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We Got This: Toward a Facilitator-Youth Apprenticeship Approach Supporting Collaboration and Design Challenges in Youth-Designed Mobile Location-Based Games

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It's May at a New York City high school's after-school program. We—the adult facilitators—have been guiding a group of youth to produce a location-based mobile game. The teens have worked dozens of hours and want to see a finished product. But with the final playtest coming soon, we are stuck. Reflecting on the most recent session with the participants, we realize that the game is far behind where it should be. Despite having already begun to code the game and write its interactive text, the game's core mechanics are still only half-baked, and adjusting problematic real-world locations in the digital game will take time we just do not have. Something went wrong in the design process, and we have to figure out what to do next.
We ask ourselves, should we make this a “teachable moment?” Reiterate the challenges of mobile game design and let them experience what happens when your product does not work and you are facing a deadline? Or should we adults step in, potentially undercutting the teens’ agency as designers, to help them achieve a play-able outcome? Time is ticking. We decide that this time, we’ll step in and mock up a new prototype to help them out. But there has to be another way to balance the challenges of designing a complex mobile game against the teens’ agency and ownership over the process. What might we do better next time?

With the release of Pokémon Go! in 2016, geolocative or location-based augmented reality (LBAR) gameplay experiences have become far more widespread and familiar. Mobile LBAR games embed players in an experience, providing layers of digital information (characters, objects, and interactions) displayed on the player’s location-aware smartphone based on her current location. As players move around the real-world game space, virtual-game components enable dynamic, meaningful experiences with the attributes, artifacts, landscape, and cultures of the physical spaces (Klopfer & Squire, 2007). Due to the mobile nature of LBAR games, their creators put their own stamp on a place—from a local urban neighborhood to a curated museum space—constructing within and commenting upon real-world contexts in their own distinct voices (Klopfer & Sheldon, 2010). As designing for mobile devices becomes more accessible, youth are becoming empowered as producers rather than merely consumers of this technological genre.

In this chapter, we describe a study in which researchers from the Massachusetts Institute of Technology (including Perry) and practitioners from the New York City-based youth development organization Global Kids Inc. (including Vogel) worked together on the iterative development of an out-of-school-time program in which high school-aged young people engaged in a collaborative design process to craft mobile LBAR games. While many elements (setting, duration, scope, resources, and age group, among other things) contribute to the outcomes of such a youth program, this chapter focuses on the critical role adult facilitators play in structuring activities and supporting youth to overcome the particular challenges of collaborative design of mobile LBAR games.

The adult facilitators of this program followed a design-based research methodology (Anderson & Shattuck, 2012), which engages researchers and practitioners in systematically designing, reflecting upon, and iterating the implementation of an educational program or intervention in an authentic educational context. Following this methodology, not only did we refine our curriculum design, but also our theories about the role of adult facilitation in such projects. With promotion of youth ownership and youth voice as core values undergirding our program, our initial impulse as adult facilitators was to only lightly scaffold activities and intervene infrequently. However, as a result of iterative design, we as practitioners came to recognize that our initial assumptions about structure and agency were overly simplistic. Rather than viewing structure and agency in opposition to one another, we modified both our thinking and our practice similarly to the way Brennan (2013) argues that appropriate structures enhance learner agency. Specifically, to ensure youth were engaged in productive collaboration around meaningful design challenges, we as adult facilitators needed to—at key moments—become active collaborators working in partnership with youth following what Kirshner (2008) would call an apprenticeship model. This is consistent with conclusions reached in other youth development contexts (Bolstad, 2011; Larson, Walker, & Pierce, 2005; Kirshner, 2008) where objectives for youth require them to operate just outside of their Vygotskian zone of proximal development (Vygotsky & Cole, 1978). We found this apprenticeship approach to be especially necessary in our context, given the complex, multilayered nature of the mobile artifact we were expecting youth to produce.

**WHAT SKILLS CAN LBAR GAME DESIGNERS GAIN?**

For more than 2 decades, researchers including Kafai (1994) have argued persuasively that game design offers youth opportunities to gain valuable insights and experiences as they grapple with meaningful challenges throughout the design cycle: planning, prototyping, testing, and iterating upon a game concept. If game producers code their own games, they also gain computational thinking and computer programming skills (Wang & Chen, 2010). Mobile technology specifically affords opportunities for games that are place-based, which means youth designers of these games also become more familiar with their environments, learning geospatial skills and geolocative contextualization (Klopfer & Sheldon, 2010). Designers also stand to gain storytelling and graphic design competencies. The more aspects of the LBAR game design process that youth are exposed to, the greater the potential benefit.

At an organization like Global Kids, which values and promotes youth expression, youth produce place-based mobile games that reflect their local experiences and histories, and transmit messages not often seen in mainstream games or media. When participants work together to author these games, they also learn to collaborate. LBAR game creation is an example of a complex design task which affords students authentic opportunities to move from being autonomous problem-solvers toward working with others to achieve a common goal (Jenkins, Purushotma, Clinton, & Robison, 2009). The collaboration fostered through LBAR
game design might also support character development (Coulter & Stauder, 2015).

WHAT CHALLENGES DO LBAR GAME MAKERS FACE?

