the Pedestrian Bridge easily accessible from the park.

The group spent its first two weeks together working on the riverfront. Artie and Ricky carved out the area for the park; Eddy and Tom built the bridge; Doug developed the elevator. Because of the persistence of the virtual world, and the (a)synchronous nature of our activity, new builds emerged while some participants were not physically present. Notably, the elevator came about while Martin was not in attendance. Upon his

return to the group, and the server, the following week, Martin, made his way toward the park, saying, "I had an idea of what I could build today. I was thinking about building the building across from the elevator. The Bridge Building."

Later that day, while Martin was working on the building, Tom entered the room/game, remembering to himself out loud: "Last time I was working on lights." To effectively work on lights, he needed the gaming environment to be dark, so he typed the in-game command "/time set 40000" to change the game mode from day to night. Inspired by the sudden change in lighting, Martin called out: "Oh, I just had a brand new idea!" He then readied himself to develop a lighting system for the elevator that would move a current of energy up the elevator one block at a time, signifying the elevator moving upward.

In the following, I analyze the mutability of this intricate lighting system that Martin will make—and return to—multiple times throughout the program. Importantly, that initial encounter stretched across space (in-game locations) and time (three weeks) each instance in which Martin reconfigured his lighting system.

Martin's lighting system—in which he used redstone—was intricate. As he initially described it:

> I had the idea for a redstone schematic that would be lights and the redstone would move up the light strand, because it would have a red stone torch on top of each redstone lamp. The redstone torch below that, on the lamp, on the next lamp down, would activate the one above it, turning it off, so you would kind of have this endless stream of lights moving up the elevator, and I was going to check like the first thing that I need to do is kinda build a redstone clock...

To develop his schematic, Martin employed what are called redstone repeaters to propel a greater amount of energy through the system. For aesthetic purposes, he designed this redstone schematic underground, out of sight, below the elevator (Figure 3).
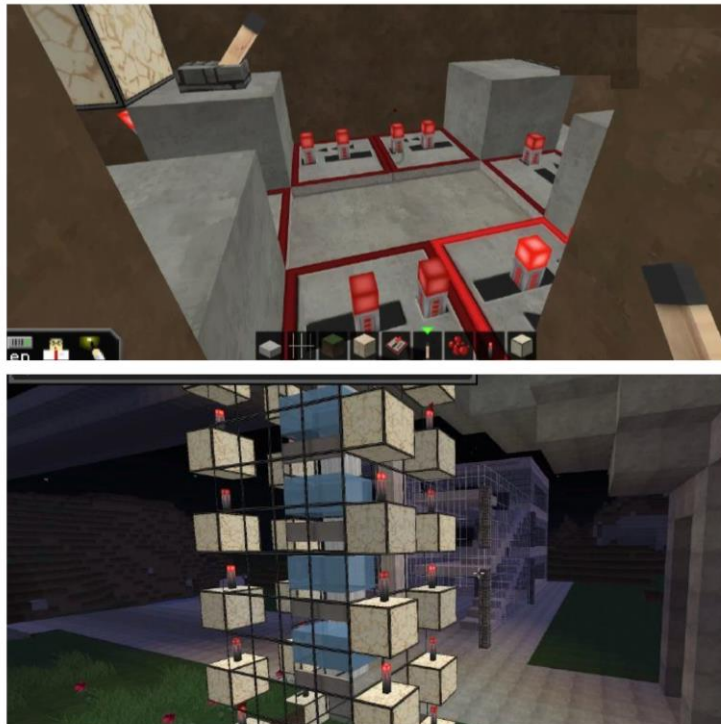

Figure 3. Martin's initial redstone schematic (top) sending light up alongside elevator (bottom).

