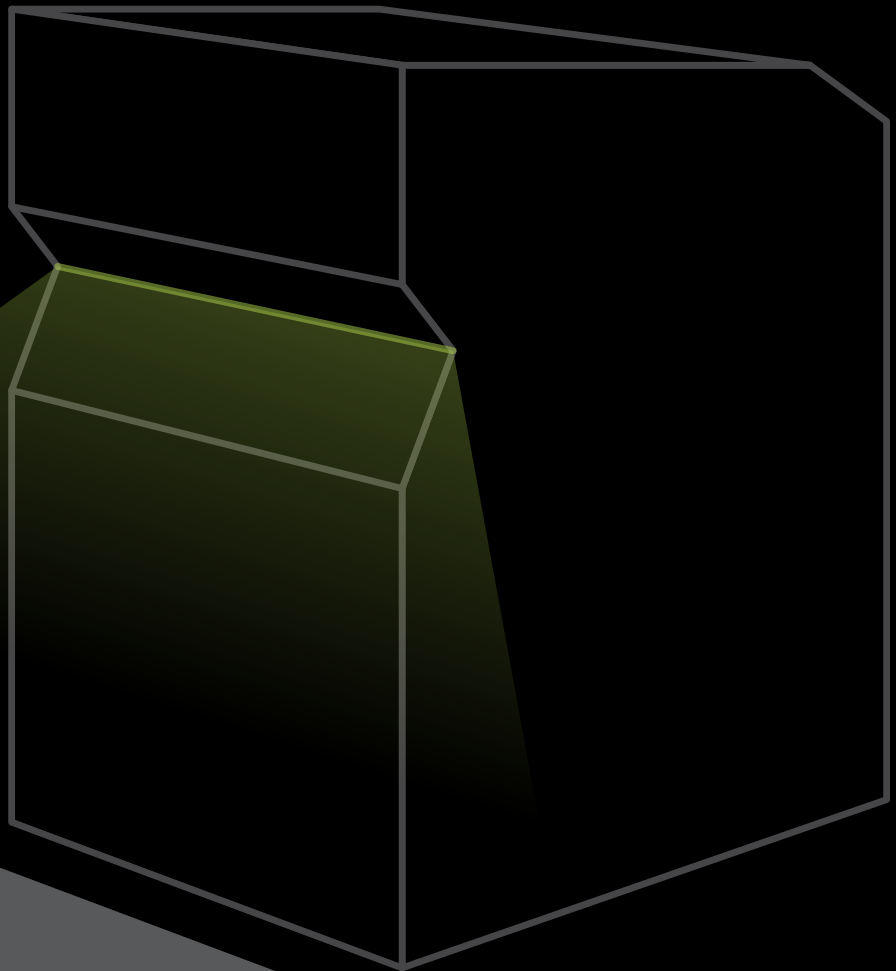
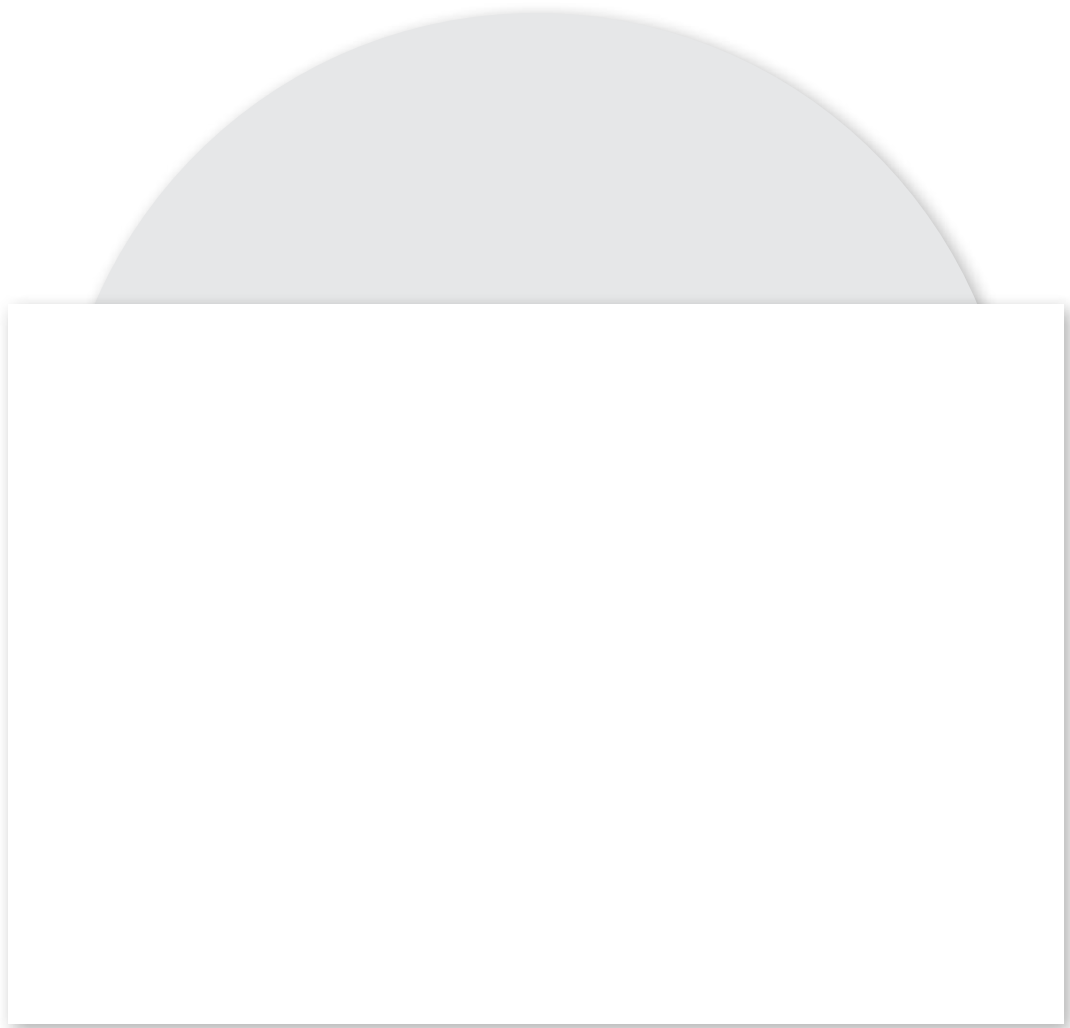


OCAD UNIVERSITY | GDES 3827

Clever Devices Summary Documentation

PREPARED BY BEN McCAMMON | MAY 2011





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Course Summary

Clever Devices is a studio course at OCAD University, available to all students as an elective. The class ran from January to April 2011, and included 24 students from Graphic Design, Industrial Design, Illustration, Advertising, and the Faculty of Art. Students explored interaction design with a focus on GestureTek's Cube.

