

Towards a Framework on Accessible and Social VR in Education

IEEE VR 2019
OSAKA

Poster ID 113



INTRODUCTION

For virtual reality to be a successful tool in social learning spaces (e.g. classrooms or museums) we must also look outside the virtual reality literature to provide greater focus on accessible and social collaborative content, such as:

- Computer Supported Collaborative Learning (CSCL)
- Generalized Social VR domains
- Public installation design frameworks.
- Existing pedagogical methodologies from the classroom.

PROTOTYPE IMPLEMENTATION

Our socio-educational framework Circles explores the use of:



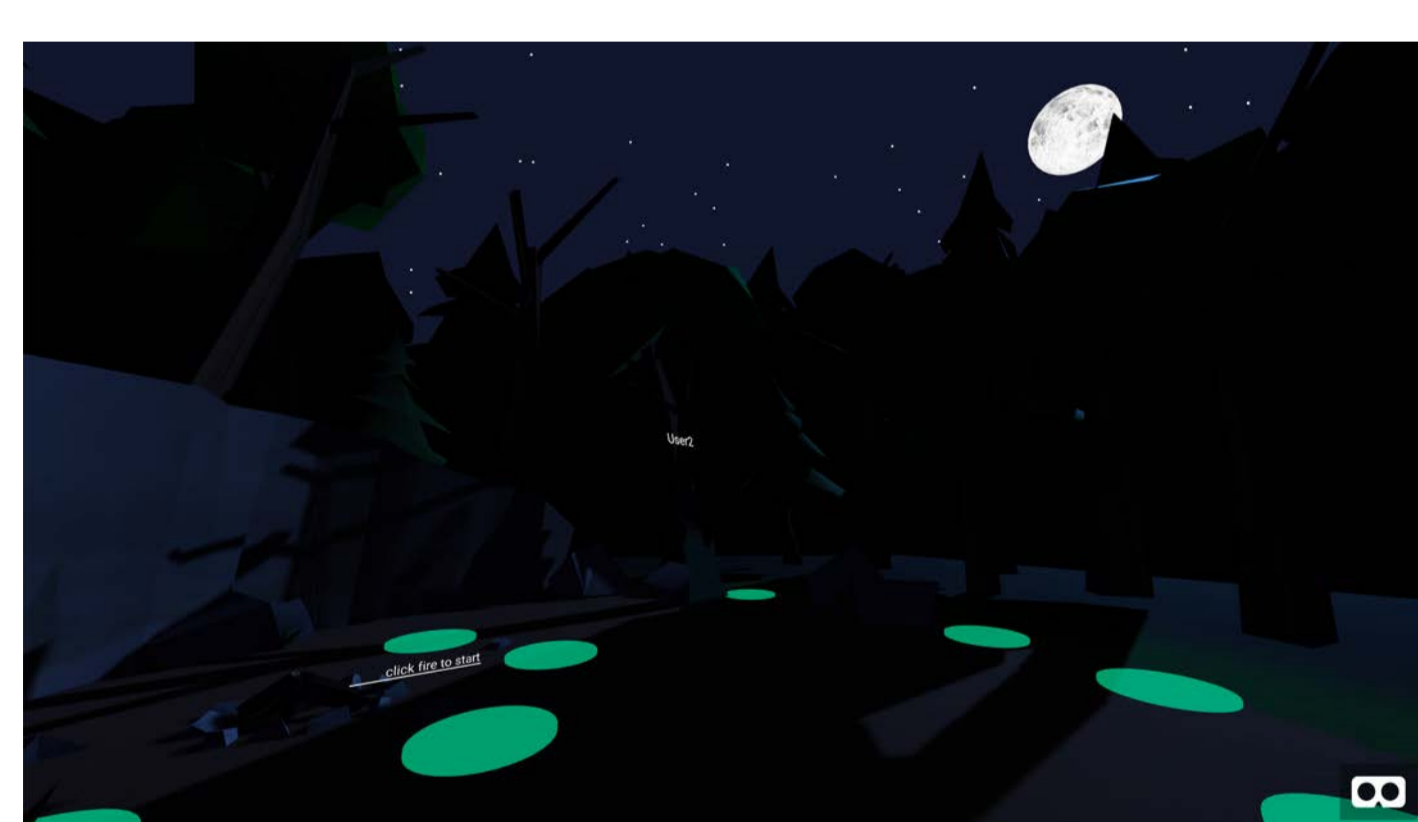
- **Multi-user** capabilities (using Mozilla's Janus networking).



