

Learning Through Design: ARIS

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Abstract: This project represents four case studies conducted across two distinctly different undergraduate courses where learners used media as a tool to build their own location-based mobile narrative experience. Our goal is to better understand how to facilitate a learning through design process using ARIS, an open source tool for creating mobile, locative games, narratives, and field research activities (Holden, Gagnon, Litts, & Smith, 2013). Using a Design Based Research (Brown, 1992; DBRC, 2003) methodology we altered the instructional approach across four iterations in order to explore the relationships between the design tools, design process, and content. We hope to use our findings to inform the development of future design projects.

Purpose

In this project we used four designed cases (Reigeluth & An, 2009) to explore the following goals:

1. Understand the design trajectories learners take when creating media experiences with ARIS, a location-based mobile production tool.
2. Identify challenges, breakthroughs and critical moments experienced by students during the design process.
3. Use our findings to further refine how ARIS might be used within design-based learning contexts.

Context

In the Spring of 2013 and 2014, we conducted the pilot study described here in partnership with Dr. Erica Halverson and Dr. Jon McKenzie in their Digital Media and Literacies and English courses at the University of Wisconsin-Madison (see Table 1). The goals of the courses were to:

- understand the affordances and constraints of digital mediums as tools for representation and apply those understandings during the creation of digital artifacts;
- be able to make appropriate design decisions and critically reflect upon the creative process and product;
- learn to work in deep collaboration with peers to achieve design goals.

While we picked these classes based on their common commitment to understanding media, representation and design, they also differed in some significant ways. McKenzie's class was an upper level English class that focused on using media as a design tool. Each group was assigned a topic with supporting documents and websites to draw upon for their project. The students in this class did the main bulk of their work outside of the lectures and discussion sections. Halverson's class, on the other hand, was an elective course with a mix of students from all grade levels and majors and focused on using media as way to represent thoughts and ideas in the classroom.

For these pilots we chose to use ARIS, an open source tool for creating mobile, locative games, narratives, and field research activities (Holden, Gagnon, Litts, & Smith, 2013). With ARIS, learners can author mobile, locative media experiences using a web-based tool and then interact with and test these experiences in specific places or locations using an iOS-based application on a mobile device.

	Week -1	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Iteration 1: Digital Media and Literacies, Halverson, 2013		Intro-duction to ARIS lecture, idea brain-storming activity	ARIS Techni-cal Training	Storyboard Design Lecture, Sto-ryboarding activity	Just in Time support for ARIS, individual work time	Unsupport-ed work time	Project Due, Playtest oth-ers' designs	
Iteration 2: Sto-ries, Maps and Media, McKen-zie, 2013	Intro-duction to ARIS lecture	45 minute technical Training	Throwaway Design Due. Research Topic thinking about ARIS objects	Storyboard Design Lecture, Storyboard-ing activity (throwaway cards)	15 minute require-ments tu-torial, Just in Time support for individual work time	Just in Time support for individual work time	Drafts due, Just in Time support for individual work time	Final projects due
Iteration 3: Digital Media and Literacies, Halverson, 2014		Place and Communi-ty Lecture, 1 hour technical training. Pitch ideas online	Team For-mation. ARIS object cards activity.	Storyboard Design Lec-ture. Team Formation 2nd Try. Storyboard-ing activity (throwaway cards)	15 minute require-ments tu-torial, Just in Time support for individual work time	Just in Time support for individual work time	Draft due for critique, Just in Time support for individual work time	Final projects due
Iteration 4: Sto-ries, Maps and Media, McKen-zie, 2014	Intro-duction to ARIS lecture	1 hour technical training.	Throwaway Design Due. Storyboard Design Lecture, Storyboard-ing activity (throwaway cards). Basic ARIS produc-tion begins.	Written Proposals Due. Revise storyboards. 15 minute require-ments tutorial, Just in Time support for individual work time	Illustrated Proposals Due. Just in Time support for individual work time	Draft due for critique. Critique others' games.	Just in Time support for individual work time	Final Projects, presenta-tion, website and video due

Table 1: Weekly Schedule Across Iterations.

Data

Using a Design Based Research (DBR) approach, we collected data at different points during each of the seven-week interventions to help us identify changes in students' confidence levels, comfort using ARIS, and beliefs about the usefulness of ARIS as a design tool. We used the following instruments to collect the data:

- Weekly student surveys, including three scale-like questions and an open-ended comments section.
- Final student design reflections written at the conclusion of the ARIS project.
- Short student interviews throughout the process.

We intentionally collected data at different time points during the design process in order to: (a) better understand how students experience the design process when building something using ARIS, and (b) identify the structures and resources that best support learners' progression through the design process.