COURSE DESCRIPTION

Building on fundamental concepts of time-based design practice, students will learn theories and methods for the research and design of interactive communications for mobile and embodied experiences, including those interfaced with personal electronic devices including PDAs, mobile phones, and media players. With a focus on user-centred design the course will explore a variety of interactive experiences involving current and future capabilities for wireless data, image and voice, location-based games, and more. Through a series of exercises, storyboards and short projects, students will gain knowledge and skills in research, conceptualization, diagramming, flow, navigation, and user interaction for device-based interactive communication.

COURSE INSTRUCTOR

Suzanne Stein,
Associate Professor

RESEARCH ASSISTANT

Ben McCammon

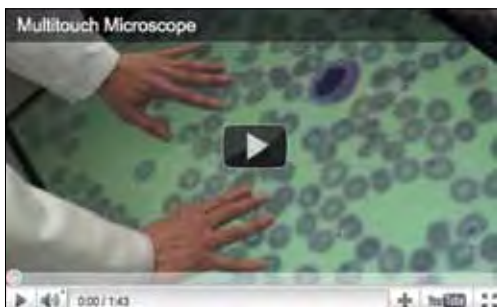
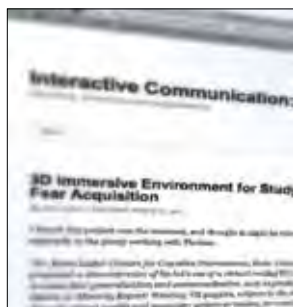
KEY TOPICS

- Trend identification, analysis and synthesis
- Taxonomies of technological devices
- User centred design and research approaches
- Prototyping, storyboarding, process flows and wireframes
- Innovation approaches or processes, including UCD and bottom-up movements
- Models of communication: one-to-one, one-to-many, one-to-few
- Interface, navigation and interaction
- **Multisensory, multitouch, gestural interfaces - special focus!**



The class benefitted from GestureTek's donation of both equipment and mentorship. The company provided a Cube, a PC, and software for class use, testing and prototype development. In addition, Vincent John Vincent and Scott Nihill were kind enough to visit the class on several key occasions and provide their insight and mentorship; presenting a history of GestureTek and their technology; explaining key features of the Cube and its software; participating in key class critiques; and attending the final presentations.

This class would not have been the same without their generous support.



Screenshots and tag cloud from the class blog:
<http://blog.ocad.ca/wordpress/gdes3b27-fw2009-01>

GROUNDWORK

In order to fulfill key learning objectives and to sensitize students to existing devices and emerging technology trends, they were asked to complete two projects.

PROJECT 1: THE BLOG

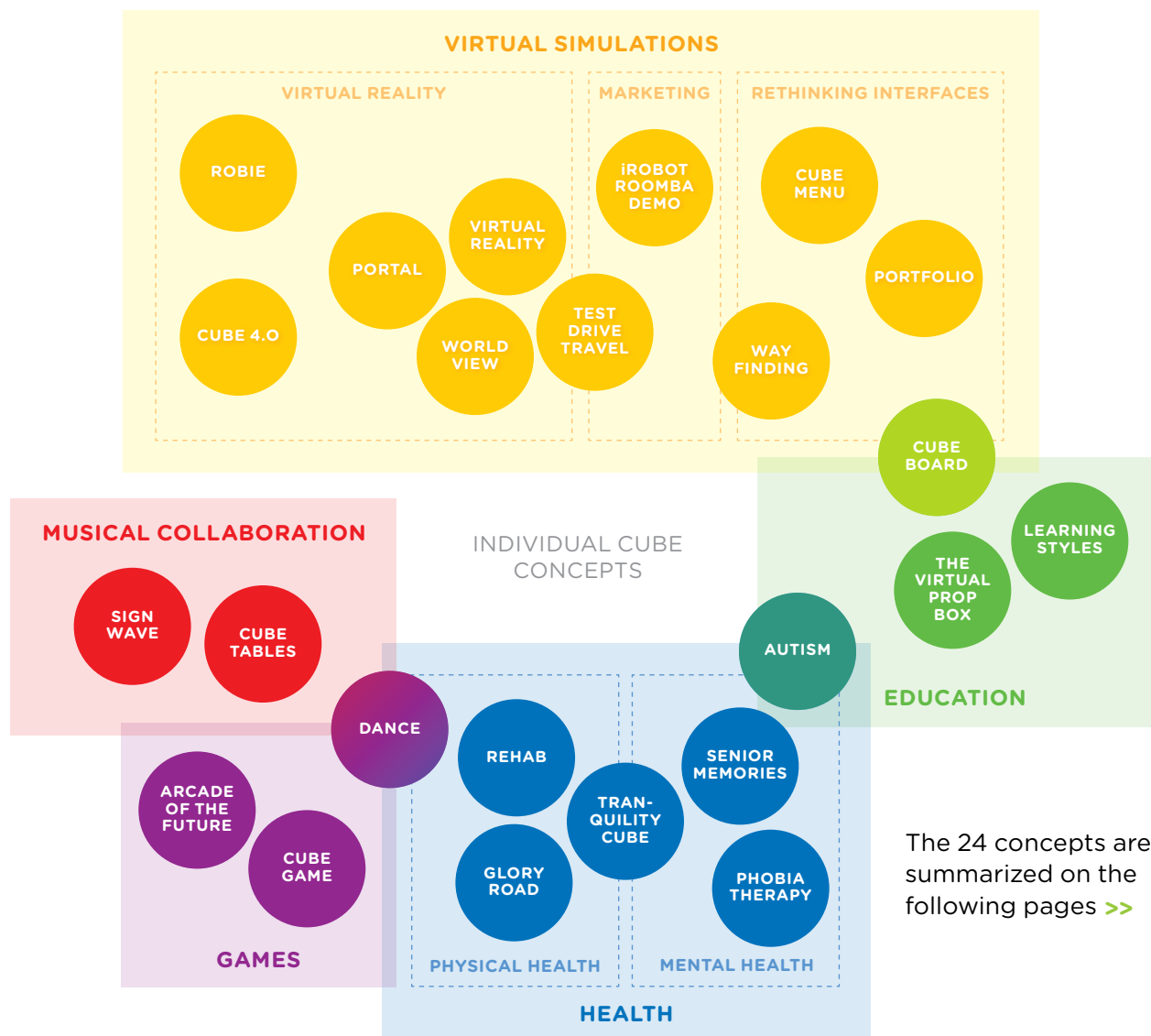
A class blog was created to facilitate observations and discussion related to technology trends, with a special focus on clever devices and gestural interfaces. Each student was also required to share one of their posts with the class in a short verbal presentation followed by questions from the group. The tag cloud at right gives an indication of the most popular topics on the blog.

PROJECT 2: DECONSTRUCTING A DEVICE

Students then worked in groups to analyze a gestural device of their choosing. They were asked to consider the broader context and also what aspects were examples of meaningful socio-technical innovation. The results were presented to the group in poster format. Some examples included the Microsoft Surface, the Wii, and the Kinect.

Individual Concepts Overview

As a precursor to their larger group projects, each student was asked to generate an innovative concept for The Cube. This affinity diagram shows some of the trends and similarities.



