

Design and Learning LSC

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Project Overview

The purpose of this paper is to design an exhibit for the Liberty Science Center (LSC). Currently, LSC has an exhibit entitled Jack Horner's Dino Dig. Children of all ages are invited to become paleontologist as they dig for dinosaur fossils. This activity is an engaging exhibit that could be further enhanced through the use of technology.

Jack Horner's Dino Dig will be technologically enhanced through the use of augmented reality technology. Uncovered fossil remains will come alive, as children are able to interact with the dinosaur of the remains found. This creates additional learning opportunities beyond discovering fossils. The SAMR model developed by Dr. Ruben Puentedura supports the notion of infusing digital learning experiences within learning (Schrock, 2013). The framework that will guide this project is Universal Design for Learning (UDL).

Sound Design Principles

Universal Design for Learning (UDL) is an inclusive approach to teaching and learning that is grounded in neuroscience research (Center for Applied Special Technology, 2015). The idea behind UDL is to make learning accessible to a wide range of learners. UDL is not bound by physical make-up, cognitive abilities, or background (Teaching Excellence in Adult Literacy, 2012). UDL is often compared to architecture with the principal understanding that initial careful design and planning of accessibility is better than retrofitting a building (Stanford & Reeves, 2009). UDL makes content accessible for diverse groups of learners (Carnahan, Crowley, & Holness, 2016).

There are three principals that govern UDL. The principals are multiple means of representation, multiple means of action and expression, and multiple means of engagement.

Multiple means of representation is the “what”; in what ways will the information be presented to the child. Multiple means of expression is the “how”; in what ways will learning be demonstrated. Multiple means of engagement is the “why” of learning and is the incorporation of learner interest. The UDL framework removes barriers to learning and supports learning that is best suited for the learner (Carnahan et al., 2016).

The current exhibit as well as the new proposed plan is aligned to Dr. Marina Bers idea of exploration of the physical environment, motor development, and social interactions (Bers, 2012). There is controlled autonomy over where students begin their dig. The notion of mastery, creativity, and self-confidence is developed as participants make discoveries (Bers, 2012). The addition of augmented reality technology within this exhibit will facilitate and support learning by connecting and extending the physical activity of discovery to contextual information about the dinosaurs.

Educational Objectives Related to LSC

The mission of LSC is to create excitement and engage learners of all ages in science and technology (Liberty Science Center, 2017). The Jack Horner’s Dino Dig has previously been aligned to the mission of LSC. With the infusion of technology the learning goal still remains the same. The goal is to engage children in a fun and exciting way by having them play the role of a paleontologist as they uncover dinosaur fossils. Young paleontologist will use tools to uncover the fossils of buried dinosaurs. Young paleontologist will identify the species of dinosaur that the bones belong to. Young paleontologist will interact with four types of dinosaurs. Finally, young paleontologist will be able to synthesize their learning experience by coloring and/or creating a story about their dinosaur.

Description of Features

Currently, an LSC staff member greets young paleontologists as they enter the dig site. Participants are given a paintbrush and a child's plastic safari pith helmet. The dig site has been divided into four sections covered in 35 tons of sand. Children immediately choose a section of there liken and begin the work of uncovering the remains of the various prehistoric creatures. Once the young paleontologists uncover the bones of the various dinosaurs their expedition comes to an end but it doesn't have too. LSC has created the groundwork for a very hands-on interactive exhibit. The inclusion of technology can further enhance the learning experience for participants. Adding augmented reality technology to this exhibit will further the learner's knowledge of these prehistoric reptiles.

Augmented Reality blends the real world with virtual objects in real time and is three-dimensional (Azuma et al., 2001). Images, videos or objects are superimposed on triggers that become activated by a device. AR brings the real world together with the virtual world allowing the user to maintain explicit control over their environment. Once a trigger is activated objects or in our case dinosaurs come to life. The dinosaurs can now be viewed from multiple angle. The learning experienced is enhanced as a result of the participant's interaction with multidimensional objects. Additionally, participatory and metacognitive learning takes place as participants use augmented reality (Dunleavy, 2014).

Rationale of Relevance

The use of augmented reality technology supports UDL. Participants regardless of physical or cognitive ability can become a paleontologist and partake in this activity. The use of this technology takes the exhibit to the next level. Participants are exposed to an emerging technology further supporting the mission of LSC. Emerging technology has the ability to

promote, supplement, and advance learning. In today's global economy it is imperative that students are familiar with current and emerging technology. It is this exposure that may lead to creativity, innovation, and collaboration.

Feasibility

Given the design approach of using Universal Design for Learning this exhibit would be suitable for all participants four years old and up. Regardless of cognitive and/or physical abilities anyone could participate. The keystone of this exhibit is the technology that will be used to bring the dinosaurs to life. The exhibit would require an Android or an Apple handheld device to be used in viewing each of the four dinosaurs. This can be provided by LSC or an application can be made available for adults to download. There should be at least one-to-two staff members available to support and move participants through the exhibit. A minimum space of 12 feet by 12 feet would be required to house the exhibit.

Case

Once participants are finished uncovering the dinosaur bones they will move to the technology station within the same exhibit. The young paleontologist will be given a laminated card that has a depiction of an adult paleontologist and a handheld device would be required i.e. smart phone or tablet. Parents and their young paleontologist will point their device at the card to receive additional information and instructions from the paleontologist as he comes to life off the card. Next, they will get to encounter the four types of dinosaurs that were out in the field. Four separate posters approximately 24X24 inches will be placed on the floor or on a tabletop. Young paleontologist and their parents will point their devices at each of the four dinosaurs. The dinosaurs will come alive and basic information on the dinosaur will be shared via pre-recording.

Finally, the young paleontologist will be given a sheet with the four dinosaurs that they can color at home and record facts that they learned.

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