Meeting Students Where They Are: Library Orientation and Augmented Reality an Exploratory Case Study

Anjum Najmi
Higher Education & Learning Technologies
Texas A&M University
Commerce, Texas
United States
anjum.najmi@tamuc.edu

Abstract: Librarians have engaged students in creative ways to orient them to library programs and services. Outreach is best undertaken when students arrive on campus for their first year. Augmented reality (AR) allows real and virtual objects to co-exist and interact with in real time. It permits users to view the real world through a virtual overlay. This study will look at the potential of using Augmented Reality (AR) to engage students and present targeted information about the library and its resources. It will look at the effectiveness of instruction, learning outcomes, challenges, and the future potential of using such methods to promote learning.

Introduction

First year students that enter college are expected to possess research skills more advanced than what is typically required in high school. For the most part they are underprepared for the rigors of university level learning (Currie, 2009). Once on campus the first step to introducing students to research and information literacy skills is to get them to come into the library.

Librarians have used creative ways to engage student interest such as learning communities, residence life collaborations, open house, meet a librarian, and themed events like mystery tours and scavenger hunts. These efforts while successful for the most part are time intensive, cumbersome, and not always cost effective. Too often students lose information that is covered in the onslaught of other beginning of the semester orientations. The challenge remains on how to engage students and make content meaningful so information is retained and skills are transferable. It is not uncommon for first year students to feel anxious about the library and how to find library resources. Many students hesitate in approaching librarians to even ask for assistance.

As learning becomes ubiquitous personal computing devices such as laptops, tablets, smart-phones, smart watches offer students numerous ways to personalize learning. Learning spaces are changing moving beyond the four walls of the classroom into alternate spaces between the physical and the ether. Learning experiences like Augmented reality (AR) allow real and virtual objects to co-exist and be interacted with in real time making information available at the exact time and place of need (Azuma, 1997). Most first year students are comfortable in such spaces having spent countless hours posting information to Snapchat, Instagram, Facebook, and text messaging.

Research Question

This study looks at the pedagogical potential of using Augmented Reality (AR) to engage students and present targeted information about the library and its resources. It will look at the effectiveness of instruction, learning outcomes, challenges, and the future potential of using such methods to promote the library and its resources.

Background

Augmented reality (AR) is defined as the capacity to overlay rich media onto real world objects for viewing that is contextually relevant and can be easily and immediately acted upon (Billinghurst, Kato, & Poupyrev, 2001). Information is made available at the exact time and place of need this may include text, still images, video-clips, sound, 3-dimensional models and animations. AR has the potential to reduce cognitive overload by providing students with 'perfectly situated scaffolding', as well as enable learning in a range of other ways (Dede, 2009; Dunleavy, Dede, & Mitchell, 2009; Squire & Jan, 2007). Following socio-constructive practices learning is seen as a shared activity, transactional in nature. Cognition, knowledge and expertise are distributed across individuals, environments, symbolic representations, tools, and artifacts (Brown, Collins, and Duguid, 1989). Vygotsky (1978, p. 29) referred to this as "mediation" and argued that when we interact with each other using tools we allow for the extension of our human capabilities.

While Augmented Reality systems have been in use in the fields of medicine, manufacturing, aeronautics, robotics, and tourism since 1990s (Azuma, 1997; Billinghurst, 2002; Shelton, 2002; Shuhaiber, 2004). The ability to use location-specific information based on GPS position and link to contextually relevant virtual information (i.e., fictional characters & narrative) has opened up the way for learning with place-based (historical & geographical) real world locations and place-independent AR (Squire & Jan, 2007). For example *Reliving the Revolution*, and *Greenbush* introduces students to historical events of the revolutionary war at Lexington, MA to determine who fired the first shot and a historic neighborhood to learn about urban planning and impact on communities. In *Mad City Mystery* students investigate environmental toxins common to lakes in the Midwest (i.e., Mercury, TCE, PCBs, fishing). (Squire & Jan, 2007). Through inquiry, problem solving, and synthesizing information students learn about environmental science.

Similarly, *Alien Contact* teaches language arts, math, and scientific literacy skills as it transforms any physical space and augments user experiences (place-independent i.e., school playground). It offers interaction with rich media, multiple points of entry, and non-linear thinking opportunities. The goal is to foster higher order thinking (Dunleavy, Dede, & Mitchell, 2009). Educational applications are emerging that allow users to design, build and manage their own augmented reality experiences. Examples are Aurasma (http://aurasma.com), Layar (http://layar.com), and Junaio (http://junaio.com). 3D printing and Google glasses are leading the way for new approaches to teaching and learning. Advances in technology and more powerful devices are making it easier to integrate AR and greater learning is taking place in augmented spaces.