Individual Concepts Summaries

VIRTUAL SIMULATIONS

ROBIE | Bevan Chung

For busy parents of toddlers, Robie is a combination of the Cube's gestural technologies and the iRobot automatic vacuum cleaner, which will allow for remote monitoring of their child.

Responding to the movement of the toddler, and using the same mobility system as the iRobot, Robie can follow a toddler as they walk or crawl around the house. It sends real-time video and location information back to the parent's computer, allowing them to work and keep a virtual eye on their child at the same time. When not in use for monitoring, it also saves time by cleaning the floor.

THE CUBE 4.0 | Vanessa Ford

For cats and dogs in crowded shelters, the Cube will provide an opportunity for exercise and training, improving their health and behaviour, and thus their chances of getting adopted.

Through testing and iteration, sequences will be created that encourage cats

and dogs to interact with projected objects (such as balls, mice, etc) which will respond to their movements and encourage exercise.

PORTAL

Maggie Chiu Yee Chan

For users separated by distance, the Portal will provide virtual social interactions between two spaces, using visual, audio, gestural, and even tactile elements.

By combining multiple Cubes along with cameras and microphones, users can wipe away the 'mirror-like' wall projection of their own room to reveal people in a far-off room and see their environment. In addition to seeing the video and hearing the audio from that distant room, analogue tools like pencils and papers will be placed nearby to facilitate various forms of dialogue and social interaction.

VIRTUAL REALITY

Chris Holborn

For individuals limited by location or disability, this system combines the Cube with a large format wall projection to create

immersive virtual tools, possibly using content and data from Google Art Project or Google Street View.

The benefits are greater access for those who may not be able to visit museums or locations in person, and with greater immersion and interaction than provided by a simple website experience. Could also be used for immersive video gaming.

WORLD VIEW

Frank Suarez-Milan

For users interested in exploring the world, World View will combine two Cube projections to create an immersive navigation of Google Street View images.

The floor projection will allow for walking movements to control forward and backward movement, while the wall projection will show the Google Street View images and allow hand gestures to control left and right turns and panning up and down.

TEST DRIVE TRAVEL

Mark Ralph

For customers planning vacations, Test Dive Travel is an immersive booth that simulates travel destinations for ‘testing’ before purchase.

The booth combines the Cube with three backlit projections, a haptic floor, and a Surround Sound system to create a fully immersive experience in which users can see, hear, and feel the simulated travel destination. For example, the haptic floor will simulate the feeling of sand underfoot, while the Cube’s projection and gestural interface will allow users to kick the sand.

iROBOT ROOMBA DEMO

Geoffrey Villaneuva

For potential customers in a retail environment, this demo will use the Cube to promote the Roomba in a more engaging way than traditional video demos.

When a user walks across the projection area, the Cube will project dirty footprints. A virtual Roomba projection will then move through the projection and clean up the mess, showing the benefits of the product in an interactive and memorable way.

WAYFINDING | Ivan Sharko

For people at outdoor retail or tourist locations, the Cube will provide a more intuitive wayfinding experience, and a more comfortable interaction in cold weather.

Because it does not rely on direct touch, users can

use their feet to interact with the wayfinding system while keeping their gloves on and keeping warm. Maps and directions will be projected onto the ground under the user’s feet, helping cognition and making the directions more intuitive.

CUBE MENU

Maureen Mendoza

For customers in a restaurant, the Cube will project a virtual menu and allow for ordering through gestural interaction.

A cube will be built into each dining booth and project a menu made of onto one wall of the booth. By touching an icon, customers can learn more about the menu item, including nutritional information, and suggestions for potential drink and appetizer pairings. Customers will use the interface to order, request drink refills, and request the bill at the end of their meal.

PORTFOLIO | James Ma

For photographers, the Cube will be used to display their photos and allow users to interact with them.

The Cube will be connected to the internet and users will scroll through a strip of images using gestures and clicking on individual images to see more detail and written descriptions.

EDUCATION

CUBE BOARD | Jimson Cheung

For students and teachers, The Cube will provide a more interactive and dynamic way to give lectures and presentations in a classroom setting.

The Cube would be mounted overhead and project down onto a standard whiteboard, transforming it into an interactive surface where teachers can display images and videos, manipulating them through gestures.

LEARNING STYLES

Kari Silver

For students in Grades 1-6, this system will use projected visuals, gestural interaction and audio to provide learning opportunities for visual, active, and auditory learners.

A series of applications or learning games would be developed based on counting, addition, fractions, and other concepts, in which students manipulate virtual objects or answer questions based on audio and visual cues.

THE VIRTUAL PROP-BOX

Ken Leung

For young students, The Virtual Prop-Box will enhance the learning experience through role-playing and physical play, using the Cube’s gestural interface and rich graphic display capabilities.

Individual Concepts Summaries con't

Students will manipulate virtual objects to learn about key educational concepts. For example, manipulating oversized virtual hydrogen and oxygen molecules to learn about how water is formed through molecular bonds. Other examples might involve simple counting exercises or more complex interactions with cells in the human body.

HEALTH

AUTISM | Stephanie Mancini

For children with Autism, the Cube will provide a series of interactive activities to promote teamwork, through physical and cognitive tasks.

The Cube would be used in centres that specialize in Autism. A teacher or caregiver could control the Cube through their smart phone. Activities might include running, hopping, ball play, sorting, concentration, and observation games. When not in use, soothing graphics will be displayed to create a calm environment.

SENIOR MEMORIES

Vera Butrimova

For seniors in retirement homes, the Cube will provide an opportunity for physical and mental exercise through simple interactions, helping prevent the onset of conditions like Alzheimer's and dementia.

As an alternative to traditional retirement home activities like bingo, the Cube could be setup to allow seniors to interact with content based on their interests, for example walking across the projection to reveal an image of their favourite movie star.

PHOBIA THERAPY

Jan Mazereeuw

For patients suffering from phobias, the Cube will create small interactive spaces where fears can be confronted in a controlled and contained setting.

Between discussing a phobia with a psychologist and confronting the phobia in the real world, the Cube would provide a virtual 'in between', facilitated by the psychologist. Simulations would have several stages,

progressing from mild or minimal interaction, through to intense and participatory interaction with the source of the phobia, as the patient becomes more confident.

THE TRANQUILITY CUBE

Laurie Fleming

This system will provide relaxing, therapeutic rehabilitation programs for adults, including yoga, meditation, or physiotherapy.

The Cube will project calming visuals onto the floor, such as clouds or water, combined with relaxing sounds like ocean waves. A second motion camera will be used to capture gestures above the floor, and will enable the system to offer verbal instruction to the user as well.

GLORY ROAD | Calvin Cheng

For patients with leg injuries, Glory Road is a row of linked Cubes which will provide a more interactive and engaging rehabilitation experience by incorporating gaming elements.