Martin's redstone schematic was mutable. It moved and changed form over time. Throughout the next week, Martin re-created this particular schematic at two other locations. As the group continued to work on Riverfront Park they eventually created a large stage for concerts and other public presentations. Martin recognized that the stage needed a lighting system, so he dug underground once again, planted his redstone schematic and then linked it to glowing blocks that he placed on the stage (Figure 4).
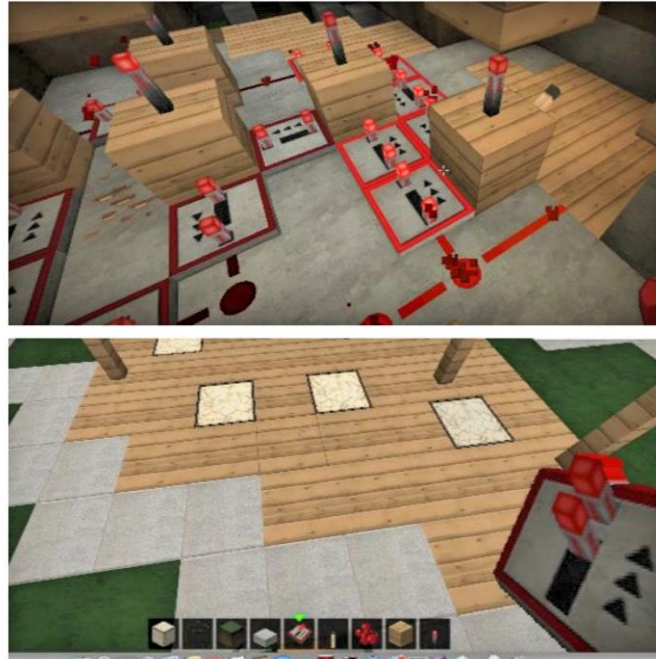

Figure 4. Martin's second schematic (top) lights up glowstone embedded in the stage (bottom).

Martin not only flexibly used his schematic in different locations, but also consistently re-created a version of it based on the underground landscape. In another instance, Martin built a small restaurant that overlooked the Columbia River inside of the Bridge Building. Once again, he reconfigured his redstone schematic to produce a stream of lights rising upward from the base of the restaurant (Figure 5).

Analysis. Martin's redstone schematic is a mutable mobile (de Laet & Mol, 2000). It travels to new locations; it "doesn't try to impose itself, but tries to serve;" it is "adaptable, flexible, and responsive" (p. 226). In this spirit, each schematic took shape alongside other builds by other participants, serving the illumination needs of each location. Furthermore, much like the Zimbabwean Bush Pump of which de Laet and Mol write, when new "models [came] into being, the old ones [did] not necessarily disappear" (p. 228). As such, each schematic also signaled gradual progress, improvement, and development of Martin's circuit-building skill-sets. Rather than being erased and forgotten, the schematics became embedded in the existing landscape, acting as models for others to follow as well as prototypes for other participants, including Martin, to improve upon.
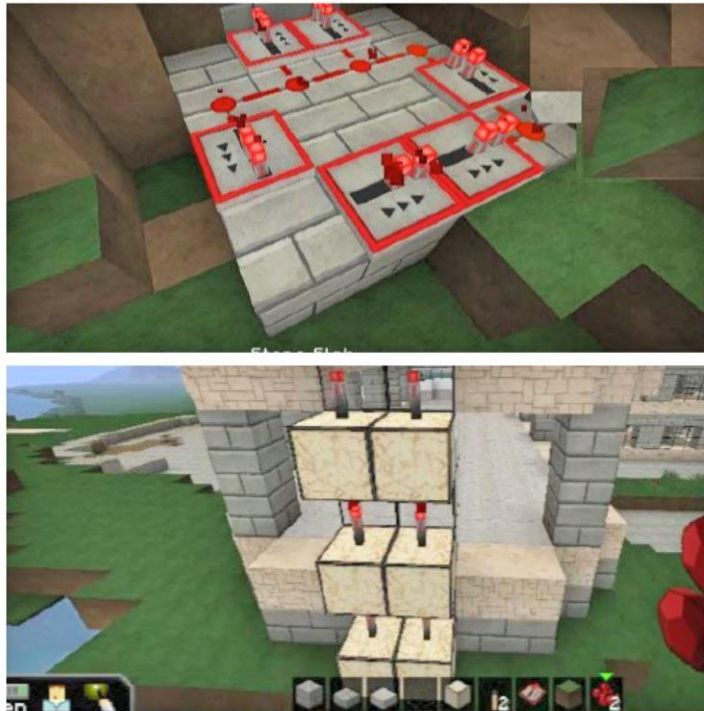
Figure 5. Martin's final schematic (top) illuminates lights alongside the restaurant (bottom).

