TOPIC II

ACCESSIBILITY, ASSISTANCE, AND UNDERSTANDING

Team Members

FRANCIS VICTA
Computer Programmer Analyst

SAYA KIM
Interdisciplinary Design Strategy

MERT OZCAN
Deloitte Mentor

MICHELLE DESGROSEILLIERS
GBC Mentor

DEVIKA NARAYANI PRAKASH
GBC Mentor

Problem Definition

TOPIC II ACCESSIBILITY, ASSISTANCE, AND UNDERSTANDING

The online learning environment when compared to that of the traditional one, poses several new challenges and discrepancies between a learner's expectations and the reality of online learning as it exists now.

In making the haste transition to online learning amidst the pandemic, many institutions and instructors have turned to learning application platforms most familiar and easily accessible to them (e.g Blackboard).

Here, it is important to note that ensuring accessibility to the necessary resources such as hardware, software, physical study space, external resources, and support services must be addressed promptly for the students to be able to make the transition.

Yet even with access to all the resources, one of the biggest detriments to the online learning experience remains that the online learning tools themselves have been inaccessible, ineffective, and unsatisfactory at best.

If instructors continue to rely on platforms designed to be supplementary teaching tools with presumptions that it would be able to replace and encompass students' entire learning experience, the online environment will fail to accommodate students' learning needs, and diminish in value.

Terms to Define

UNIVERSAL DESIGN

Universal design is the design of products or environments to make them accessible to all people, regardless of age, disability or other factors.

UNIVERSAL DESIGN FOR LEARNING

Three principles of UDL

1. Representation
   Having multiple modes of delivering content
2. Action and Expression
   Having multiple ways of assessing and testing students
3. Engagement
   Having multiple ways of motivating students, including group works, projects, assignments

ONLINE LEARNING

All modes of learning taking place digitally including:

- Lectures
- Content sharing
- Discussions / Forums
- Library resources / Supplementary resources

ACCESSIBILITY

1. Resources and devices readily available
    Everyone is able to obtain the tools required for online learning

2. Convenient to use
    Anyone can learn to use regardless of technological literacy

3. Reliable technology
    Minimize crashes, and bugs

4. Multi-faceted modes available
    Multi-sensory delivery of content
    Multi-sensory mode of interaction

EFFECTIVE INTERACTION TOOLS

1. Reports of user satisfaction
    Taken from user surveys and ratings

2.Increased or similar level of class participation as traditional learning
    Measured by an increase of online class interactions
    Taken from system data

Consistent level of interaction between users
    Measured by interaction records data

Problems & Opportunities

BARRIERS TO ONLINE LEARNING

Upon considering the accessibility of online learning within the scope of currently available resources and tools based on students of ranging needs, we have identified 6 main areas of concern:

Economic, Cultural, Social, Technological, Mental, and Physical.

MATRIX CHART

PHYSIOLOGICAL SPECTRUM

	ECONOMIC	CULTURAL	SOCIAL	TECHNOLOGICAL	MENTAL	PHYSICAL
NON-DISABLED	EXPENSIVE TUITION, FEES, AND COSTS	LANGUAGE BARRIERS, CULTURAL EXPECTATIONS	DIFFICULTY CONNECTING WITH OTHERS, LIMITED INTERACTIONS	INSTRUCTORS' INABILITY TO USE PLATFORMS, ACCESS TO EQUIPMENT	UNCONTROLLED PACE OF LEARNING	ACCESS TO DEVICES, AND PRIVATE LEARNING SPACE
MENTAL IMPAIRMENT	EXPENSES ASSOCIATED WITH PERSONAL TREATMENT	STIGMA, MISDIAGNOSIS, DISMISSED AS "PERSONALITY ISSUES"	INVISIBLE DIFFICULTIES FUNCTIONING IN SCHOOLS AND RELATIONSHIPS	STRUGGLES HIDDEN BEHIND THE SCREEN	WITHDRAWN, UNMOTIVATED, ALIENTATED,	EASILY LEAD TO PHYSICAL COMPLAINTS, ISOLATION
PHYSICAL IMPAIRMENT	PERSONAL MEDICAL COSTS, DIFFICULTY TO SELF-SUSTAIN	NOT ALL CONDITIONS ARE ALWAYS VISIBLE -- PERIODS OF REMISSION	COULD ALSO EXPERIENCE HINDERING PERSONALITY DISORDERS	MANIPULATION OF EQUIPMENT AND WRITING MAY BE DIFFICULT	MAY REQUIRE MORE TIME TO COMPLETE TASKS, AFFECTED CONFIDENCE	FREQUENT OR UNEXPECTED ABSENCES, GAPS IN SCHOOLING
VISUAL IMPAIRMENT	EXPENSIVE ASSISTIVE EQUIPMENT, DIFFICULTY TO SELF-SUSTAIN	LACK OF UNDERSTANDING SPECIFIC/UNIQUE NEEDS	VIDEO CALLS WITHOUT SEEING SUBTLE CUES OR BODY LANGUAGE	NEED SPECIFIC VISUAL ACCOMODATIONS, HEAVY RELIANCE ON VISUAL	TENDENCY TO BE PASSIVE, HESISTANT, UNDER-PERFORM	DELAYED MOTOR MILESTONES, LIMITED RECEPTIVE SKILLS
AUDIO IMPAIRMENT	EXPENSIVE ASSISTIVE EQUIPMENT, DIFFICULTY TO SELF-SUSTAIN	SIGN LANGUAGE IS UNCOMMON, NO SYSTEMS IN PLACE FOR ACCOMODATIONS	POSSIBILITY FOR SOCIAL INTERACTION, PARTICIPATION ARE LIMITED	DELAYS IN RECEIVING LEARNING MATERIAL	EDUCATIONAL DISADVANTAGES CAN LEAD TO ANXIETY	UNRECOGNIZABLE FACES, LIPS, POOR LIGHTING, QUALITY, AND CONNECTION