Several Cube projections in a row will form a path divided into multiple slices,

each one a milestone for the patient, with railings on each side as in a typical rehab exercise. Simple interaction would involve simply walking and reaching the next milestone. Gaming elements could be added in successively more difficult levels, to make the process more fun, more motivating, and thus more successful. These might include timed performances, interacting with virtual balls through the projection, scoring points, and beating records of previous 'personal bests'.

REHAB | Elina Tarkkonen

For patients with disabilities or injuries, the Cube will provide fun rehabilitation opportunities, increasing motivation.

The Cube would project an interactive abstract visual for patients to use in exercising their feet or hands. It could be projected onto the floor in front of a wheelchair, or on the wall next to a patient's bed.

GAMES

DANCE | Olivier Mayrand

This game will allow users to exercise while dancing, promoting physical health.

The projection from the Cube will be divided up into different input zones, and the user will follow a dance sequence by stepping in the correct zone.

CUBE GAME | Cameron Allen

For gamers in retail environments, this game will provide a casual gaming experience that is more physical and promotes healthy activity.

Using the Cube's gestural interface in combination with a wall mounted display, the user would be represented by an onscreen avatar that dodges obstacles based on the users actual physical movements. Encouraging messages would provide the user with approximate calories burned after 5 minutes of game play.

ARCADE OF THE FUTURE

David Dowhaniuk

For casual gamers in public spaces, the Cube could become a portable gaming system that promotes both physical and mental health.

By adding a wall projection in addition to the floor projection, a more robust gaming platform could be created and used for both cognitive games and short physical games similar to Wii or Kinect. Multiple players could participate through the floor projection interface.

MUSICAL COLLABORATION

CUBE TABLES | Aamna Muzaffar

For casual musicians, Cube Tables combines a gestural interface with audio equipment and effects processors to provide an immersive audiovisual experience.

Users choose from various materials (such as wood, metal, or water), which are then projected onto a table and respond to users finger taps visually, and by playing the appropriate sounds. Sound loops up to 10 seconds can be saved and sampled on one Cube Table, or through a network of multiple Cube Tables, leading to collaborative co-creation.

SIGN WAVE | Tim Bettridge

This artistic installation of networked Cubes will allow users in different countries to collaboratively create electronic music in real-time.

The projection will consist of words in each users language which can be manipulated through gestures (for example wind, rain, glass). Each word will have a corresponding sound, and words placed in the center of the projection will be louder. The cubes in both countries will be synchronous, so both users see and manipulate the same words (in their own language) and hear the same music. The experience cuts across language and cultural barriers and encourages cooperation and co-creation.

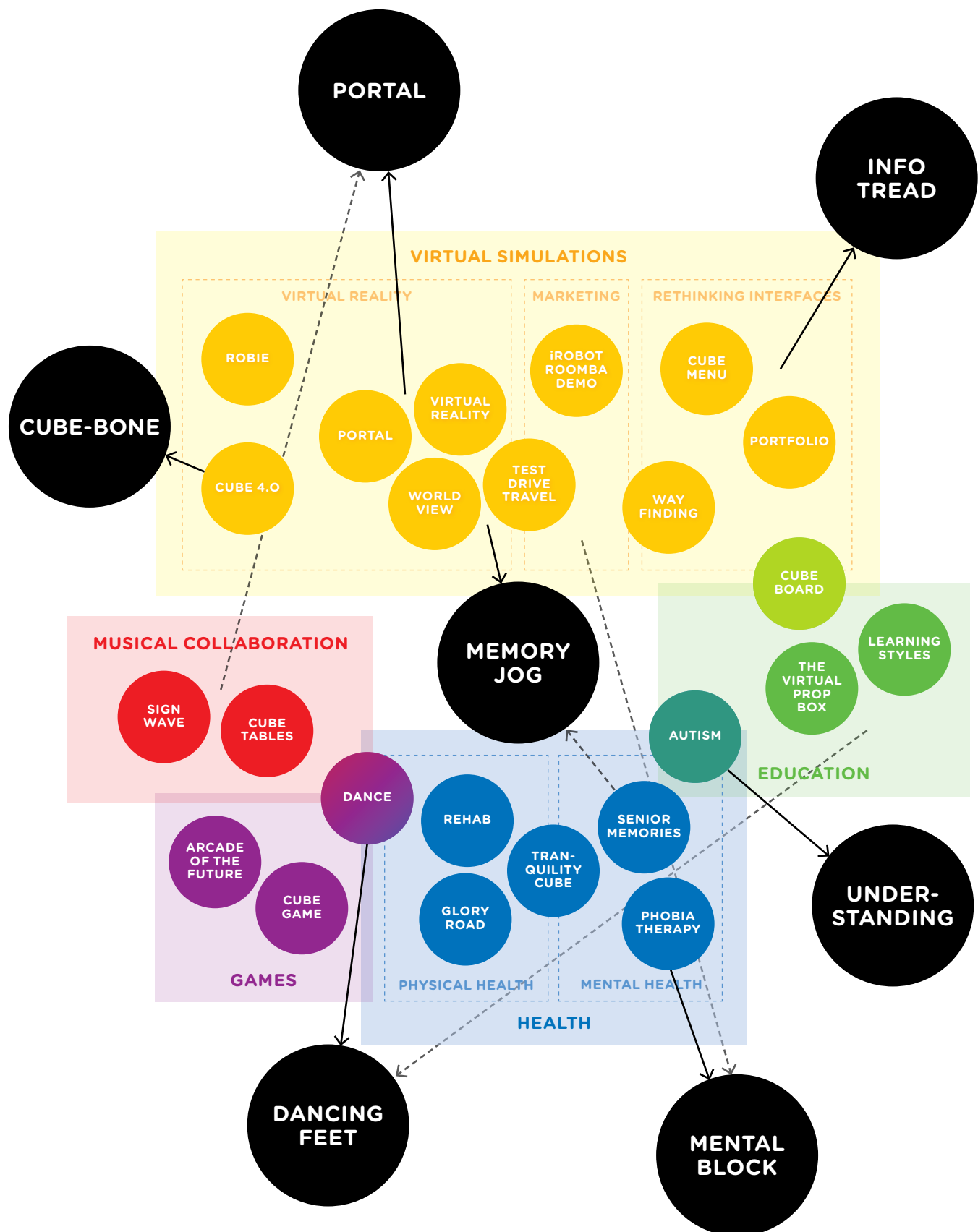
Group Projects

After the individual explorations, students formed groups based on their interests. Some chose to further develop ideas they began in Project 3, while others decided to cross-pollinate and explore new directions. The diagram on the right shows how some of the ideas grew out of the previous projects.

Groups developed their interactive system concepts in an iterative process, with input and guidance from their peers in other groups, the course instructors, and GestureTek's Vincent John Vincent and Scott Nihill.