As a mutable mobile, the schematic not only allowed Martin to work with it in three discrete locations but it also allowed him to test out his continually burgeoning expertise in the development of simple circuits—and interest—each time. Martin generated learning opportunities for himself, gradually increasing his own level of difficulty, as he repeatedly encountered a new problem set consisting of new materials within a new setting—i.e. the material configuration of the elevator was much different than that of the stage; the material configuration of the stage was much different than that of the restaurant. His interest in circuitry—embedded within the schematic—spread, moving across time and space through his consistent re-production of the schematic.

Martin did not consistently re-configure his lighting schematic in a vacuum, though. That schematic existed in social milieu that blended together our MBB community with the overarching affinity space of *Minecraft*. Moreover, his lighting system lingered and provoked, it drew other participants towards it. When the avatars of other participants were nearby the elevator, for instance, Martin had the opportunity to describe how he "rigged up the elevator." That is, Martin's interest not only emerged through the mutability of idea of the schematic in-and-of-itself, it also emerged—or even took on a new form—when he could share that idea with others.

Showcasing his work in situ to other participants also enabled Martin to reflect upon and question the design decisions that he had made. When describing to Ricky how the elevator-lights worked, for example, Martin began to reconsider its design: "Now that I think about it, I should have made the lights actually part of the elevator. Just like destroy the corners and then move them, like one block in," he told Ricky. These reflections were spurred, in part, by the schematics' persistence—the very fact that they were not erased, or deleted, at the end of the day, but rather that they became lasting, steadfast objects embedded in the digital landscape.

Martin's redstone schematic, like the bush pump, had its own limited set of configurations, however. It was meant to produce light—yet Martin was able to re-arrange how the schematic emitted light each in each location based on both the underground layout upon which he built the schematic, and the aboveground layout of

the lighting system. Thus, not only did the non-human schematic move Martin towards additional learning opportunities, but those learning opportunities were also dependent upon other non-human components of the game (e.g. the ground, the elevator, the stage, the restaurant).

Arthur's Mutable Transit Station
Narration. Production for the entire group eventually moved east, away from the Columbia River, as the group began to re-imagine the nearby Lutece community. At the time, Lutece was currently in the early stages of redevelopment by the local housing authority. As the housing authority elaborated, "the neighborhood is considered a food desert, and the only retail opportunity in the neighborhood is a recently opened Family Dollar…The plan seeks to create over 200,000 square feet of commercial and institutional space, including a new health center" (p. 5). As a group, participants in MBB began to think alongside the housing authority. Arthur, especially, led the charge to imagine new forms of transportation that could connect residents to other parts of the city. Thus, in the following section, I focus particularly on how Arthur continually adapted a redstone-powered transit station according to both the emerging ideas of MBB group members, as well as the needs of the Lutece community. Like Martin's lighting schematic, I analyze the transit station as a mutable mobile, as a fluid entity in which that fluidity was "built into the [system] itself" (de Laet & Mol, p. 226).

Arthur initially began production in the Lutece community by building a large, spiraling statue. When asked why he chose to build it, he replied: "No reason. I just wanted to try it out." As Arthur became more acquainted with the program, however, and the kinds of projects that other participants were taking on—parks, urban farms, health centers—Arthur segued toward building something that could, as he said, help the community: a transit station.

Inspiration for Arthur's transit station was born from a Youtube video that he "hadn't watched in forever." In the video, the builder creates a redstone-operated system which enables an avatar to press a button that sends a minecart—*Minecraft's* swiftest form of transportation—down a chute, arriving at the avatar's feet. The avatar can then climb in the cart and press another button to dictate which track the cart will travel, thereby taking the avatar in one of multiple possible directions. Arthur also installed a mechanism (a pressure plate in *Minecraft* terms) to recognize if the avatar failed to enter the cart, subsequently sending the cart back into storage. Figure 6 illustrates Arthur's system and his description of it. The production of the transit station became a hotbed of activity over a three-day period. As a result, the transit station became a "changeable object," one that "altered over time and [was] under constant review" (de Laet & Mol, 2001), especially as new participants entered the scene.

Figure 6. Arthur's description the inner-workings of his transit system.