Data: Confidence, Usefulness and Comfort

The following graphs (Figure 2, Figure 3, Figure 4, Figure 5) represent the responses from the weekly student surveys. The surveys consisted of three questions: one measured their confidence level in their own project (design

focused), another measured the perceived usefulness of the day's activity (tool-focused), and the last measured students' level of comfort with using ARIS.

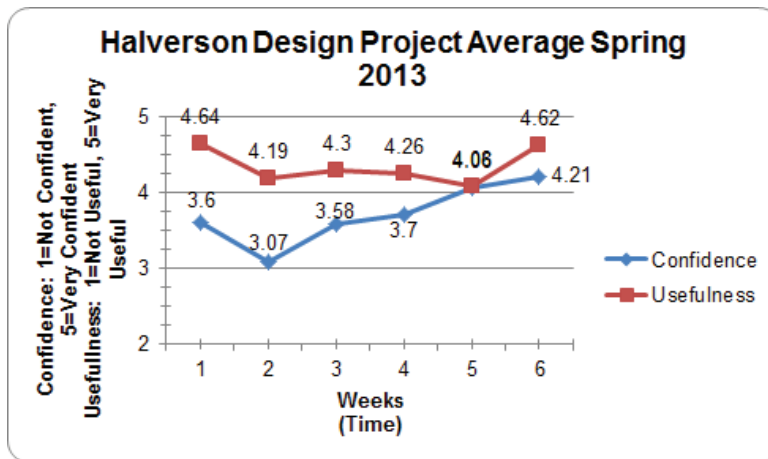


Figure 2: Graph for Iteration 1.

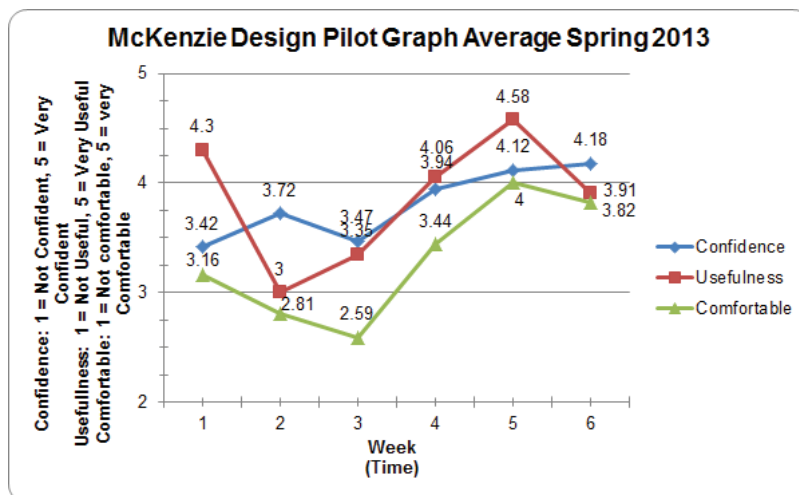


Figure 3: Graph of Iteration 2.