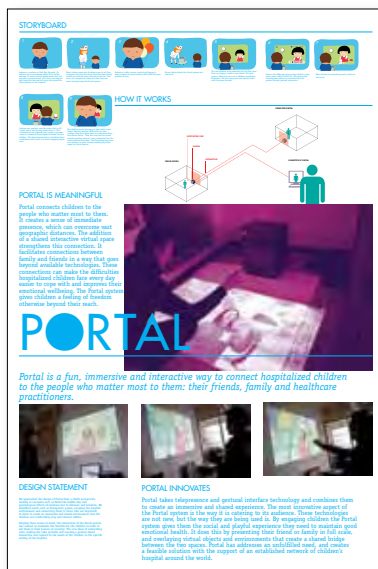
Groups were asked to present their final concept, to submit a printed dossier documenting the project, research, and process, and to prepare a poster summarizing their clever device.

The following pages present snapshots of the groups' concepts, taken from their documentation. PDF's of the posters can be found on the accompanying disc, along with the digital prototypes produced by some groups.



Portal

Portal is a fun, immersive and interactive way to connect hospitalized children to the people who matter most to them: their friends, family and healthcare practitioners.



See disc for PDF of poster.

SUMMARY

We identified needs such as therapeutic games, escaping the hospital environment and connecting them to those who are important to them to create an immersive and shared environment that the children can comfortably play and interact within.

The core ideas of networking cube, making the cube portable and creating a gesture-based interaction was tapered to the needs of the children in the specific setting of the hospital.

INNOVATION

Portal takes telepresence and gestural interface technology and combines them to create an immersive and shared experience, with the support of an

established network of children's hospital around the world.

MEANINGFUL ASPECTS

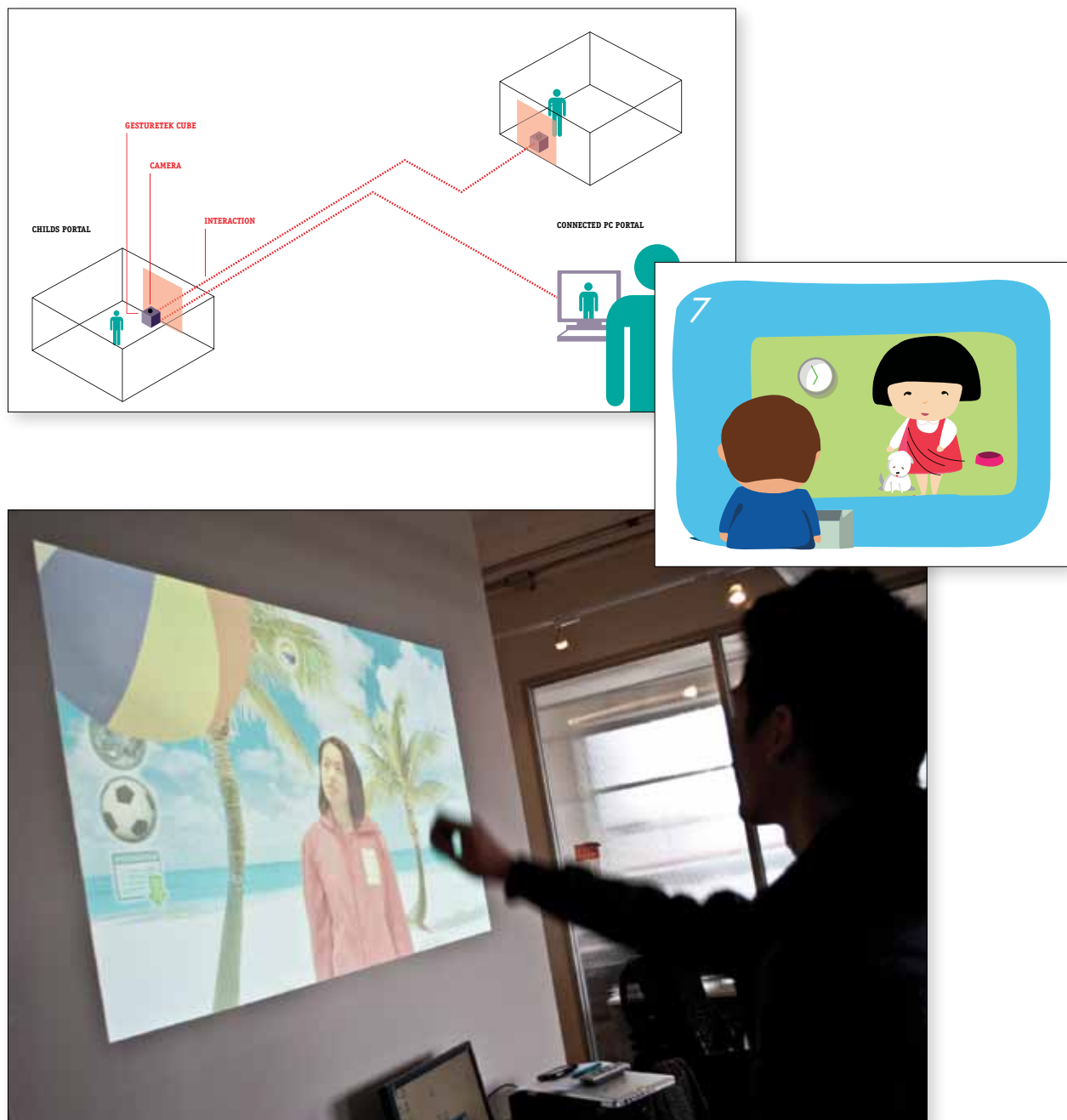
Portal connects children to the people who matter most to them. It creates a sense of immediate presence, which can overcome vast geographic distances. The addition of a shared interactive virtual space strengthens this connection. These connections can make the difficulties hospitalized children face every day easier to cope with and improves their emotional wellbeing. The Portal system gives sick children a feeling of freedom otherwise beyond their reach.

GROUP MEMBERS

Tim Bettridge
Maggie Chiu Yee Chan
Calvin Cheng
Aamna Muzaffar
Ivan Sharko

OPPORTUNITIES

Healthcare
Virtual Socialization
Children



InfoTread

The InfoTread system is a way of relaying relative and dynamic sales information to customers within a retail environment via interactive informative wall projections and engaging floor projections.



See disc for PDF of poster.

SUMMARY

InfoTread combines the use of an interactive wall projection and an interactive floor projection to create a promotion and advertisement system within a retail store. This is achieved by moving the majority of inventory into the store storage and creating a more spacious environment. Examples of its applications are: store information, latest promotions, watching advertisement for discount rewards, entertaining floor projects, and alternative store ordering system through menus.

INNOVATION

InfoTread provides customers with a unique shopping experience; an entire section of the

store has been dedicated to the use of the Cube to not only pull customer traffic, but to also help the store communicate sales information and to minimize walk-outs by keeping customers constantly engaged from the moment they enter the store to the moment they leave.

MEANINGFUL ASPECTS

Customers are being offered a more dynamic digital way of accessing product information, while being immersed in the brand identity. This implementation of Gesturetek technology is able to target and provide meaningful interactions for both adults and children.