We expected participants to develop a range of competencies and skills from collaboratively designing a mobile LBAR game. But that would not be without its challenges.

**Challenges Stemming From the Novelty and Complexity of the LBAR Design Process**

Despite being avid players of many kinds of games, youth participants of Global Kids’ programs generally had no experiences with LBAR mobile games (Pokémon Go! had not yet been developed at the time of this study). Facilitators would be responsible for introducing youth to the genre. In addition, facilitators expected that the design process would be new to many of our participants. While some youth regularly engage in peer and interest-driven design practices as they “mess around” and “geek out” with digital technologies (Ito et al., 2008), in traditional school-based settings, youth typically encounter few opportunities to produce complex products with new technologies in an open-ended way, and, thus, may struggle with the open-ended nature of designing place-based AR (augmented reality) experiences (Mathews, 2013). Students may even resist such constructivist approaches to learning to create with digital tools because of the disjuncture with traditional school expectations and cultures (Brennan, 2015). Despite being roughly organized around a process that cycles through ideation, prototyping, building, and testing, design processes are fluid, nonlinear and unpredictable (Lawson, 2006).

LBAR games, in particular, are multilayered products; especially those designed to promote learning. They often integrate several instructional approaches, including emphasizing locations, the player’s role, and the tasks she must complete (Wu, Lee, Chang & Liang, 2013). The AR experiences that Global Kids encouraged youth participants to design fell into a category that Klopfer (2008) calls “lightly augmented,” in which players interact with specific features in the physical environment. Therefore, during the ideation phase, youth designers of lightly augmented mobile experiences engage in place-based education to make thoughtful connections to particular locations (for an extensive literature review on place-based education in youth-produced AR contexts, see Mathews, 2013).

Once LBAR designers gain familiarity with a particular location, they draft and geolocate an appropriate narrative with meaningful connections to that place and produce an effective prototype of the game. The creation of prototypes is a particularly challenging, important step of the game design process for youth (Macklin & Sharp, 2012). A good prototype helps designers test, and therefore ensure, that the parts of the system (interactions with place, story, game mechanics, and theme) are coordinated to provide an optimal experience (Mathews, 2015).

**Challenges Arising From the Collaborative Nature of the Project**

A second set of challenges arose from the collaborative nature of the project. Youth AR experience designers interviewed in Mathews’ (2015) study ranked conflicts around consensus-building as some of the most difficult aspects of the design process. To operate efficiently and democratically, members of collaborative groups must be skillful at “providing everyone with a chance to speak, coordinating the actions of group members, reaching consensus, ensuring elaboration of the material being learned, and keeping all members on task” (Johnson & Others, 1984). Collaboration is a skill learned over time, and in classroom contexts, teachers have roles to play in scaffolding group work (Gillies & Boyle, 2010). Our goals around collaboration included ensuring all of the teen participants at our sites felt like they contributed to and had a voice in the project. We also aimed to guide the youth to recognize that in collaborative design, compromise is inevitable and conflict can be productive.

**OUR CONTEXT**

The settings chosen for study were summer or after-school programs run by Global Kids, Inc. Global Kids is a non-profit youth development organization that provides out-of-school time programming, in-school enrichment, and other services “to ensure that youth from underserved areas have the knowledge, skills, experiences and values they need to succeed in school, participate effectively in the democratic process, and achieve leadership in their communities and on the global stage” (“Global Kids | Home,” n.d.). Most staff are professionals in the field of youth development, many from the communities they serve. In aiming to foster leadership skills, the organization urges staff to promote youth self-expression, be sensitive to the diverse needs of participants, and ensure workshops are inclusionary and youth-led whenever possible.
In 2011, Global Kids and the New York Public Library founded NYC Haunts, a STEM-based learning program in which youth designers create a digital, mobile location-based game exploring local history and contemporary issues facing a particular neighborhood. The NYC Haunts location-based games produced by Global Kids youth typically follow the footsteps of a “ghost”—a historical figure or composite modern-day character with some “unfinished business” for the player to assist (Vogel, 2014). The games aimed to immerse players in stories that would truly engage with the history, local issues, or artifacts in a place. To create their games, youth used TaleBlazer, a software platform developed by the Massachusetts Institute of Technology’s Scheller Teacher Education Program Lab. The software is equipped with a blocks-based programming language and a user-friendly interface—features that enable young people and other non-experts to code the back end of these games (Medlock-Walton, 2012).

Research was conducted during three Global Kids' NYC Haunts programs during the spring and summer of 2014 (program components and participant demographics summarized in Table 7.1), which all served approximately the same number of high school-aged youth (between 14 and 16 youth participants). Of the 45 total participants, 20% of them reported their ethnicity as Latino/a, 67% of them Black, 7% Asian and 7% White. Fifty-seven percent of them were female, and 43% were male. Youth were engaged in the programs for roughly the same number of contact hours (between 24 and 25 hours). The spring program (Iteration 1 of the study) differed from the summer programs (Iteration 2 of the study) in a few key ways. Participants in the spring semester-long after-school program received partial school credits. Attendance was sometimes spotty. Participants in the month-long summer programs, which were run in conjunction with an art museum in Brooklyn and a community center in the Bronx, received a stipend (museum) or minimum wage pay (community center). Attendance was generally consistent in the summer.