Analysis. The station's fluidity resulted from its interaction with other participants. Just as the Zimbabwaen bush pump, as described by de Laet and Mol, "includes the villagers that put it together," it is "nothing without the community it will serve" (p. 235-4). As de Laet and Mol further detail:

> In order to be a pump that (pre)serves a community, it notably needs to look attractive, have properly fixed levers and well-made concrete aprons, it must also be capable of gathering people together…it must seduce people into taking care of it. Thus the boundaries around a community pump may be widely drawn. Indeed, they embrace the community. (p. 235)

Just like the bush pump, Arthur's transit station seduced and embraced the community of MBB participants. Prior to Arthur's second day of work on the station, for instance, all participants—including Eddy, Tom, Neil, and Jerome—worked on their own, separate initiatives. As Arthur began to work, the transit station lured participants toward it and collaboration, seducing them "into taking care of it." Arthur and Eddy, for instance, became highly engaged in the production of a fully-functional system that could cut across the entire city of Metro; Tom turned his attention to the entrance to the station; Neil flew his avatar in to check in on the action and help others as needed; Jerome tested out how well the rails actually worked by placing his avatar in a rail cart (Figure 7).

In luring participants towards it—and in providing numerous pathways into participation—the boundaries of the transit station began to re-shape. What was once an

isolated, individual project by Arthur, relegated to a limited geographic area, became a collaborative, emergent entity for all participants that began to stretch far beyond its original location. Eddy, for example, developed an interest in connecting the above-ground transit station to a nearby, underground Metro stop from previous efforts (by the author) that had been left unfinished. As a result, the transit station—once focused on above-ground tracks—now included a subterranean component, which extended to other areas of the Lutece neighborhood. Similarly, while Eddy extended the station underground, Tom extended it outward, adding an entrance to the station, in which an non-player character could distribute tickets. The "boundaries" of the transit station were never fixed, static. Rather, they were protean, taking on new shape as new participants entered into collaborative production together. While Martin reconfigured his lighting system multiple times according to contextual factors, like the location (e.g. restaurant, stage) and underground layout, Arthur's transit station fluidly expanded as new participants entered and collaborated alongside him.
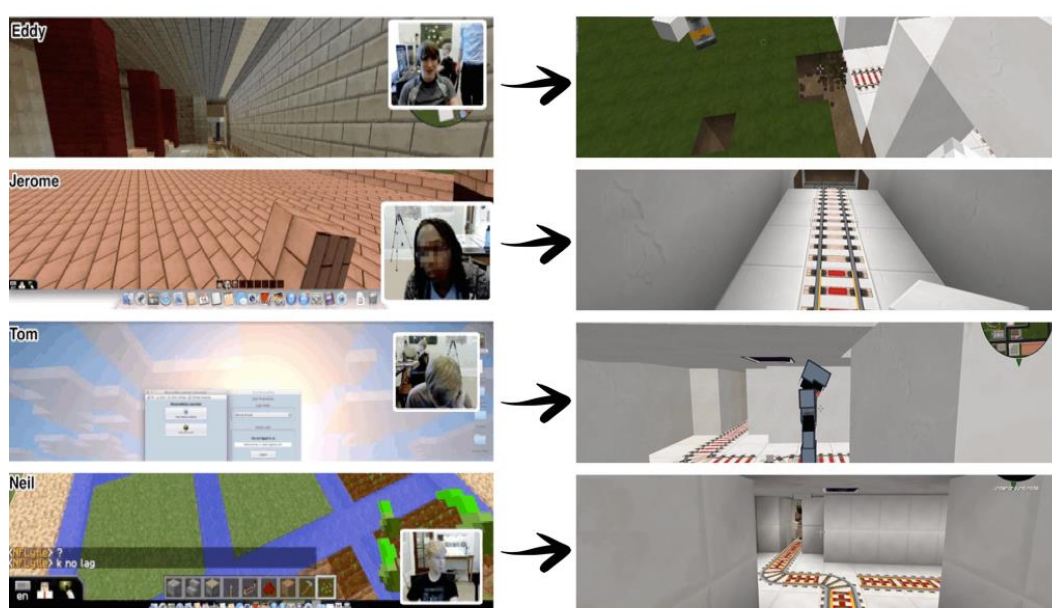

Figure 7. Previously working on individual projects throughout the open-world, all participants are lured toward Arthur's transit station.