GROUP MEMBERS

Jimson Cheung
James Ma
Geoffrey Villanueva

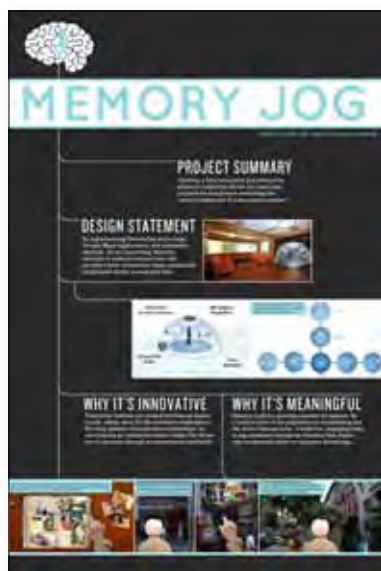
OPPORTUNITIES

Retail
Information Design
Branding



Memory Jog

Memory Jog enables elderly users to explore and interact with 3-dimensional, immersive representations of locales which they are unable to travel to in real life due to limitations in bodily mobility.



See disc for PDF of poster.

SUMMARY

Our goal is to create an immersive virtual environment for seniors, which will serve as a tool for the reliving of places and events from past memories (facilitating the exercising of memory centers in the brain), as well as enabling the sharing of these memories with younger generations.

Dynamic imagery of the user's desired locale will be represented through Google Street View, using the Google Maps API. The floor sensor and gestural sensors within the tent will serve as a 'interface' to Street View, for the purposes of movement and interaction.

INNOVATION

Traditional devices use tactical switches as digital inputs, taking away the immersive experience. By using gesture and projection technology, we are creating an interactive virtual reality that allows users to navigate through an environment intuitively.

MEANINGFUL ASPECTS

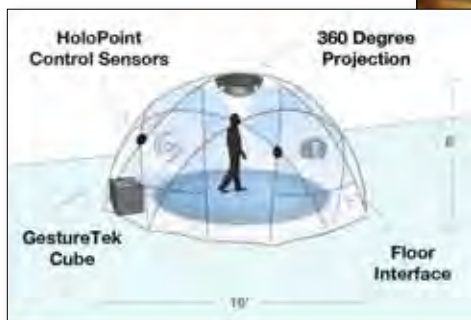
Memory loss is a growing concern for seniors. As a large portion of the population is transitioning into the senior demographic, there is a need for engaging ways to jog memories through an interface that doesn't rely on physical ability or computer knowledge.

GROUP MEMBERS

David Dowhaniuk
Laurie Fleming
Chris Holborn
Ken Leung
Mark Ralph

OPPORTUNITIES

Aging Population
Alzheimers/Dementia
Virtual Reality



She spies an eatery that used to be where her friend's flat was -- she is curious about it, and 'touches' the eatery with her hand.



Understanding

To provide children who have autism an outlet and activity that could improve social interaction and communication.



See disc for PDF of poster.

SUMMARY

The ideation is based upon various sessions targeting different areas for children with autism. From speech and vocabulary, to social interaction, to increasing their comfort zones, and increases attention spans.

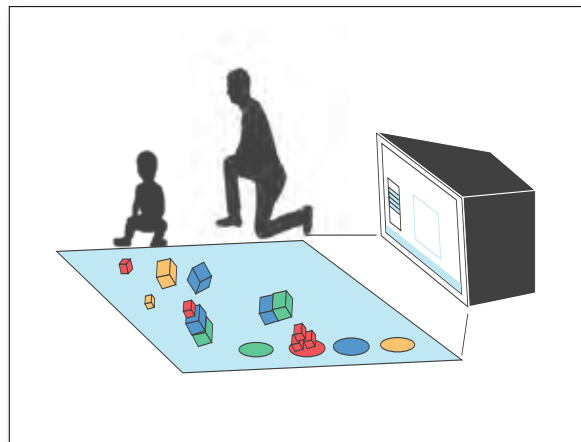
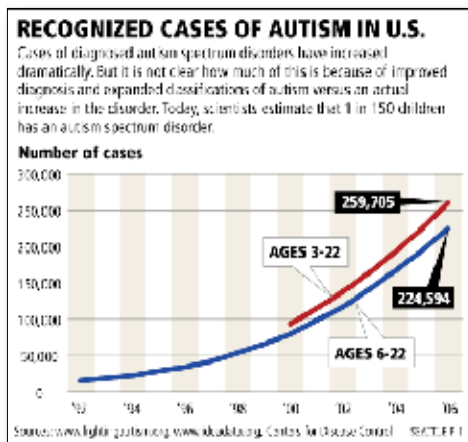
INNOVATION

With this system, families that have been unable to help their children will have multiple strategies at their disposal.

MEANINGFUL ASPECTS

The sessions and overall idea of promoting social interaction of children with autism is clearly meaningful due to the overwhelming increase of cases in the past ten years by 600%. (Andrews) It can be argued

that children of today have it harder than previous generations due to increase in cost of education, lack of funding for education, lack of funding towards programs to help those who have disorders, and increased anxiety and pressure to increase their monetary gains. There are many low income families and middle class families that not only do not know how to help their children who have autism but also have a hard time paying for treatments.



UNDERSTANDING

Session Menu

Classroom

Play

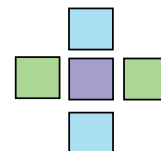
Speech

Body in Space



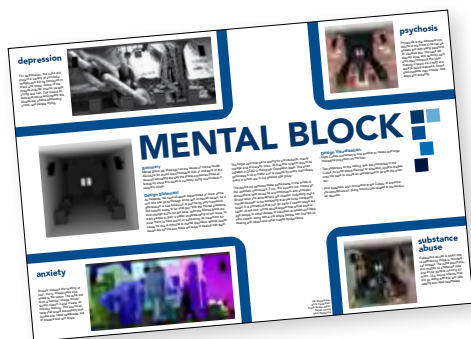
Can you say: "I had fun."
(computer voice says it back)

Can you say: "At school!"
(computer voice says it back)



Mental Block

Mental Block will shed light on the issue of mental health disorders for those uncomfortable with or unaware of the issue, by simulating the way the illness consumes those affected.



See disc for PDF of poster.

SUMMARY

The target user that we're aiming for are students, mainly college and university ones. At first this system would be installed in OCAD U during the Orientation week and the Fourth Year Grad Exhibition week.

Through visual and auditory cues, the system will simulate various mental illnesses, including depression, anxiety, psychosis, and substance abuse. At the end, words would appear that would encourage people to either donate or volunteer at Health and Wellness centre, along with a link where people can find tips on dealing with stress and other mental health issues.

INNOVATION

Mental Block would be more of an educational tool unlike the regular awareness media; it would incorporate a lesson through an experience rather than a lesson through someone speaking or telling a story. The result will be a more profound impression on the viewers.