Several adult facilitators helped to shape this study’s design and implementation (see Table 7.1). Across the three sites, there were a total of six adult facilitators. The spring program was led by two educators and the summer programs were each led by four. Vogel, one of the authors of this study, was the lead educator facilitating the program across all sites and programs. In the spring, she was joined by a Global Kids facilitator who had worked with some of the youth in previous programs. At each summer program, Vogel was joined by one facilitator and a college-aged intern from Global Kids, and one of two site-specific facilitators. It was the first time that facilitators worked with students at the museum. The community center-based staff member had prior relationships with some of the youth there. Facilitators varied in years of experience working with youth and varied familiarity with the TaleBlazer technology and the game design process. All facilitators ascribed to the philosophy of promoting youth voice. All three sites benefited from at least one visit from Perry, who supported as a consultant.

### Table 7.1. Summary Description of Youth Game Design Program Sites Included in the Study

<table>
<thead>
<tr>
<th>Iteration</th>
<th>Site</th>
<th>Schedule</th>
<th>Attendance</th>
<th>Demographics</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High school (Brooklyn)</td>
<td>Jan.-May 2014, weekly 1.5 hr. sessions after-school, ~25 contact hours</td>
<td>16 enrolled, 11 attended a majority of sessions, 7 consistent attendees per session, unpaid; partial credits in school</td>
<td>10 girls, 6 boys (1 Latino, 15 Black)</td>
<td>2 total: Vogel (2 total)</td>
</tr>
<tr>
<td>2</td>
<td>Site A: Community center (Bronx)</td>
<td>Jul.-Aug. 2014, biweekly 2.5-3 hr. sessions during a summer work program, ~25 contact hours</td>
<td>15 enrolled, 13 consistent attendees, compensation (minimum wage)</td>
<td>9 girls, 6 boys (8 Latino, 7 Black)</td>
<td>4 total: Vogel (1 college intern), Global Kids facilitator, one college intern and one community center educator</td>
</tr>
<tr>
<td>3</td>
<td>Site B: Art museum (Brooklyn)</td>
<td>Jul.-Aug. 2014, biweekly 3 hr. sessions, ~24 contact hours</td>
<td>14 enrolled, 14 consistent attendees, compensation (small stipend)</td>
<td>7 girls, 7 boys (3 Asian, 8 Black, 3 White)</td>
<td>4 total: Vogel (1 Global Kids facilitator, one college intern, and one museum educator)</td>
</tr>
</tbody>
</table>

In line with design-based research approaches, as we designed our original curriculum and considered its implementation and outcomes, we reflected on our baseline assumptions about the role of the facilitator. There are many potential models for adult-youth interaction in youth programs, with some approaches classified as more “adult-driven” and others more “youth-driven” (Larson et al., 2005). Approaches along this spectrum have their benefits and limitations. Youth-driven approaches might be more appropriate for programs that expect youth to take on
active role in decision-making and that are geared toward the development of leadership skills, whereas adult-driven approaches often afford more opportunities for youth to develop specialized skills or organize sophisticated events or projects (Larson et al., 2005). Larson (2006) outlines the tensions facing adult facilitators of youth programs: adult participation in the process should not be so heavy-handed or directed as to limit or stifle youth motivation, engagement, voice or ownership over the project. At the same time, too little guidance from mentors can leave youth participants feeling without direction or purpose, or result in incomplete projects that youth are not likely to take pride in.

In some youth-digital media production settings, such as the Computer Clubhouse centers around the world, youth are encouraged to use software and other materials to make projects of their choosing and adult mentors are “guides on the side,” engaging in little direct instruction of concepts. In these contexts, “the creation of a design culture requires substantial support and direction from Clubhouse coordinators and mentors, less so in telling Clubhouse members what to do but more so in helping them develop their own ideas” (Kafai, Peppier, & Chapman, 2009, p. 4). In other contexts, such as in video production, adults have managed tight schedules (Goodman, 2008), provided critical feedback (Goldman & Booker, 2008), and have “polished” work so that outputs are high-quality products (Jenson, Dahya, & Fisher, 2014). In Macklin and Sharp’s (2012) examination of “issues literacy”-based game design, facilitators of one program chose to limit the parameters of the project to focus the youth primarily on research and producing a working paper prototype, rather than the back-end coding and development: “We need to consider balance, one of the most important hallmarks of a challenging and fun game, as we try to balance the triad of issues: literacy, game design, and technology/tools” (Macklin & Sharp, 2012, p. 400). Echoing these approaches, before beginning our first iteration, our intention was to provide some structures for youth participation; but in line with our philosophies about youth empowerment at the time, we aimed to do so minimally and infrequently.