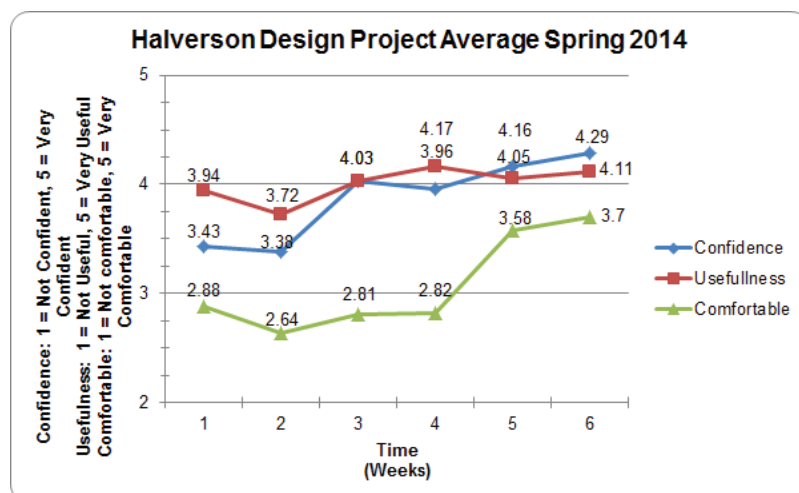


Figure 4: Graph of Iteration 3

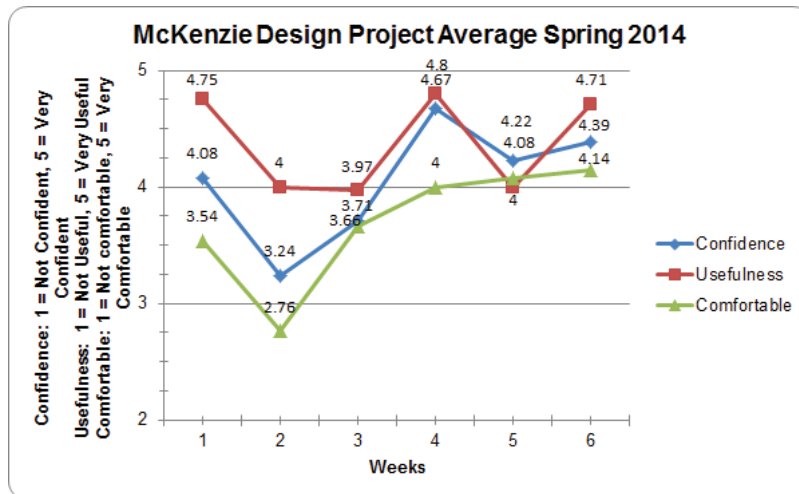


Figure 5: Graph of Iteration 4.

Data: Content, Design, and Tool

The data in this section explores the relationship between design, content and tool. Design is the story students wants to convey. Content is the necessary information the story is required to have. Tool includes both having a basic knowledge of ARIS and the capabilities of the software. Iterations one and three did not have a content component to the course however iterations two and four did. The graphs below (Figure 6, Figure 7) represent the self-reported amount of time spent on each aspect of tool, design and content in iterations two and four.

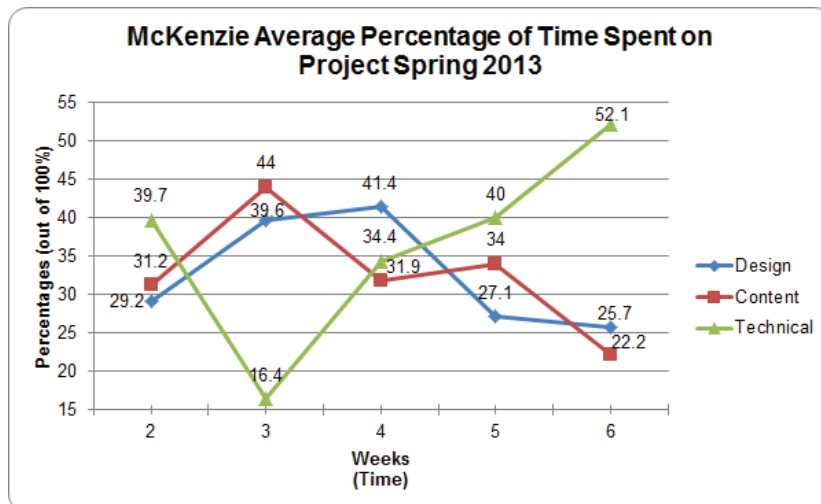


Figure 6: Graph of time spent on project in second iteration.

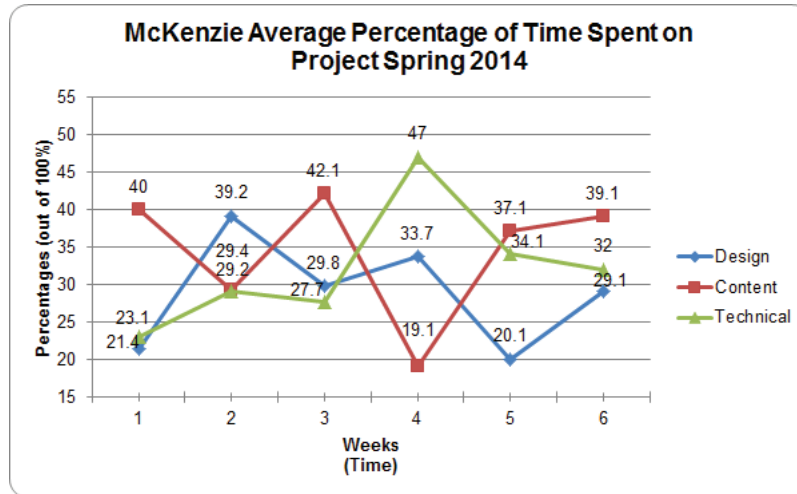


Figure 7: Graph of time spent on project in fourth iteration.

In addition to the data shown in these tables we also collected and analyzed personal feedback and reflections of students based on their responses from interviews and their final design documents.