MEANINGFUL ASPECTS

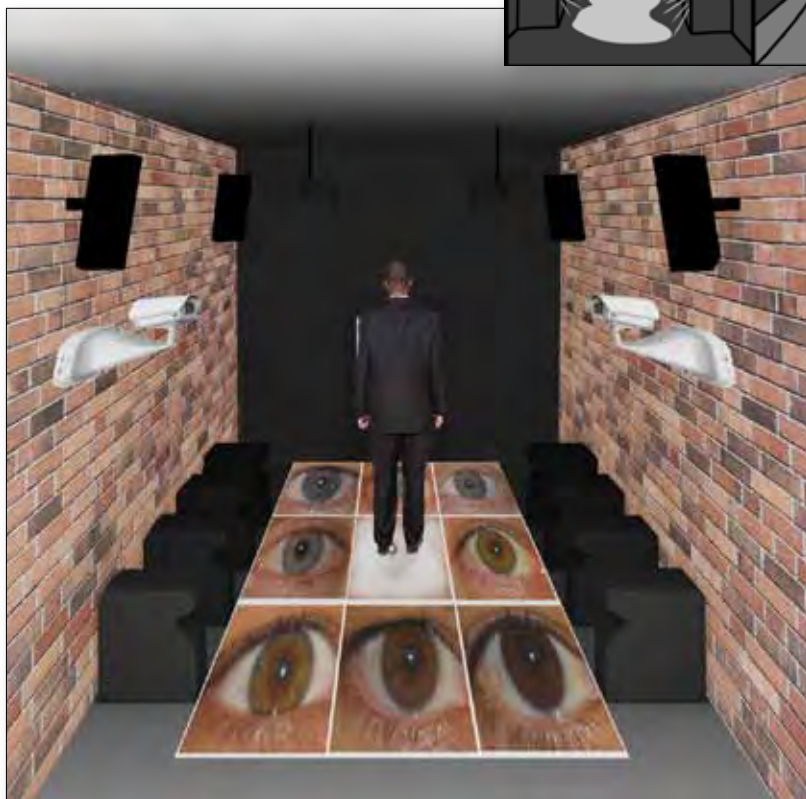
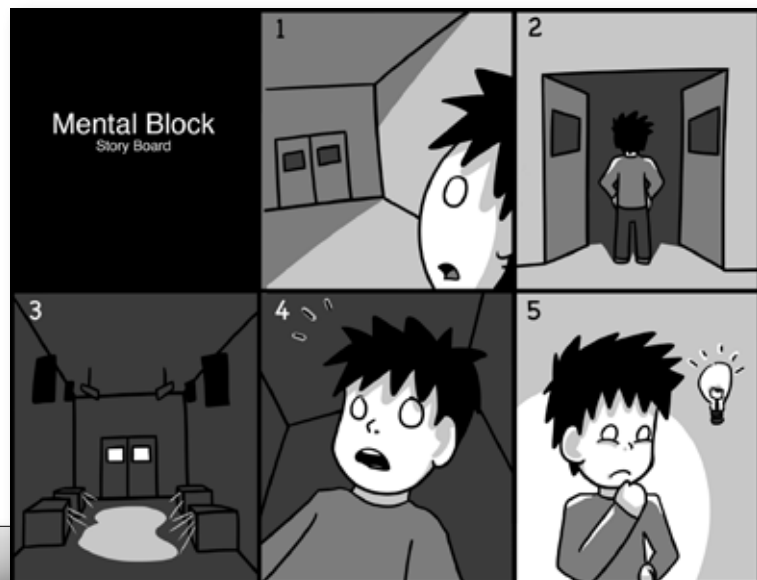
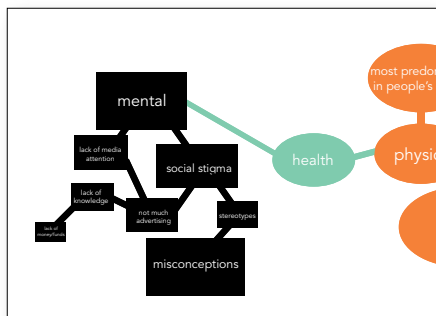
It is meaningful because it tackles an issue that carries a lot of stigma, misconceptions and lack of recognition of severity compared to physical illnesses. This system would shed light on the issues that people are either uncomfortable with or do not want to acknowledge.

GROUP MEMBERS

Vera Butrimova
Bevan Chung
Jan Mazereeuw
Frank Suarez-Milan
Elina Tarkkonen

OPPORTUNITIES

Mental Health
Cause-based Marketing
College Students



Dancing Feet

This game develops fitness and movement skills by teaching students dance steps, and allowing them to create their own dance sequences.



SUMMARY

There are 3 game options that enable game play for a variety of ages and skill levels. They encourage the integration of dance into the physical education curriculum. This exposes children to a variety of different exercise activities which contributes to a healthier lifestyle for the future.

INNOVATION

It is a unique dance game: the game teaches how to do dance steps but also gives control to the user by letting them arrange the steps into their own dance sequence.

MEANINGFUL ASPECTS

Participation in physical activity provides mental, emotional, and physical benefits. Early exposure will lead to healthier lifestyle choices in the long term. In addition, this type of exercise allows students to use creative thinking as part of the physical activity.

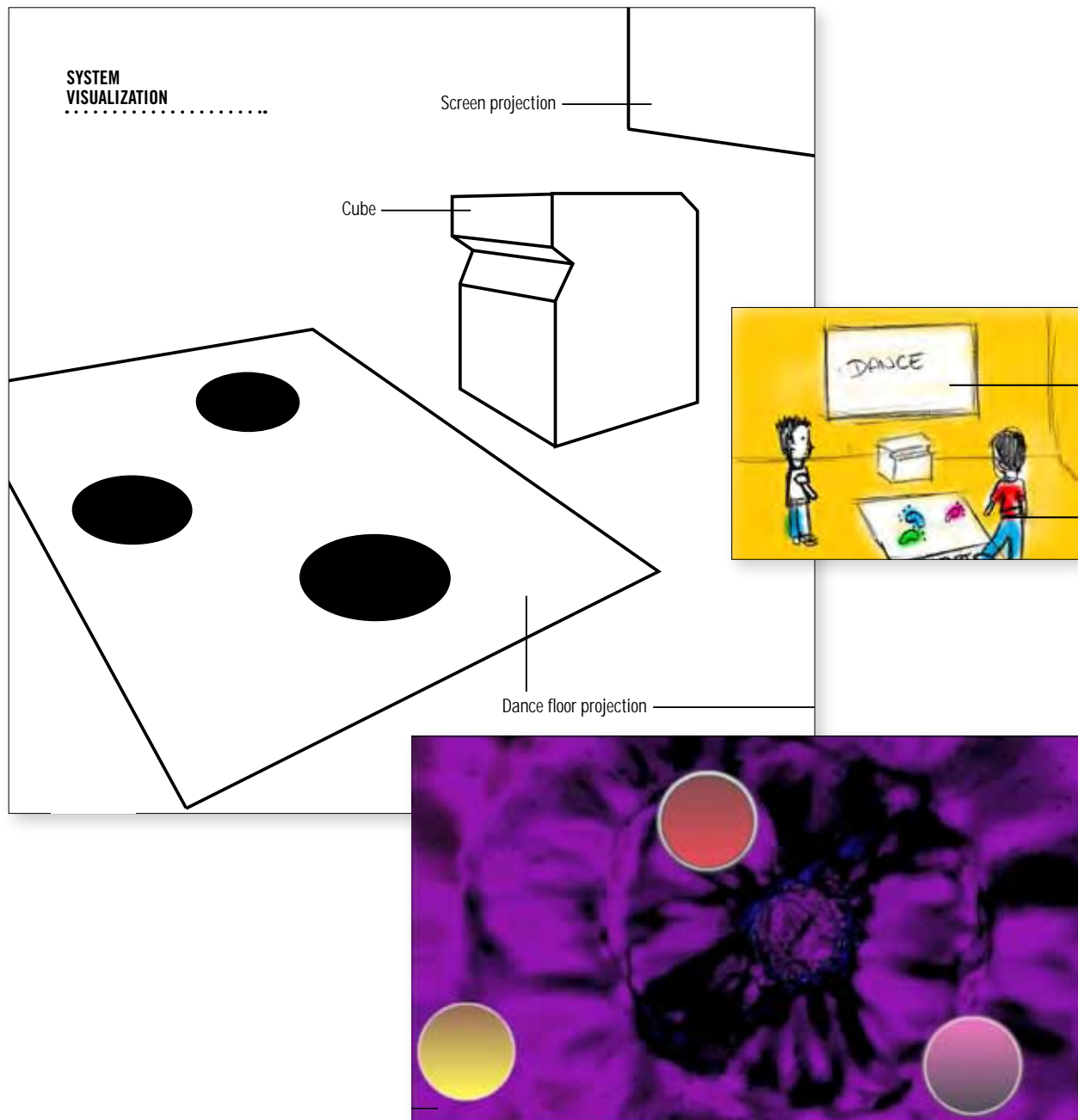
See disc for PDF of poster.