Using the design-based research technique of conjecture mapping (for more detail see Sandoval, 2014), we developed a conjecture to both articulate and evaluate design and theory, and later reshaped the conjecture as our research unfolded. Initially, during Iteration 1, our conjecture was that facilitators providing limited structure would allow for a maximum of equitable youth active participation (agency) and learning through engaging with the full design arc of constructing a location-based augmented reality game. Our curricular facilitator materials and practices (described in more detail in the next section) embodied this conjecture by encouraging facilitators to provide limited structure for student efforts in keeping with our level of experience with AR game creation at this time. However, during Iteration 1, facilitators saw that students were often overwhelmed by the degree of novelty and complexity of the design process, which meant facilitators had to vacillate from a “hands off” approach to a high-involvement, “save the day” approach doing the heavy-lifting when the students were appreciably floundering. As described in the next section, we saw the need for additional structure in two main areas: (1) student collaboration and (2) scaffolding the design process. Despite the increased facilitator involvement in Iteration 2, we hoped the project would remain largely youth-driven.

After completing the Iteration 1 of the program, we were struck by the degree to which we hoped for, but did not see, youth collaborating and grappling with a range of meaningful design challenges unique to mobile LBAR game production, such as closely observing and integrating features of the landscape into the game, taking active roles in crafting the game’s story, translating paper prototypes to code in TaleBlazer, and problem-solving around coding bugs. We also observed that a few dominant voices (including ours as facilitators) had an outsized role in the end product, even though we had hoped that a range of voices about the place and its history would be synthesized to create a broader whole. In line with our conjecture, we had initially so lightly structured design activities that the situation necessitated a drastic ramping up of scaffolding at the end in order to yield an experience that approached our initial vision of engaging youth in the entire arc of the design process.

We considered where students were struggling and determined that not only did we need to change aspects of the curriculum itself, but also our underlying assumptions about our roles as facilitators. In debriefing our experience, we found a model to help guide us in formulating a new approach: Kirshner’s (2008) research on adult-youth interaction during programs centered around activist campaigns. Kirshner conceptualized three categories of adult-youth interactions: facilitation, apprenticeship, and joint work. In the facilitation approach, adults sought to be neutral, “hands-off” guides of a youth-led process. The apprenticeship approach was characterized by adults engaging in campaigns alongside youth, while modeling, scaffolding, and structuring complex activities in ways that were sensitive to youth skill levels. The joint work approach is a form of collaboration where adults and youth work together on a project in an environment where the goal is oriented more toward completing the project than on training novices. We began to view our approach to supporting youth LBAR game creation through the lens of apprenticeship. While Kirshner found that in programs exhibiting this approach, youth had fewer opportunities to plan and facilitate meetings than in approaches where adults were less involved, participants in the program which tended toward apprenticeship had “more extensive practice developing and
implementing a campaign with clear policy objectives" and "gained access to a communication strategy used by seasoned advocacy organizations" while still benefiting from a youth-centered environment (p. 84).

Revising our conjecture, we recognized that rather than providing limited structure, facilitators might "apprentice" the youth by providing more consistent, thoughtful structures, still very much aimed at maximum equitable agency and learning through engagement with the design process of LBAR games. We refined our practices at various steps, providing more structured support for collaboration. We also engaged in codesigning alongside the youth, specifically, in structuring and supporting work at the early stages of developing a LBAR game (e.g., brainstorming, synthesizing ideas, and prototyping). As we discovered, these first stages are crucial moments which can set youth up to succeed or stall as they embark on producing a particularly complex, multilayered artifact. Our specific scaffolding and structuring practices will be discussed in depth in the next section below.

Throughout the implementations, a variety of data were collected to shed light on adult-youth interaction, collaboration between youth members of the group, the opportunities they had to grapple with design challenges, and their sense of ownership and voice over the process and final product. Data collection methods included pre-, mid-, and postsurveys of youth participants, postprogram interviews with youth participants, an analysis of products created by the youth, and facilitator fieldnotes taken after each program session. A sampling of youth participants also participated in semistructured interviews by Vogel, Perry, and Jason Haas, a doctoral student at MIT. Finally, photographs of the various products of the design process were analyzed, including brainstorming sheets, anchor charts, game design documents, prototypes, slide decks created for the final presentation, and the TaleBlazer games themselves.

**IMPROVING PROGRAM DESIGN ACROSS ITERATIONS**

In both the spring and the summer at all three program sites, youth emerged from the design process with a playable LBAR game artifact that leveraged mobile technologies to link gameplay to local environments and culturally relevant topics. In the spring, the game took place at a housing complex near the youth participants' high school, which, decades prior, was the site of Ebbets Field, home of the Brooklyn Dodgers baseball team. In this game, the player assumed the role of Jackie Robinson, who broke the color barrier in baseball in the late 1940s at that stadium. Youth participants found the task of creating a mobile game in their community eye-opening, with one participant commenting, "most people that live in

the apartment complex ... they don't know about Ebbets Field ... or how important it was.... When I think back ... it's really disappointing that I lived in a place for so long and I didn't know anything about it." Youth at the museum-based summer program produced a spooky game which took place at the cool, dimly lit visible storage exhibit. Here, the player is an average museum visitor who must, through close observation and selection of particular museum artifacts, uncover how a fictional girl named Helen died in order to halt her haunting of the exhibit. At the community center's program, participants designed a game (Figure 7.1) centered around Drake Park, a recently discovered slave burial ground from the 17th and 18th centuries in the middle of Hunts Point in the Bronx. The player must restore items to the "forgotten" ghosts of the slaves in order to honor their memories and use location-based clues to guide a runaway slave to safety.
In postprogram interviews and surveys, youth from all three sites expressed that they were proud of the game they produced and their contributions to the final outcome. All 12 of the youth interviewed from both spring and summer programs reported that collaboration and teamwork were some of the central takeaways of the program. The kinds of challenges they described having grappled with throughout the design process, however, were quite different.

