

# Designing for Impact: Shifting Children’s Perspectives of Civic and Social Issues Through Making Mobile Games

**Julie Lamarra**

Instructional Technology & Learning  
Sciences  
Utah State University  
Logan, Utah, USA  
Julie.Lamarra@usu.edu

**Apoorva Chauhan**

Computer Science  
Utah State University  
Logan, Utah, USA  
apoorva.chauhan@aggiemail.usu.edu

**Breanne Litts**

Instructional Technology & Learning  
Science  
Utah State University  
Logan, Utah, USA  
Breanne.Litts@usu.edu

## ABSTRACT

Within the growing movement to teach children computational skills and practices, it is important to understand how children engage and identify with the content they are designing. In this paper, we explore how children’s perspectives of civic and social issues shift or do not shift as they make a location-based mobile game using augmented reality and location-based mobile technologies. We conducted two workshops with children, where they individually or in pairs created a narrative-based game around civic and social engagement topics such as pollution, waste management, or animal rights. We present one illustrative case in this paper to highlight how mobile, augmented reality, and location-based mobile technologies afford impactful shifts in perspective. Findings indicate that these technologies may contribute to a shift in children’s perspectives about the world around them and in some cases may prompt meaningful action towards civic engagement.

## CCS CONCEPTS

• Social and professional topics → Computing education; *Computational thinking*, *Informal education* • Applied computing~Interactive learning environments • Human-centered computing → Mixed / augmented reality

## KEYWORDS

Children; Location-based mobile games; ARIS; Civic Engagement.

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## INTRODUCTION

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*“I guess like if you do download this game at home, then you can make your own apps and then show it to your friends, and then if they don't really care about nature and then they play it, they're probably like, 'oh, we should help out the earth this way' and then it would help everybody.” –Interview, Kelsey, 12-year-old girl*

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Providing children with opportunities to understand and identify issues of importance to them and then share those opinions is a first step towards creating socially aware citizens who know how to stay informed. One way to create opportunities for children to build their desire to instill civic change in their lives is by designing location-based mobile games. Game content is important but not nearly as important as creating a game that allows the player to have a sense of purpose and meaningful roles [9]. By allowing children to play games with civic content they are more likely to become involved in civic engagement within their own communities [10].

Mobile devices have become synonymous with accessibility of information whenever and wherever the learner wants it. To get children involved and motivated

in civic engagement there needs to be opportunities for them to participate in civic and social issues. As a ubiquitous tool, smart phones could promote this engagement [13,15]. Location-based mobile games provide a platform for children to engage with things they are learning on a more personal level. They can promote children's cognitive and social skills by involving them in different tasks such as exploration, content generation, collaboration, problem solving and navigation in space [12]. Location-based mobile games also have the potential to influence participants knowledge and intentions to change behaviors [7].

In this study, we aim to examine whether and how children's perspectives of civics and social issues shift as they design their own location-based mobile game. We conducted two workshops with 19 children (ages 9 - 15), where all participants were asked to design a narrative based game around civic engagement topics such as pollution, waste management, or animal rights using Augmented Reality and Interactive Storytelling (ARIS). ARIS is a narrative-based visual programming tool for non-programmers [5]. In this paper, we present one illustrative case to highlight how mobile, augmented reality, and location-based mobile technologies afford impactful shifts in perspective. Our findings indicate that these technologies have the potential to shift children's perspectives about the world around them and in some cases may prompt meaningful civic engagement. The main contribution of this paper is to investigate how creating a location-based mobile game about civic and social issues affects children's perception of those issues.

## CONTEXT

Scholars have noted that at least half of teens have created media on the internet and have shared that content with others [6]. This wave of using technology for sharing ideas and concerns is referred to as a *participatory culture* [6]. A participatory culture is one where those who are members feel like their contributions matter, and one in which the members feel like their voice is valued and heard [6]. Creating opportunities to challenge children to participate in media as well as produce media, changes their role from just being a consumer of media to becoming a producer of media content.

The notion that children need to be invested in the creation of the learning and given opportunities to create

their own interpretations is paramount to engagement in the content [8]. Studies such as, the Pew Internet and American Life Projects' report [1,16] suggests that children who play civic games are more likely to participate in real world civic engagement, such as, voting or raising money for charity [16]. For this study, we use Gordon and colleagues' [4] definition of civic engagement, who defined civic engagement as the ability to: (1) acquire and process information relevant to formulating opinions about civic matters, (2) voice and debate opinions and beliefs related to civic life within communities or publics, and to (3) take action in concert and/or tension with social institutions such as political parties, government, corporations, or community groups.