GROUP MEMBERS

Olivier Mayrand
Maureen Mendoza
Kari Silver

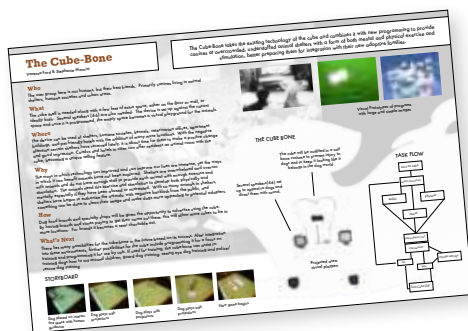
OPPORTUNITIES

Physical Health
Educational Games
Children



The Cube-Bone

The Cube-Bone provides canines at overcrowded, understaffed animal shelters with a form of both mental and physical exercise and stimulation, better preparing them for adoption.



See disc for PDF of poster.

SUMMARY

The cube itself is needed along with a few feet of extra space, either on the floor or wall, or ideally both. Several speakers (4-6) are also needed. The device is set up against the vacant space and once it is programmed, the empty space becomes a virtual playground for the animals.

INNOVATION

The ways in which technology has improved and can improve our lives are immense, yet the ways in which it can benefit animals have not been well explored.

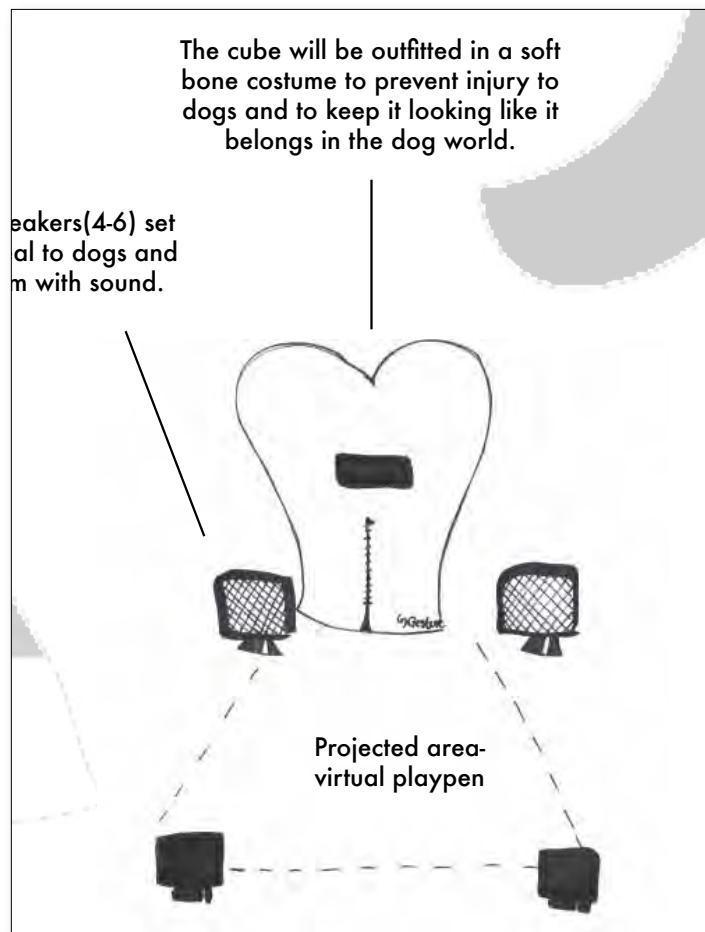
To help offset costs, dog food brands and specialty shops will be given the opportunity to advertise on the Cube-Bone.

MEANINGFUL ASPECTS

Shelters are overwhelmed and overrun with animals and do not have enough staff to provide each animal with enough exercise and stimulation. The animals need this exercise and stimulation to develop both physically and mentally especially if they have been abused or mistreated. And with so many animals in shelters, shelters have begun to euthanize the animals, despite negative backlash from the public.

Vanessa Ford
Stephanie Mancini

Non-human Users
Targeted Marketing
Pet Owners



Conclusion

This iteration of the Clever Devices course was an example of successful collaboration between students and industry partners. The students came from diverse backgrounds and were able to work in a cross-disciplinary environment with an emphasis on conceptual thinking, iterative design, and technosocio innovation. The results are a body of original solutions which use gestural technology to address important user needs.

BEYOND THE CLASSROOM

This course has been showcased beyond the classroom in several ways. The collaboration between GestureTek and OCAD University was featured in an article by the Ontario Ministry of Research and Innovation (see article at www.mri.gov.on.ca/english/ontario_innovates/gesturetek.asp).

Along with Vincent John Vincent and Scott Nihill, some students from the class attended the Toronto RIC Launch at MaRS Discovery District, held on February 9th, 2011, which showcased innovation from a range of Toronto-area companies and educational institutions.

Finally, selected projects were on display at Canada 3.0, “Canada’s Premier Digital Media Event”, held in Stratford, Ontario on May 2-4, 2011. These projects continue to be displayed in the Digital Futures Initiative space at OCAD University’s south campus.

THANK YOU

This course would not have been possible without the following people:

GestureTek

Vincent John Vincent
Scott Nihill

OCAD University

Monica Contreras
Andrew McAllister
Myly Pham
Joe Saundercook
Mike Steventon