Several key moments in the spring (Iteration 1) design process challenged our ideas about the optimal role for facilitators of mobile LEAR game design programs. Below, we describe structures that facilitators put in place at various moments during the spring program's game design process and report the visible practices of the youth participants connected to those structures. We then describe modifications to these facilitation structures for the summer programs, and the youth practices that we observed subsequently.

**Brainstorming, Evaluating, and Selecting Ideas for the Game**

Coming to consensus around choosing a game's topic, location, and story-premise was a challenging endeavor for many youth participants in both the spring and the summer. As Rachel, a 17-year-old female participant at the museum, put it:

"I'm not really the collaborative type. Like, I normally like to do things on my own and get them done because I feel I work well when I know what I want to do. I can just get right to it. So, it took me a while to adjust to the collaborating with others and hearing their ideas and stuff.... It took me a while to realize I couldn't do this on my own.

Anticipating that the youth would face challenges around generating, selecting, and evaluating ideas for their game, facilitators put specific initial structures in place to scaffold this work in the spring later modifying these practices for the summer programs.

**Iteration 1—Spring Approach: Unwittingly Fostering Competition**

In the spring, facilitators attempted to guide students to brainstorm and select a topic for their game as a group. The facilitator's practices included (1) encouraging youth to advocate for their own particular, disparate ideas and (2) facilitating open-ended whole group discussions.

The first practice, youth advocating for their disparate ideas, may have unwittingly fostered a competitively-oriented dynamic among the participants. After a whole-group information-share and brainstorm about local events and history, youth chose to do preliminary research about distinct and diverse topics. Some had chosen to look into Revolutionary War history in the area, others were interested in crime history, and another was passionate about Jackie Robinson's role in baseball and Black history in the area. Facilitators encouraged the youth to go around in a circle, sharing their ideas with the group. They were told that if they felt strongly about one or another of the topics, they should make a case for it by justifying their ideas using a set of criteria that the facilitators had generated and posted on the board, which included ensuring the game was about local history, took place around the school's neighborhood, was structured around a story, and required the player to walk around, meet characters, answer questions, and/or collect items. Ideas were shared, but one voice emerged as dominant. Fatima, a 14-year-old female participant, made a case for her idea related to Ebbets Field and Jackie Robinson, using a combination of criteria she had developed herself (related to the cultural relevance of the topic) and criteria from the facilitators (related to local history and location). In describing that moment, Fatima interpreted the process as a competition:

"They all had spectacular, I mean really great ideas—I mean really great—ideas and we all wanted our ideas to be the one chosen. Of course, that is what a competition is, but after I talked to them for a while, they realized that we should do something much more close, and that was my main argument: something much more close and something that relates to all of us.

And most of the other topics, they related to us, but not as directly as the topic of Ebbets Field and Jackie Robinson.

At the end of the game design process and program, the group's final presentation highlighted Fatima as the participant responsible for the game's topic. When two other students were interviewed about the topic selection process, both attributed the idea for the game to Fatima. Lawrence, a 15-year-old male, said that Fatima's idea "overshadowed every other topic." While other youth game designers had bought into the idea, they continued to view it as "her" idea, up to the end. By facilitating a "voting" model across widely varying topics, there could only be one clear "winner" rather than a thoughtful synthesis, and ultimately few contributions or voices were incorporated.

Having selected a topic for the game, facilitators engaged in the second practice: open-ended whole group discussion. As the youth worked toward the basic story, goal, and mechanics for the game, adult facilitators asked the whole group to answer questions (e.g., What should the player's goal be? What does the player do in the game?) to spur on an organic conversation about ideas. The first such group discussion was fruitful, "with stu-
students contributing ideas like baseball card collections, radio announcements and other details” (Field notes, 3/26/2014). However, discussion at the next design session became unwieldy, as captured in our field notes:

To some extent they were building on each other’s ideas, but sometimes it was as if they hadn’t heard the idea before theirs and contributed unrelated ideas. There was a range of ideas expressed: finding something Jackie Robinson had lost, finding a genie in a piece of wood, collect cards because someone is stuck in purgatory, it [sic.] was difficult to evaluate all of them and slow students down...The dialogue was free-flowing, but at times, criticism was bordering on unsafe space territory. Some students were not open to criticism. Other students usually quite active (Shamar) today during the fast-paced design process seemed withdrawn toward the end. (Field notes, 4/2/2014)

The loose, unstructured format facilitators chose for discussion made it difficult for the students to tease out, evaluate and incorporate ideas meaningfully. While we had intended to promote youth agency with structures that would provide space for participants to advocate for their ideas in a whole group, the end result was an atmosphere where a few voices dominated, while others retreated. All signs led to reevaluating facilitator practices toward more inclusive and participatory collaboration during this hurdle in the design process.