Providing children with the chance to engage with complicated topics in a safe and robust way allows for them to explore storylines that may not align with their preconceived notions of the world [13]. Games allow children to explore narratives and worlds in their own way and garner rich context from the experience that they may have not gained otherwise from traditional methods of instruction [13]. Creating games moves beyond instruction and can emphasize contexts outside of the classroom experience. For example, Bers and Chau [2] conducted workshops, where children explored and developed a virtual community using Zora (a web-based technology designed to help young people explore issues of identity and to foster positive youth development). They found that the network technologies (such as Zora) have the potential to facilitate different aspects of children's civic development. Previous work, such as the study done by Barab and colleagues [1], also suggests that when youth create civic and social games they have positive and impactful changes in their perceptions of those issues.

We build on this work by providing children the opportunity to design a location-based mobile game by either working collaboratively or on their own with the intent to transform themselves from being consumers of content to becoming producers of content. Specifically, we investigate how making games about civic and social issues can influence children's civic engagement. Our research is guided by the following research question: How does designing a location-based mobile game about civic and social issues affect children's perception about those issues?

## METHODS

In partnership with a local makerspace, we conducted two afterschool workshops in an informal setting with 19 middle school children (ages 9-15). Over the course of 12 hours (six 2-hour sessions), participants created location-based mobile games. In the first workshop session, we introduced participants to ARIS and invited them to explore an example game on an iPad. Participants were then asked to brainstorm and come up with a game around a civic or social issue within their community. Next, we facilitated discussion of ideas as a group, which in turn, lead the participants to engage in research individually or in smaller groups of two. Participants first conducted initial research about local animals and issues, which in turn, informed what they were going to add to their game. Next, they created storyboards on large paper that outlined the sequence of their game design. Storyboarding assisted participants in setting the progression of their games and expedited the design of their games in the ARIS platform. Once participants finished designing their game, they were asked to play-test their games as well as their peer's games. If participants found a bug in their game, they returned back to the ARIS platform to fix it, while also referring back to their original storyboard and research items. In the last workshop session, we interviewed each participant to understand their experience of game design and also whether and how their perspective toward the civic or social issue they chose shifted. These interviews were about 20 minutes long.

During the workshops, we collected a range of qualitative data including field notes, interviews, video observation, screen recordings, and audio recordings. To analyze our data, we first transcribed all the interviews. Next, we read and coded all interview transcripts and field notes and watched the video and screen observations. We collaboratively developed a codebook that utilizes iterative open (bottom-up) and elaborative (top-down) coding methods [11], and at least two research assistants coded each data. In this paper, we present an illustrative case study that exemplifies how two participants created a game with civic or social content and how their game design experience influenced perception changes of how they thought about civic and social engagement more broadly.

## FINDINGS

In this section, we highlight an illustrative case of two girls who collaboratively created a game with civic or social themes. One of the girls, Selina (age 13), already came into the workshop with a strong perspective on civic engagement while the other participant, Kelsey (age 12), did not. The shift of perspective of the later participant was due to influence from her partner and peers as well as immersion into the content of civic engagement through the process of creating a location-based mobile game

### Shifts in Perspective

Kelsey and Selina collaboratively created a game called, "The Dr.'s." Kelsey and Selina incorporated multiple endings into their game, with the intent to create a game that was, "more than catching stray animals" and "interactive" for the player. Their game revolves around two different narratives- one narrative follows an 'evil doctor' and the other a 'good doctor'. The game ending depends on the path a player chose through a series of conversations, but the overarching goal is for the player to make decisions and choose their own pathway. One ending was blissful and the other ended with the world imploding due to the destruction of all the plants, trees, and animals.

Kelsey and Selina were one of only four groups across workshops who chose to work together to make their game collaboratively. Their initial research into the local ecosystem and animals that comprised their surrounding area evolved from sharing with each other their prior experiences with certain species. In their shared notebook, Selina and Kelsey started off with a list of animals that they liked which was then narrowed down to specific local species of their region. Selina specifically called out the use of trout because of her experience fishing for trout with her father in nearby waterways. She was able to help shed light on all the various species of trout that Kelsey was unfamiliar with. This was an interesting component to take note of because it changed the trajectory of their game to one that was focused on species where the girls were connected with due to their personal interactions with them. The other animal group that they choose to spotlight were predatory cats because they both shared an affinity towards cats.

The girls used game mechanics that were mimicked from real life scenarios of civic and social engagement. For example, the pair began to delve deeper into creating their game, by identifying more local issues through conversations with each other and their peers. From these conversations, the girls included a new game mechanic which required the player to pick up trash. Once the trash was collected the player was prompted to “destroy” it. In ARIS the player would be prompted to collect the item and then take the item to a drop off, in this instance the drop off is a trash can. Selina describes this side quest as something that she does in the real world:

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*I think we're going to add a side quest sort of to have them pick up like a bunch of trash monsters, so that they can destroy it. And I think that that will be really good because I know that I go walking sometimes in my neighborhood and I'll find trash and it'll make me sad so I'll just pick them up and be like, 'now, trashcan.'— Interview, Selina, age 13, girl*

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Furthermore, during the interview, Selina mentioned that her initial objective is not to seek out litter but when she does see litter she immediately thinks of collecting it and disposing of it.