The Study

The Library Convocation "*Follow the Steen Trail to Jack Success*" introduces first-year experience students to the library and its resources in an informal but friendly way that combines information literacy, outreach, collaboration, and campus-wide involvement. Participants are 130 first year students at a Southern University in the United States who are taking a one credit first year experience class offered across several disciplines (i.e., business, computer science, general education, inter-disciplinary studies, forestry/environmental science, nursing, pre-health, mass media & communication, and global studies).

A passport a main document offers a way to track attendance, instructions on how to follow the trail, stations to visit, a place to stamp once the station visit is completed, and a way to earn extra credit. All students visit the last station to get their passport checked, give feedback, and enter the drawing for the grand prize. Goody bags and popcorn are available. Table 1 provides an overview of the four trails, stations, library rooms and resources.

Four Trails	Stations		Library Rooms & Resources
	1.	Start	
Lumberjack Trail	2.	Check-out Point	Circulation / Computer Lab 1
Librarian Way	3.	Virtual Den	Founders Room
Digital Pass	4.	Computer Cove	Main Computer Lab

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Steen Hike	5. Archive Adventures	Special Collections / Research Center
	6. Librarian Loop	Librarians
	7. Digital Expeditions	Digital Scholarship Center / Computer Lab 2
	8. Exit - Customs	

Table 1. Follow the Steen Trail to Jack Success

Students use Augmented Reality to take a 1-2 minute virtual tour of the Library at one of the stations using an iPad. From a group of six pictures that represent different areas of the library students select the picture that interests them the most. With the iPad they activate the augmented reality overlay and take the tour. They are led through each section of the area and can view the different library resources that are available. Once the tour is over they respond to three questions to provide feedback about their experience.

Data Collection & Analysis

A qualitative method was used to analyze results. Ninety responses were transcribed and coded using Microsoft Excel. Researchers then engaged in a constant-comparative process established by Glaser & Strauss (1967) to analyze the content to discover salient categories and data patterns and to reach an agreement for modifying, or eliminating redundant codes. These codes were then sorted into relevant categories after several additional reviews key themes emerged from these categories that were then identified and color-coded.

Findings

Four themes and eleven categories were identified related to various departments and resources that the library offered. Table 2 provides an overview.

Themes	Categories
LibraryService	Resource Help, Computers, Hours
Library Experience	Librarians, Staff, Student Support
Library as a Place	Study Place, HUB, Academic Assistance Resource Center
Information Access	Special Collections/Research Center, Digital Scholarship Center

Table 2. Themes and Categories

Participant responses for Q1 revealed 56% of students related the experience of taking a virtual tour of the library to "strongly agree" other responses included (36% selected "agree", 7% "somewhat agree", & 2% "disagree"). These responses indicate for most students' engagement held a high value. Similarly, for Q2 usefulness of the information gained during the virtual tour 50% of students chose "strongly agree" other responses included (31% selected "agree", 13% "somewhat agree", and 6% "disagree"). The percent of students (6%) who found the information not useful is slightly higher for this question despite information being presented at the exact time and point of need. This suggests perhaps some students were distracted, in a hurry to move on to the next station or simply had no interest in the activity. Figure 1 and Figure 2 show student responses for questions 1 & 2.

Figure 1. Q1. Experience taking a Virtual Tour of the Library

Figure 2. Q2. Usefulness of the Information gained from the Virtual Tour of the Library

Nevertheless, students found it easy to identify physical areas of the library and to know the location of different resources i.e., "Founders Room on the first floor", "Gov. docs, maps, surveys are on the second floor" and "the fourth floor is a quiet study space". They could remember room names easily and the resources of each room as their responses showed "this is very good at showing what the HUB has to offer", and "I learned exactly where every room is because I had trouble navigating before". One comment described the virtual tour as being helpful in understanding the "different things the library has to offer". Most students who took the virtual tour found they wanted "to learn more about the library" and felt "librarians are our friends". They viewed the library as a place to "meet friends" and a space where "there are places to socialize".

When students were asked to list one fact about the library that stood out the most during the virtual tour i.e., the AARC, reserving study rooms & lockers, charging ports in the seating, bring-your-own-device, access to computers and printing were the library resources listed the most. While a few comments were random such as "the campus ghost is Chuck" and "one of the floors is purple" the following comment summarized the experience as "amazing". Figure 3 provides a word frequency map of student responses for question 3. The reasons students come to the library is clearly visible. Further details of this study will be discussed during the conference presentation.

Figure 3. Q3. Word frequency map of student responses

Conclusion

The purpose of the library convocation was to provide students with a welcoming and positive first year experience, and introduce them to targeted information about the library and its resources. Augmented Reality (AR) has the unique ability to combine the physical with the virtual to engage students in participatory, rich interactive learning experiences and provide information at the exact time and point of need. Results of this study although promising offer some considerations for using AR in education such as time for students to develop fluency with the AR interface, selecting pedagogical strategies that complement learning content and goals, and helping students

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develop higher order thinking. The emergent and fluid nature of virtual spaces requires further research and exploration to fully understand concepts of student engagement and learning.

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