**Iteration 2—Summer Approach: Structuring Compromises**

To promote a wider range of youth voices and ownership over the topics, locations, and stories of their games, we changed the structures for generating ideas and selecting a topic during the summer programs. The three main practices we employed were (1) choosing locations and game topics all together, (2) encouraging groups of youth designers to brainstorm around similar locations and topics, and (3) modeling how ideas could be separated from their initial origins, evaluated, and recombined.

First, instead of splitting designers up to brainstorm about disparate topics and locations, game locations were established together as a whole group before dividing up to brainstorm. We hoped that, in that way, youth would brainstorm story ideas around more similar themes, thus making it possible to combine multiple ideas into a cohesive synthesis, rather than having to choose one and discard others. At the museum, the group had a chance to tour three different exhibits and to select one to house their game. Small groups were randomly assigned to record observations and evaluate the pros and cons of each exhibit as a potential game space. Youth evaluated spaces using a set of criteria which the facilitators had modified from the spring program to be more open-ended and reflective of strong location-based games. These criteria were also elicited from the youth by facilitators after they had played a sample location-based game, and included judging whether place was used in a unique way (i.e., could this game be played anywhere else?), whether the gameplay was fun, and whether the story supported gameplay. At the same time, the process of touring and evaluating the exhibits also helped the youth develop new criteria to evaluate potential spots, stating that one location promoted a “sense of exploration,” and had “lots of characters” (Figure 7.2). Participants still had an opportunity to justify their perspectives about the best locations before taking a final vote, but those youths whose ideas were not selected were still able to contribute core ideas to the game because the only element we had determined up to that point was the game’s location.

At the community center, the location was preestablished by the staff there to be Drake Park, the former slave burial ground. We worried that this choice would undercut youth agency and ownership over the game. In midway and postprogram surveys, when asked to answer the question, “How interested are you in making a game about this topic?” by indicating their response on a Likert scale of 1 (not at all) to 5 (a lot) four of the participants who answered the question ranked the topic with a 4, and three with a 3. Only two indicated 5, “a lot.” Contrast that with the
responses from the museum program, where all but one participant marked “5,” and the remaining marked a “4.” Some at the community center did not much mind that the topic was preselected, as one 18-year-old participant, Sofia, noted “I’m a person who just goes with things, so I was like, ‘Okay, Drake Park. I’m fine with it.’” Another participant in the 11th grade, Janice, however, noted on her survey, “We were given the topic by facilitators/not really given a chance. Not that history isn’t interesting but I was never so into social studies.” Given these responses, we would have to exercise caution in this regard in the future. Not only did it undercut some participants’ ownership over the game, but unlike the museum participants, they did not have the opportunity to practice evaluating locations against criteria. The youth generally rated other aspects of the program highly, however, and choosing the topic in advance did ensure that youth would have the time to make collective decisions about the game’s story and mechanics.

To facilitate brainstorming and topic selection, we implemented a second practice: convening small groups of youth designers to generate potential story ideas and game mechanics appropriate to that location. Facilitators purposefully kept the brainstorming parameters loose to solicit a range of ideas. Designers were told to think of ideas for a game which would fit well within, and teach players something about, the selected location. Youth were permitted to draw, write, and talk about their ideas. The goal was not to develop polished, internally coherent ideas, but to generate a variety of ideas. Figure 7.3 illustrates one group’s collectively brainstormed ideas for the game near the community center.

Each small group then presented their ideas to the larger group. As they did so, facilitators engaged in the third core practice: modeling for youth how ideas could be separated from their initial origins, evaluated, and recombined. We jotted notes down on poster papers, separating out ideas that referred to the player’s role, the player’s goal, the agents (virtual characters) the player would meet, and game mechanics. After each small group’s presentation, other participants were given an opportunity to state which components of the group’s ideas they liked, and to explain why. Ideas that were “seconded” were checked off on the poster paper (Figure 7.4). After the presentations, individual youth designers were given an opportunity to state their “must-haves”—the ideas they felt most passionate about.

This approach to evaluating ideas communicated a crucial aspect of the design process: the fact that ideas generated during brainstorming sessions might be recombined in new ways. This key theme around synthesis of ideas was reflected in the participant interviews during the summer program. Eighteen-year-old Ron, a male participant at the community center, said his favorite part of the project was “everybody interacting and everybody ideas come together to make one idea.” In his interview, Trevor, a 17-year-old male participant at the community center characterized the process: “we just kept on throwing out ideas and eventually all the ideas merged into the game we have today.”
Participants still took ownership over the ideas they contributed. Sofia, 18, of the community center program, was proud that her group “got picked to have the basis of the game” adding, “we put a lot of time into it and they picked our idea. That was really awesome.” Even if one group’s general premise was chosen, there was space for others to also feel proud of their contributions. For example, Trevor said: “Um, I don’t wanna take the credit for it, but I feel like, I brought up the idea of having multiple scenarios.” A few youth interviewees also took pride in watching their ideas evolve. Zora, a participant at the museum program said, “[I like] ‘having my ideas put into something. Like, if I say something, people try to work with it.’” At the same time, she said that she became more open to other participants’ ideas throughout the course of the program, noticing that “when my idea wasn’t picked and someone else’s was, I realized it was better than mine.” When asked what collaboration in this project looked like for her, Rachel, of the museum program, said: “Definitely compromise. Like, collaboration for me is, like, everyone sort of comes with their ideas and we all talk about our ideas and then it’s just a matter of, ‘I like this and your idea and my idea and let’s use these two things and make a whole new idea.’”

