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# Virtual Reality for Cultural Competences

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## Abstract

With the expansion of multicultural communities, raising awareness to diminish cultural misconceptions became a must. We investigate different research probes using interactive Virtual Reality (VR) applications to increase such awareness. VR environments provide a high sense of immersion, which enhance the user's experience. In this work, we present three VR interactive research probes that allow users to understand cultural differences and to reduce cultural misconceptions.

## Author Keywords

Virtual Reality; Understanding Cultural Differences; Multicultural

## CCS Concepts

•Human-centered computing → Virtual reality; •Social and professional topics → Cultural characteristics;

## Introduction

Living in a country with people with various cultural backgrounds is becoming more and more common. In almost every major city in the world, cultures mix and live side by side already. However, prior to experience this, people are afraid of unknown cultures, values, habits, and customs. In Germany, for example, being on time is an important act of courtesy while in Egypt being on time is not valued partic-

ularly high. This difference in values might result in tension between people from both cultures without having a mutual understanding of the reasons.

This work explores how virtual reality technology can be used to tackle cultural misconceptions. We report on three case studies that highlight cultural differences, provide reasoning for certain habits, and communicate background information on the past. These case studies highlight that VR technology through its immersion is a strong tool to communicate cultural differences. We show that these differences can be easily communicated in a way that users understand the habits and the underlying reasons for them of the unknown culture.

VR has been used as a tool for communicating misconceptions before. One common application is for psychological help. Kandaladt et al. developed a VR application that creates social situations for people with autistic spectrum disorders to train everyday life situations [?]. Tackling social phobia, Klinger et al. prove that therapy this phobia in VR shows promising results [?]. Similarly, Anderson presents an application for helping people with social anxiety [?]. Another popular type of VR applications are touristic applications. VR has been used to visit remote places, for example, as a tourist [?] or visiting Ancient Italy [?]. VR has also been used to preserve cultural heritage [?].

### Development of the VR Probes

The three applications are generated within the context of a VR hackathon. Overall, 20 German and Egyptian students participated in this hackathon as part of an ongoing collaboration projects to increase cultural awareness. In a first step, we conducted ideation sessions to elaborate different social differences in both countries. For the identified differences, the students came up with a concept of how to



**Figure 1:** Handicapped waiter scene perspective. The waiter should be moving around in the scene delivering the orders to the corresponding tables

communicate this using VR technology. Next, they had 48 hours to implement the concept.

### Virtual Reality Applications

In this section, we introduce three applications that were implemented using Oculus rift along with Unity game engine. Each application addresses interactively a separate concurrent challenge that different societies face. All the applications were developed from multicultural backgrounds (i.e., Egyptians and Germans), providing various insightful design aspects.

#### *Handicapped Waiter*

This is a game-like application that depicts and passes on the handicap life challenges in performing normal jobs like waitressing in an interactive manner. All the events take place in a restaurant, where the player is a waiter/waitress there (see Figure 1). With each ready order, an audible command directing to the targeted table is heard. For lively interaction purposes, the ready orders were not just placed on a fixed tray, but was thrown in the air so that the player would have to move and catch it.

The events of the game evolved smoothly, where each level adds a new challenge. At the beginning, the player starts as a normal person who can control the scene and perform his task by moving around in the scene, catching, and placing stuff with the controls in both hands. After passing all the required orders in that level, the player is notified that he had an accident and that he would no longer be able to use both hands, which would force him to interact with only one of the controllers (i.e., the player is free to move both hands, however the system would only respond to one of the two arms). After each successful passed levels, a new challenge was introduced.

This application shows the different social security systems between both cultures. While in many western countries a social security system is in place that supports workers after an accident, in many countries these workers are not supported at all and have to go back to work immediately. This application should communicate the value of such a social security system and also highlight the difficulty to keep on working despite the handicap.

This kind of applications could also raise the awareness about certain diseases. So the player would not only experience the difficulties but she/he could be also introduced to ways where her/his role would positively contribute in helping those in need.

#### *The Border*

This application mimics the refugees experience after leaving their home. It is composed of two scenes. First, in the so called *metaphoric forest level*, metaphorical cartoonish nature represents the refugees dream of having a peaceful society to live in. Once the level starts, the players discover that they are being followed by a tiger, which depicts the troubles that they ran into sometimes in different communities, which tries to deplete them of everything even, in some



**Figure 2:** A participant moving her hands up and down to mimic the running motion in the virtual reality scene. The target is to escape a tiger that is chasing her.

cases, their own bodies. The aim in this level is to find a blue halo, mimicking their escape way. In order to run from the tiger, the player should use the hand controllers in a exchangeable vertical motion representing the running motion. The running speed is relative to the controllers vertical displacement (i.e., the faster the player move her/his arms, the faster the running speed is applied in the scene, see Figure2).

After escaping the forest, the players face the area of the border. Where they find themselves in front of the border control, being asked not to approach, the players are left

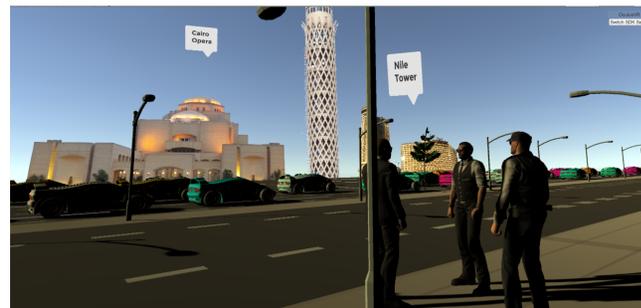
with two options. The first option is to disobey the commands and approach, in that case they would be shot. The second option is to wait just next to the border check-point, where the waiting period is to be determined. In both scenarios, the players would finally be directed to a scene where some refugees transporting hardships would be displayed in a form of mini-articles.

This application only depicts a prototype of one difficulty, which faces the refugees (i.e., threats and border checks). This kind of applications it can be used to show the hardships that different categories of refugees see in their homelands, raising the awareness of the causes of the hardships existing in different countries and some cases how can different societies contribute in helping.

#### *Pitch Phrase*

This application addresses the existing misconceptions across different cultures (i.e., Egyptians riding camels instead of using cars for transportation). This application would allow the players to learn about foreign cultures, landmarks, habits and experience living a whole scenario in any place of their choice.

The application starts with an image of the earth, allowing the user to choose any country. Once a country has been selected, the player is directed to a street scene where the most known landmarks in this country are displayed. In this prototype Egypt is the only available country (see Figure 3). As the scene unfolds, a friend (i.e., a scene character) would approach the players to invite them at his place. The player is then given two options. The first option is to reject the offer in a polite way, the second option if to accept the offer and set a date. After setting the date, the player would be doing some sight-seeing, with the risk of being late the player is given the chance to skip the sight-seeing part and go directly to the friend or to be late.



**Figure 3:** Interactive virtual reality scene in Cairo. Users can experience the social aspect by interacting with the locals.

After all decisions, the players are brief with the actual behavior that is expected in the culture. For example, that players should first decline the offer and accept it after the third time. Further, it is also fine to go sight-seeing and being a little late.

### **Conclusion**

The different applications show that cultural differences can be easily communicated using VR technology. Given the requirements (i.e., being realized within 48 hours), the results show that even a basic version of each concept is already capable of providing a convincing user experience.

In the future, we plan to further develop the applications and test them in the large scale. We deliberately plan to pick groups of people visiting a specific country to prepare them prior to the trip.

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