Importantly, it was not only the transit station itself that drew participants toward it, but also the affective energy that resonated from it. In this case, participants worked together "symbiotically," thriving not only on mutually beneficial partnerships, but also on their mutual energy (Engeström, 2009, p. 6). This mutual energy, then, signaled a felt-response to collective intensities. It enabled playful, individual-collective participation: the opportunity to be a part of something, working—and feeling—alongside others incrementally. Moreover, that energy did not arise from neat, pre-planned pathways; rather, it propagated through pulsations, excitable bursts, the desire to contribute to the collective, while also testing out one's own developing expertise. As such, the stakes for participants were relatively low as no individual took complete control of the ongoing project.

Discussion: Designing-in-time

As libraries, museums, and other informal, media-rich settings continue to design and implement learning opportunities for youth (Ito et al., 2013) there is an increasing need to

understand the relationship between interest and time, including how interests ebb-and-flow, how they accrue, how they transform and even dissolve. Therefore, in this article, I have focused particularly on mutable mobiles by specifically attending to how youth return to, and reflect upon, interest-driven experiences over time. I have avoided emphasizing *Minecraft* itself as overt interest. Rather, through analyses of both Matthew's lighting schematic and Arthur's transit station, I called attention to the mutability within this *Minecraft*-based connected learning setting, or the ability for participants to re-visit, and then re-configure, in-game productions over time.

In the following, I expound upon mutability to draw out implications for *designing-in-time*. To explore designing in time, I play with the language of the phrase itself, making two passes through it. In the first pass, I question what it means for time to be a critical component of the design of a given program and its respective sessions. In the second pass, I emphasize how mentors can attune themselves to the emergence of mutable mobiles, altering their own pedagogy in response to that emergence.

Designing-In-Time (1): From Shared Purpose to Shared History
Toward the end of MBB, I asked Arthur why he returned, again and again, to his transit station: "Because I could," he said, before following up with: "There was no time limit." Arthur was most proud of his work when it "took its time," when he could continue to think and work over days, and even weeks, at home and during MBB. This capability was in stark contrast to, as he noted, the twenty minutes he often had to complete worksheets in math class, which he often rushed through and rarely completed. This is not to say that Arthur only worked on his transit station through the duration of his MBB experience; rather, he came back to it over time, making additions and tweaks, re-watching YouTube videos and honing specific skills to make the system more efficient. Because of the open-world nature of *Minecraft*, participants, like Martin and Arthur, often returned to previous builds. As a result, the passage of time was evident—old builds, left unfinished, remained, residue from collaborative work over previous days, weeks, and months (Grimes & Fields, 2012). Unlike social media networks, for instance, in which that residue (i.e. likes, tags, comments) is buried, only accessible through variations of deep, digital scraping, virtual worlds—and the objects and artifacts within—are persistent. Residue is accessible rather than submerged.

In MBB, time—instantiated in this residue—began to factor into the design of regular programming. As new participants joined, they were often lured toward the objects and artifacts built by previous participants. These new participants, who had a general interest in *Minecraft*, developed more refined interests as they interacted with this temporally-laden residue. One participant, Tom, for instance, tested out the redstone circuitry in Arthur's transit system, using the model Arthur had left behind in order to, as he said, "get inside and see how it works" so he could build something similar.

As a group, our activities became less about moving onward to new territory in the Metro area, with new objectives, and more about re-imagining old territory. Unlike a school classroom, which might be considered a site of erasure (e.g. whiteboard wiped clean after each period, markers re-writing the same notes, over previous etchings, each class period), the server that MBB operated on was a site of duration. As such, it enabled new participants to entangle their emerging present with the program's past, fostering not only a shared purpose, but also a shared history, as participants dialogued with previous (and current) participants by engaging with their residual builds.

Designing-in-Time (2): Attunement to Interests-in-Motion
Learning settings that hold, steadfast, to arbitrary temporal units, jettison opportunities for learners to feel, sense, their way toward interests-in-motion. Interests, in other words, are sparked—by objects, or things, as well as by other participants. As a mentor, however,

to attune one's self to sparks of interest necessitates loosening what mentors/adults/researchers consider a so-called interest. For example, as mentor, I designed MBB with the open-world video game *Minecraft* at its core. While I was drawn to a number of *Minecraft's* attributes—including its world-building potential, multiplayer capabilities, and educator- friendly community—I was primarily drawn to it because I knew that my participants were interested in it, having spoken with many of them about it at length over the previous year.