- **Multi-worlds** that can be visited and fluidly traversed between.



- **Multi-platform** symmetric interactions (HMD, mobile, and desktop), using WebVR /A-Frame.



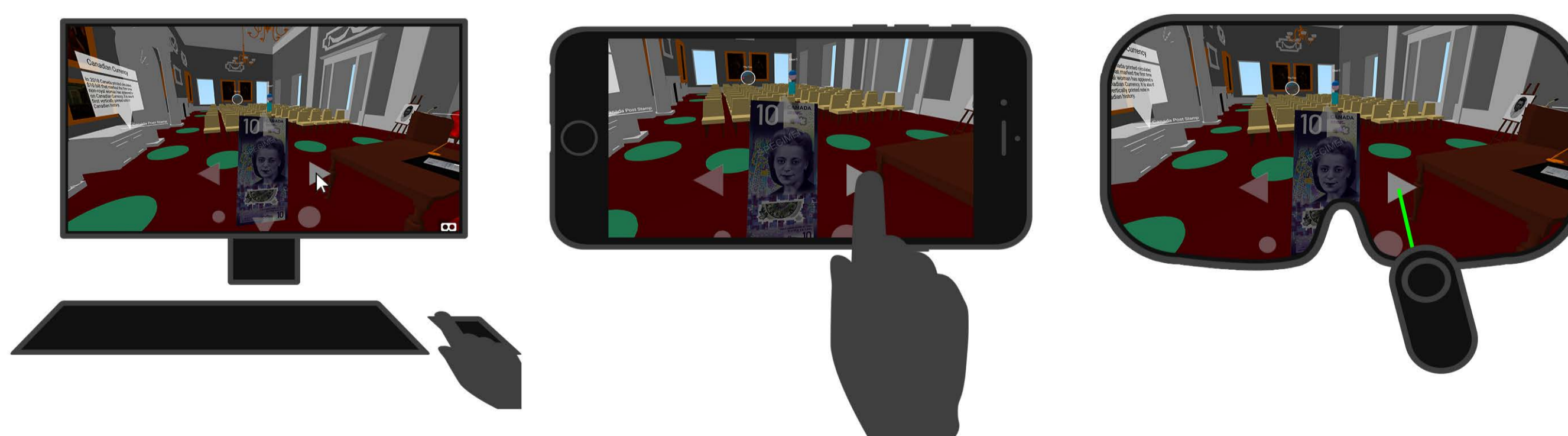
TOWARDS A DESIGN FRAMEWORK

Within social learning spaces, VR should be accessed via multiple pathways and includes socially scalable interactions. A basic design framework follows:

Design Principle	Description
Device Accessibility	Support multiple VR types such as desktop, mobile, and HMD to better serve learners with various abilities.
Social Scalability	Should allow for multi-user collaboration and scale to variable group sizes.
Flexible Communication	Include various forms of communication e.g. voice and gestural.
Customized Avatar	Avatars can be customized by the user.
Simple Interactions	Require minimal training within limited control schemes



Basic single-click interactions, from left to right: hyperlink portals, click to trigger events, click to teleport to a checkpoint, click to pick-up objects.



From left to right, (PC, mobile, HMD) Circles' symmetric object manipulation across multiple VR devices via ray-cast mouse, touch, laser respectively. All rotations/zoom on an X-Y plane interface locked to camera.

Viola Desmond, Canadian Civil Rights Pioneer

Circles' first "worlds" are inspired by the actions of Viola Desmond. Recreated time-spaces include: a **Desmond beauty salon** from the 1930's, **The Roseland Theatre** where Viola refused to move seats in 1946, and **The Halifax Province house** where Viola Desmond was posthumously free-pardoned in 2010.

Anthony Scavarelli
Carleton University
anthony.scavarelli@carleton.ca

Ali Arya
Carleton University
ali.arya@carleton.ca

Robert J. Teather
Carleton University
rob.teather@carleton.ca

 **Carleton**
UNIVERSITY
Canada's Capital University