BUILDING A PORTABLE, MODULAR, LOW-COST IMMERSIVE CLASSROOM

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Abstract

The Fort Hays State University Forsyth Library and Institute for New Media Studies have built a portable, modular, low-cost immersive classroom kit using funds from the Institute of Museum and Library Services National Leadership Grants program. The immersive classroom provides a space for 3D exploration and collaboration, data visualization, and interactive exhibits. The kit will make it possible for smaller and rural institutions to provide smart classroom technology without a large investment of time, funding, or building renovation, thereby promoting digital inclusion.

Figure 1: Initial diagrams of potential smart classroom layouts submitted to the IMLS

Introduction

As library collections have moved online, the primary purpose of many library spaces has shifted away from storage toward independent study and exploration. At the same time, library classrooms (and classrooms in general) have become more flexible as new technologies enable new instructional methodologies. Specifically, over the past 20 years, two new types of learning spaces have emerged: "smart" classrooms, which incorporate new devices such as interactive whiteboards, and immersive "caves," which use multi-projector displays to place learners in a virtual environment. With new tools for virtual and augmented reality, the lines between the two are beginning to blur. Both types of spaces are useful for instruction, preparing students to encounter new media in the workplace, and facilitating digital collaboration. Smart classrooms are now fairly ubiquitous. However, immersive spaces remain out of reach for smaller institutions, particularly institutions in rural areas, due to high cost, insufficient space, and lack of expertise.

Potential Uses

- Collaborative design
- Data analysis for large data sets
- Data visualization
- Gamified instruction
- Interactive exhibits
- Outreach
- Real-time collaboration
- Spatial reasoning
- Viewing high-resolution images
- Virtual field trips

Methods

Design Process

Data Collection

- Video recordings of test users
- Surveys of test users

Figure 2: Selected survey results from test users

Materials List

Figure 3: Current frame prototype

Challenges and Lessons Learned

- Not all screen materials are appropriate for touch or travel
- Grip strength is a factor when assembling screens
- Keeping frames straight and square is a challenge
- Aligning projectors on uneven floors doubles setup time
- Sunny spaces wash out projection
- Hand-held peripherals can be difficult for children and the elderly to use

Figure 4: Photo of test exhibit using digitized archival photographs and documents

Next Steps