Our approach in the summer was to evaluate and select locations together, encourage youth designers to brainstorm around similar locations, and then to model how ideas could be separated from their initial origins and recombined. These structures made it easier to synthesize ideas—providing more opportunities for youth to see their own contributions reflected in the game premise. Such an approach also prompted more opportunities to watch ideas evolve and improve.

**Designing the First Paper Prototype to Test the Game Concept**

In the early stages of the design, our participants faced yet another key challenge: moving from a smattering of ideas to a viable paper prototype that successfully integrated TaleBlazer-friendly game mechanics, location, and narrative. During the first iteration in the spring (as described in the vignette at the start of this chapter), youth as well as adults found ourselves flummoxed and stalled at this stage. By the summer, armed with more experience and context, we could support youth in tackling this challenge earlier, fast-tracking them over a key hurdle and enabling them to grapple with challenges related to building the digital game.

**Iteration 1—Spring Approach: A Shaky Foundation**

At the high school site, the youths’ game premise about Jackie Robinson breaking the color barrier at Brooklyn’s Ebbets Field had many elements of a strong game: a main character and auxiliary characters, conflict, and roots in both the neighborhood location and in history. They had a few ideas for mechanics including answering trivia questions in order to collect “supporters,” and stumbling upon hidden agents that would trap players or provide a bonus. As the weeks went by, facilitators began to recognize the significant holes in the game premise: What would these trivia questions be about? Could we assume the average player could answer these trivia questions? Would trivia questions at all engage the location where the game would be taking place? Facilitators articulated these questions to youth, and worked with them to brainstorm an alternative: “ethical dilemmas” rather than trivia questions. Youth then began to work on coding and writing the story for that premise, discovering the following (as noted during a facilitator check-in):

> At the “research/story” team came up with the character descriptions and dialogues, they kept pointing out how obvious the answer to the [ethical] question (did I make the right decision?) actually was. After students wrote their stories using powerful language about Jackie Robinson’s struggles, the questions sounded condescending. Students and adults alike came to the conclusion that the design of the game / the questions had to change.
> (Field note, 5/7/2014)

In debriefing what had occurred, we realized that the game’s concept had been weak from the start, but both facilitators and youth were unsure how to strengthen it. We attempted to guide the youth to design a paper prototype for their project, but the one we came up with was incomplete, failing to adequately incorporate the question types as well as critical aspects of the game’s location. In previous workshops guiding the construction of TaleBlazer games, games were less complex, relying less upon prototypes to uncover and iterate through problematic designs. However, in the spring groups, with youth taking the lead in creating far more complex games, facilitators felt that creating a paper prototype might be beneficial. However, with limited experience making and using prototypes, we didn’t scaffold youth to create robust enough prototypes capable of surfacing deficiencies within the designs. As such, we moved forward with the game idea before evaluating whether the idea successfully integrated all parts of a location-based game (location, narrative, mechanics, theme). By the time the facilitators (including Vogel) sought help from mentors at Global Kids and TaleBlazer (including Perry) to produce a prototype that captured the essential elements of the game concept, we were just weeks from the launch and had to dramatically compress the production time.
line. Facilitators rushed the youth to complete the game’s story, coding, and artwork, providing very explicit templates for code and game text for the students to work off of, leaving less time and space for youth to express their creativity and to grapple with unique challenges of the building stage.

The compressed design timeline did enable the group to finish the program with a playable prototype for their game, which they took pride in playing and showing to others. However, rushing at the end also limited youth designers’ experience with other meaningful design challenges including grappling with storytelling, coding, and outdoor playtesting. In the spring, all four youth participants who included design challenges on their midprogram and postprogram surveys mentioned one thing: reconciling ideas among the group / choosing topics. In interviews, three of the four youth spring participants recalled challenges the group faced in the paper prototyping stages. They expressed that their initial ideas for the game were too complex, that the questions they wanted to ask were too obvious, and recalled how we attempted to come up with solutions, but they attributed the ultimate solution to Judy (Perry) and the adult facilitators, rather than to their own efforts. During interviews, youth at the spring after-school site remembered being part of a storytelling or coding team, but did not cite specific challenges.

**Iteration 2—Summer Approach: Fast-Tracking Youth Over the Synthesis Hurdle, Transparently**

In the summer, the approach to synthesizing the group’s ideas involved more hands-on work from the facilitators at the outset, rather than as a scramble at the end. It also involved being transparent with the youth about the work the facilitators did. After the facilitators took stock of the ideas that the youth generated and flagged during their brainstorms, we decided to meet together, apart from the participants, to synthesize their ideas into a playable paper prototype that would integrate place, story, and game mechanics, from the start. Our goal as facilitators was to incorporate as many of the youth designers’ “must have” ideas as possible—adding few to no new ideas so that the youth would see their own contributions reflected back—while also ensuring coherence and clarity of game elements.