BARRIERS TO ONLINE LEARNING

A matrix chart visualization of the 6 categories of barriers to online learning based on the physiological spectrum of potential students

ECONOMIC

Tuition costs are one of the most prominent barriers to learning in general, and as learning moves online and students are deprived of previously available physical resources, the high cost of learning becomes increasingly difficult to justify sans the use of latest technology and software.

CULTURAL

There is a general lack of cultural awareness of accessibility issues especially for students with learning disabilities both by the institution and faculty members that tend to implement egocentric systems of accommodation by lumping students into large categories instead of addressing individual issues and tailoring specific solutions.

SOCIAL

There is an expected difficulty in connecting socially online as interactions become delayed, asynchronous, monotone, and one-dimensional. Without visual and audible cues such as body language, facial expression, tone of voice, and voice inflection, students are likely to fail to signal their needs, discomfort, and/or their struggle to keep up, and as a result, instructors unaware of individual student concerns can become non-accomodating, dismissive, and make harmful assumptions.

TECHNOLOGICAL

Other than the need to make devices and equipment necessary for online learning widely available and easily accessible, there's a need for the technology itself to be able to accommodate and adapt to students' needs; by ensuring that all users, especially the instructors, are able to make use of all the tools available, to open up new possibilities for the most optimal content delivery and methods of assessment.

MENTAL

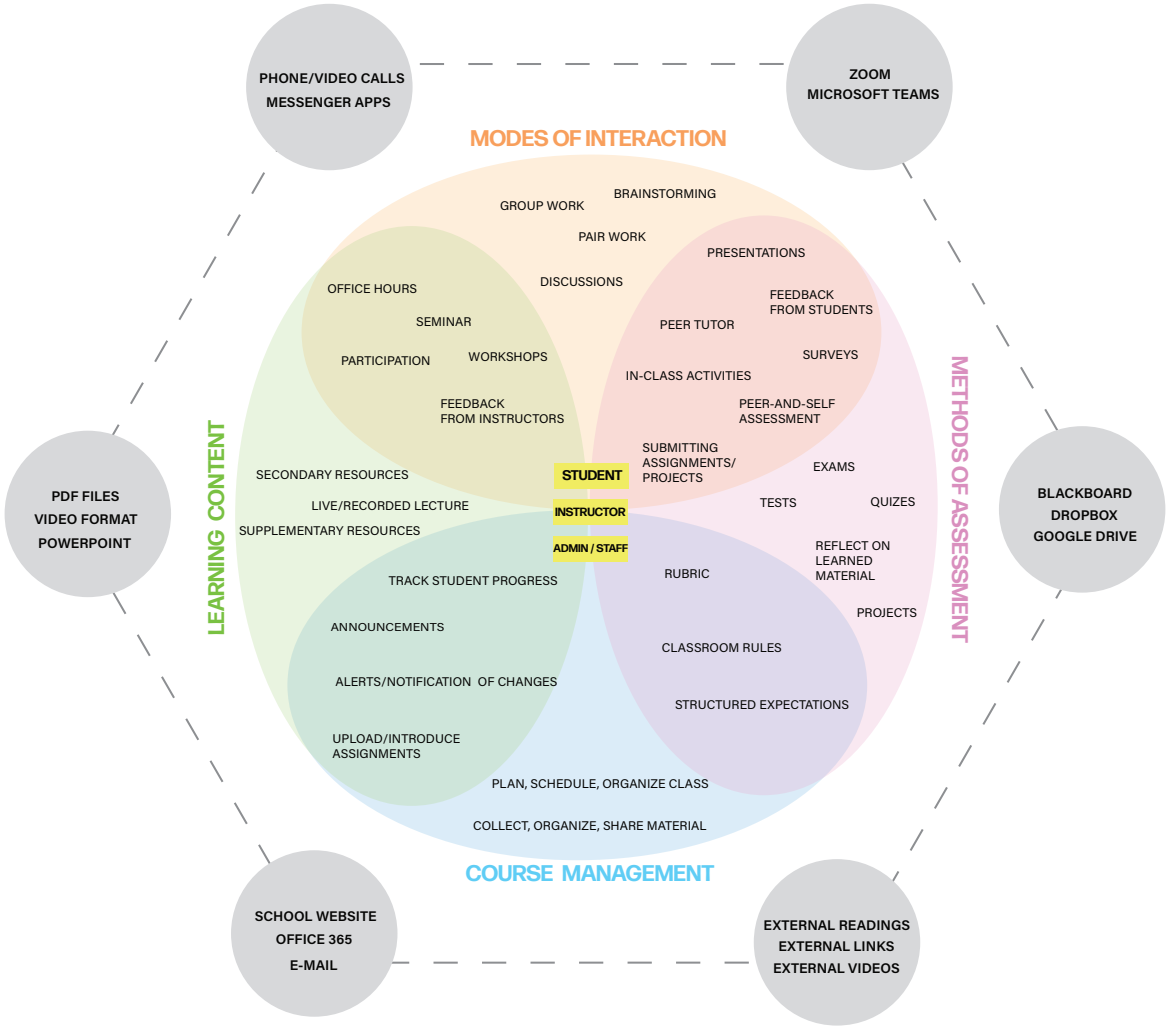
Students already experiencing difficulty functioning in school due to plethora of causes such as depression, anxiety, personality disorders, disturbance of conduct (i.e. inappropriate behaviour), isolation, physical complaints, fatigue, communication difficulties, lack of motivation, independence, and time-management skills are likely to experience heightened skepticism toward online learning.