By moving with interest as it emerged in my analysis, I sought to avoid an overt emphasis on *Minecraft*-as-interest. Rather, I began to attune myself to related interests that sparked, those that lured learners toward them and then enabled participants, as Tom said, to "get in and see how that works." While in Arthur's case this included a burgeoning interest in transportation, for others, like Doug, it included a refined focus on housing development, or, as for Artie, a focus on using modifications to the game to learn coding. As a result of these initial sparks, participants began to shuttle across a number of participatory competencies (Kafai & Peppler, 2011), including debugging and decoding; critical practices, like critiquing and reworking media; creative practices, like multimodal composition; and ethical practices, like providing insider information and crediting ownership.

Tom's desire to "see how that works" exemplifies an interest-spark. Curious about how Arthur's transit system operated, Tom "open[ed] it up," quite literally, by breaking blocks to peer inside. Tom's curiosity led to a back-and-forth with Arthur that enabled Arthur to reflect on the process of the system's creation, narrating out-loud how it worked. This moment pushed beyond Tom merely observing others' work and commenting on it; it provided both the opportunity for Tom to see, feel, pull apart, and put back together again, before adopting similar tactics to produce his own system in another location.

Tom's "get[ting] in to see how that works" could be considered a pop-up learning opportunity that resulted from this interest-in-motion. It emerged, in-the-moment, resulting from the energetic, amplified scene surrounding Arthur's transit system. While it is worthy to note the ways in which pop-up learning opportunities emerge in informal, media- rich settings, more pressing questions might be: What happens afterwards? How do mentors alter their pedagogy and, perhaps, even the direction of an ongoing program as interests take form?

Once attuned to participants' interests-in-motion, mentors not only recognize "pop-up" learning, but can also implement learning opportunities that "pop-out" and, later, "pop-in." That is, mentors can harness the energy surrounding those emergent interests and create subsequent learning opportunities around them (pop-out). And further, those opportunities can enter back into circulation (pop-in), enabling greater opportunity for refinement, or even mutability, by learners over time. Attunement to interests-in-motion can lead mentors to facilitate diverse learning arrangements for participants that cut across size and scale, solo projects, mini-demonstrations, and deliberate forums (Sheridan et al., 2015). In short, pop-in/-out learning integrates the mentor into this emergent scene. It calls for the mentor to design-in-time, responding to energies reverberating from participants and their work, recognizing the affective spikes surrounding specific components of the program and integrating potential learning opportunities as a result.

Conclusion

Designing-in-time necessitates being-in-time with participants. When mentors—and their program designs—are in-time with participants, activities become unbound, resulting in emergent activities-in-process instead (Boldt, Lewis & Leander, p. 436). Time, in this, case is not pre-ordained, predicted well in-advance with, for example, twenty minutes set aside

for worksheets, as they are in Arthur's math class. Being-in-time enables mentors and facilitators to adapt to the affective sparks that fuel participants' interests, setting those interests-in-motion in unpredictable routes. Moreover, being-in-time recognizes the role of (im)material objects—avatars, redstone, elevators, and more, in this case. Tools, in turn, are not pre-ordained, but emerge alongside those mobilized interests.

Designing-in-time does not dismiss preparation. Instead, it promotes the circulation of (im)material objects that prompt opportunities to learn across digital and physical, synchronous and asynchronous settings. Because of these circulations, MBB was a constantly growing program—both in terms of its literal expansion across the digital cityscape of Metro over time, as well as its integration of new participants, who increasingly found new trajectories into participation. Some participants, for instance, reported seeing their home city in a different way, recognizing details that had previously gone unnoticed—those details then made their way into our virtual space; some participants reported a need to have models to build specific living units—those models were then installed into our virtual space, residue from earlier affective sparks. By designing-in-time, then, these affective circulations promoted—and sustained—interest over time, enabling it to return rather than dissolve at the end of each session.

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