Initial Findings

Generally, the first set of graphs (see Figures 2-5) illustrates that learners had a positive experience throughout the ARIS project. Though our survey targeted different characteristics of the making process, the graphs echo Halverson's (2011) *representational trajectory* - her take on meta-representational competence (diSessa, 2004) - because as students started the project they had lower confidence in working with the tool as a result of being focused on the design and content parts. Further, *representational trajectories* are ones that "begin with a focus on content of their stories, move to a focus on how the tools of the medium afford a representation of these ideas, and end with a consideration of the relationship between these two aspects" (pp. 37).

The most concerning feature of the first set of graphs above (see Figures 2-5) is the drop in confidence during week two. This drop in confidence happened a week after the Software Training for Students (STS) and a week before representing their ideas using storyboard cards. From the first iteration we learned that we had to find a better way to introduce the tool to the students. Therefore we shortened the beginning training for the remaining iterations. Starting with the easy, basic STS training made ARIS seem easy to use. Students gained a boost in confidence in their ability to create a complicated game. However once they started working on the project and realized the gravity of the situation, the students became disheartened. This trend is also due to the fact that students spent a lot of time thinking of the affordances, but little to no time thinking of the constraints of the ARIS tool.

The second set of graphs (see Figures 6, 7) illustrates that students rarely thought of the technical aspect of the project in week three compared to future weeks. Between iterations two and four we took three steps to try to level the graph:

1. Lesson the amount of technical training in the first week (1.5-2 hr lesson to 30-45 minutes).
2. Spread out the ARIS technical training using a "just in time" method (Gee, 2003).
3. Have a staff member from the research team available every class to offer support.

After implementing these three steps between iterations two and four, there was a change in the relationship between design and content. In the second iteration design and content closely followed each other. In iteration four, the technical aspect had a similar trend as design. The second iteration in McKenzie's class (see Figure 7) had less sharp changes in the three aspects than the first (see Figure 6).

Moments of Reconciliation

Throughout the project, there were moments when students realized the tool could not construct what they wanted to create. Their design did not make sense anymore due to the tool. These moments were captured when students talked about their projects:

“We would create something and it would be working and then we would add something else and something would go wrong” (student 12, final design doc).

“While laying out the design of the game we encountered many problems with the placement and setup of the plaques and locations. Sometimes the text would not save and other times the media picture would get deleted. Also, ARIS would not allow for videos over 35 seconds, so some of the messages of the project may be lost because of the lack of video time” (student 16, final design doc).

In order help students overcome these challenges we:

1. Created analog design tools: cards that introduced the ARIS lingo
2. Implemented a “throwaway game” design activity in iterations two and four

We found that it is imperative that learners understand the affordances and constraints of ARIS in order to effectively design with it. To foster this thinking, we used design cards to support storyboarding. The goal of the cards is threefold: (a) to offer a concrete outlet for ideas; (b) to situate ideas within the constraints of the tool; and (c) to immerse learners within the vocabulary of the tool. The design cards were a success:

“We worked on our layout of the application by creating a story that would establish a good flow from start to finish. We did this by creating a diagram demonstrating how we plan to tie each location with the steady flow from one event to another” (student 7, final design doc).

“I think that the concept of having different tasks and characters are relatively easy as a concept but once you have to start thinking about it as an experience not only of your experience but other people’s experience step for step and really the process of A to B to C regard-um separated from a general experience. I think it was a tough one but it was necessary and I think it was good from us” (student 4, interview).

Students in Jon McKenzie’s class who participated in the throwaway game were more likely than other groups to consider the constraints of ARIS during their subsequent design work. This thought process and focus on the technical aspect of ARIS escalated as the project came to an end.

Resistance to Online Community

An observation we had during the end of iteration four was that although we encouraged students to use the ARIS online community for support with their project, not many students used it. When inquired as to why, students stated they wanted to search the site for answers before posting their questions and preferred asking a peer. We concluded that students prefer to talk to people who they can physically interact with. For future references, we are thinking of how to make the online community feel more appealing, welcoming and less intimidating to students.

Conclusion

Overall, students who participated in this project gained a robust knowledge of design, both as a content area and as a process, when building projects in ARIS. With future studies, we will continue to develop our understanding of how to best support learners’ negotiation between design and the associated tool(s). As we move forward with this line of inquiry we plan to explore a more content-focused study to understand how students negotiate content (in addition to their design) within the boundaries of the tool. Put differently, we’ve shown that learners gain design knowledge through producing media experiences with ARIS, and we hope to next find that learners gain more specific content knowledge through producing media experiences with ARIS. Our end goal is to develop an instructional method to equip future educators to support learners throughout their design process with ARIS.

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