Youth mostly needed assistance in selecting a TaleBlazer-friendly core mechanic that would serve as an organizing principle for the game. For example, at the community center, participants had suggested that ghosts of the slaves who were in unmarked graves at the site should be characters in the game, and that potential goals of the game could be to “help the ghosts,” “make sure that history is not forgotten,” and “save your friend.” They brainstormed mechanics such as “collecting and delivering items.” Armed with the youth’s must-haves, facilitators were able to map out a prototype to structure their ideas. In order to connect participants’ ideas about not forgetting this history to the “collect/deliver” mechanic they had suggested, we incorporated a “memory” mechanic. Players would meet a series of characters, all of which would be ghosts of the slaves buried around the park. They would learn what items each ghost desired to honor their memories. The player would then have to remember which item each ghost needed, delivering the correct items to them.

At both sites, facilitators synthesized youth ideas during after-hours. When the groups reconvened the next day, facilitators presented youth with a visual outline/paper prototype to express the core elements of the game (Figure 7.5). We discussed transparently which ideas from the brainstorming session we had incorporated and modeled our thinking about how we integrated multiple, interrelated components. Youth were encouraged to ask questions about, evaluate or change the prototype as we presented it. At the museum, facilitators presented the group with two paper prototypes so youth designers might choose whether the game would have a linear or nonlinear structure. Youth in both locations incorporated the facilitators’ synthesis of ideas as a point of departure for fleshing out particular storyline elements and mechanics.

![Figure 7.5. A proposal for a mobile game structure consisting of youth’s ideas, as synthesized by facilitators.](image-url)
This fast track over the “synthesis hurdle” also afforded youth participants more time to focus on actually building the game. In the summer, interviewees and survey respondents wrote about a greater range of meaningful design challenges such as using a flowchart to guide their logic as they coded, debugging scripts, and making collective decisions about whether to include controversial subject matter. There was also more time for youth to engage with the locations where the games would take place. A smaller team within the larger group was able to visit the sites where their games would take place multiple times, closely observing elements in the space, and working within the constraints of the location to select features in the landscape that would best tell their stories. As a result, both mobile games produced during the summer programs integrated place in more intentional ways than the spring game did.

While youth participants had played a sample game and had been exposed to the TaleBlazer game editor, they were still relative novices in this domain. The facilitators—having learned from experiences in the spring—had more knowledge about the range of possible game mechanics that the editor would support, and we were able to lend our expertise to get youth over a key hurdle in the process. The working prototypes that facilitators brought to the table helped youth make informed choices and made it possible for the youth to skip some of the structuring steps so they would have time for other aspects of the design process.

**DISCUSSION**

Given youths’ close connection with mobile technologies, the creation of mobile games can be a compelling way to transform technology users into technology makers, and to promote youth’s deep engagement with particular places. Mobile devices’ limited graphics capabilities, smaller screens, and modest computing power might lead those unfamiliar with the process of creating mobile games (particularly location-based AR games) to initially view this task as a simple one. However, these assumptions belie the inherent challenges in creating mobile games, challenges which our program participants discovered. These false expectations weren’t limited to youth game creators. Facilitators, new to designing mobile games, similarly initially failed to appreciate the difficulty of this challenge. It became clear, over time, that the novelty and complexity of making LBAR games required us to shift our perspectives and to view ourselves as learners and collaborators in the design process.

We can consider varying levels of facilitator support for youth LBAR game creation along a continuum (Figure 7.6), with lower levels of support (left) building toward higher levels of support (right). During the implementation of the program, initial expectations were that we might focus on levels 1–3 of the continuum: enabling youth to build by providing resources, on-ramping them with examples, and then mentoring them with structures for group discussion and collaboration. We were hesitant to go beyond this, lest we tread too heavily on youth agency. However, it became clear that rather than expecting youth participants to effectively navigate these complex tasks, facilitators instead might change their overall approach, moving to more of a level 4 apprenticeship model (Kirshner, 2008). In assuming this perspective, we facilitators not only gave ourselves permission, but saw value in stepping in to support tasks above the current level of participants, modeling skills and helping to develop strategies and structures to collaboratively find solutions to roadblocks.

Some youth participants we interviewed recognized the value of a “we got this” approach as well. As Trevor, a summer participant from the community center, put it:

> I feel as though, it’s [the game is] all of our souls. I guess you could say that. Like, the instructors and ours, because we did a lot of work, but they weren’t like, ‘You guys got it.’ Everyone put a lot of work in... It was just collaborative the whole time... Where they were at, I like it because they would push me to find the answer on my own.

Once facilitators internalized their roles within this apprenticeship model and let go of the false notion that all decisions ought to be guided...


"I John Brown am now quite certain that the crimes of this guilty land: will never be purged away, but with Blood. I had as I now think: vainly flattered myself that without very much bloodshed it might be done."

— From John Brown's last letter, the day he was hanged, December 2, 1859

Exploring Harpers Ferry National Historical Park in West Virginia can be a profound experience as one observes the natural beauty of the Blue Ridge Mountains and the Potomac and Shenandoah rivers, the picturesque remains of a 19th century industrial town, and the vestiges—some barely visible—of a federal government presence that included one of only two U.S. armories at that time (National Park Service [NPS], 2009). Outdoor exhibits situated around the town distill the various stories of the area down to a few sentences. These are fascinating stories to be sure, but