Selina consistently gave examples of how real-world experience guided the formation of the game narrative. Selina mentions in her interview that, if you are uninformed about something dangerous you could react to it in an inappropriate way that could result in harm or death. The research component provided a substantial ideation process for Selina and Kelsey and is documented in the amount of time spent on the computer conducting searches of various forms of pollution and in conversations with each other. This highlights the initial research component to spur ideation of the game within the workshop and the process in which the participants approach local environments and the impact of pollution on those environments. Selina added to the game narrative her personal viewpoint, her objective seemed to be one of instilling informed change, and establishing a motive and context for caring about the local environment.

Kelsey described how her view of civic and social engagement changed after the workshop and that producing a game she has the potential to reach out to other children and get them to think about civic and environmental issues beyond the screen. By creating a location-based mobile game, Kelsey was able to contextualize her physical engagement to her community. Her shift of perspective was influenced by her engagement with the content through the process of producing a game. She was also influenced by her partner and knowledge that preceded the workshop. By creating a game with narrative voice, Kelsey was able to identify with issues that were relative to her life.

### **Design Process and the Change Over Time**

Kelsey and Selina’s case suggests that through making location-based mobile games that these technologies can possibly provide leverage for children to engage in their local communities. This case shows that a change in perspective over time could occur. Engaging with the content in preliminary research, storyboarding, creating, and playtesting; attitudes about local and global environments could be amplified. Kelsey and Selina provide an example that there is a desire to become more active in the preservation of these environments. Kelsey was adamant in her interview that:

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*“If they [other people] don't think it's important [to not litter], then they should, because if you guys keep on throwing trash, the whole world's going to become like a trash can.” Interview, Kelsey, 12-year-old girl*

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The process of creating and curating a location-based mobile game have provided Kelsey and Selina with opportunities to participate and interact with their environments in a way that is different than before. As learners evolve from just being consumers of information to becoming active producers of information, they are taking active agency in their education and are thus able to reach larger audiences which intentionally impact their local and global communities.

## **DISCUSSION**

Selina and Kelsey's case suggests that perceptions of civic and social engagement can change over time through producing location-based mobile game. This means that mobile technologies and game making could impact participation in civic and social issues that relate to children. These findings are important because situating children as creators of content potentially allows them to become more engaged in civic and social engagement in the real world. Other studies have shown that location-based mobile games engage children in civic and social issues [1,13,14]. We are proposing that curating and producing location-based mobile games allows for the creator to dig deeper into the issues and find personal interpretations that impact their communities.

Similar studies such as Barab and colleagues [1] and Raphael and colleagues [10] also show that leveraging location-based mobile game technologies can also impact participation in civic and social engagement. One study in particular use citizen science in the form of location-based mobile games to bring awareness to pollution and effects over time on a specific area [3]. One reason that progress has not been made on the lake is due to the fact that people just do not know what is happening and how to stop it [3]. The idea around this study was to examine what an individual person can do, and if that person could "save" the lake in the game could it also give them agency to try and save it in the real world [3].

There are some limitations to our study, especially in that we present only one case here as an illustrative example of what is possible. What is interesting about this case is the potential impact that the collaboration had on participants' perspective shift. Since this study is part of an ongoing research project, we are conducting further analyses to investigate this theme and have also found evidence of perception shifts in regard to civic or social issues across participants. Moreover, further research should examine how civic and social engagement is impacted after the workshop is concluded to fully understand the potential long-term impact, if any, of this shift.

Our takeaway from the data is that location-based mobile games have the ability to create a shift of perspective based on interactions with materials that are

meaningful and tangible to the user. Location-based mobile games create affordances for the user due to the ability to play anytime and in any place through any content.

## **CONCLUSION**

By equipping children with the tools to produce their own games with civic and social prompts provides opportunities for children to become more aware of their local environment and the current civic and social contexts being posed to them within their communities. Thus, these games become a platform to inform on a larger scale. By sharing a game with others, children are also connecting with other people in a conversation of these issues.

Location-based mobile game technologies are synonymous with creating access to information. Children need opportunities to be active in their communities and by leveraging mobile technologies this helps to provide that opportunity. By turning children into producers of content we have established a platform for civic and social engagement that can be personalized and meaningful.

## **SELECTION AND PARTICIPATION OF CHILDREN**

We conducted the workshop discussed in this paper in partnership with a local makerspace. The workshop advert outlined the nature of the research study to fully inform parents and children prior to signing up. Parents and children selected the workshop as part of a suite of options based on their own interest. All who signed up for our workshop were invited to participate in the research study. Parents were first invited to consent for their children and, if they consented, children were invited to assent with the help of their parents. All parents consented and all children consented assented. Parents and children were permitted to ask us to remove any information from data collection or withdraw from participating in any aspect of the research study without penalty. We received and followed our approved Institutional Research Board protocol for this research study from Utah State University.

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