PHYSICAL

Common problems include requiring students to be glued to their screens resulting in physical fatigue such as eye-strain, difficulty manipulating equipment, failure to account for each student's environment and the varying levels of distractions and difficulties they can face, and difficulty implementing curriculum for building the necessary hard skills and applied learning.

Education Ecosystem

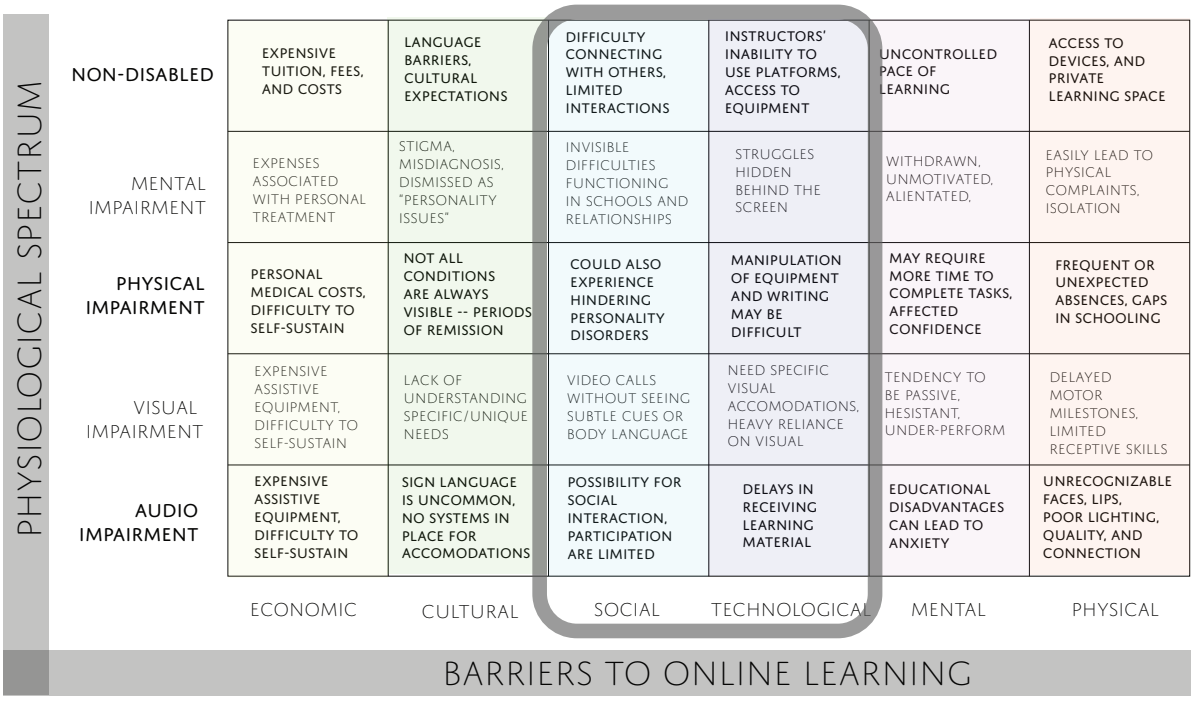
CURRENT ONLINE LEARNING



An ecosystem map visualization of the current online learning tools and resources

Area of Focus

SOCIAL & TECHNOLOGICAL BARRIERS

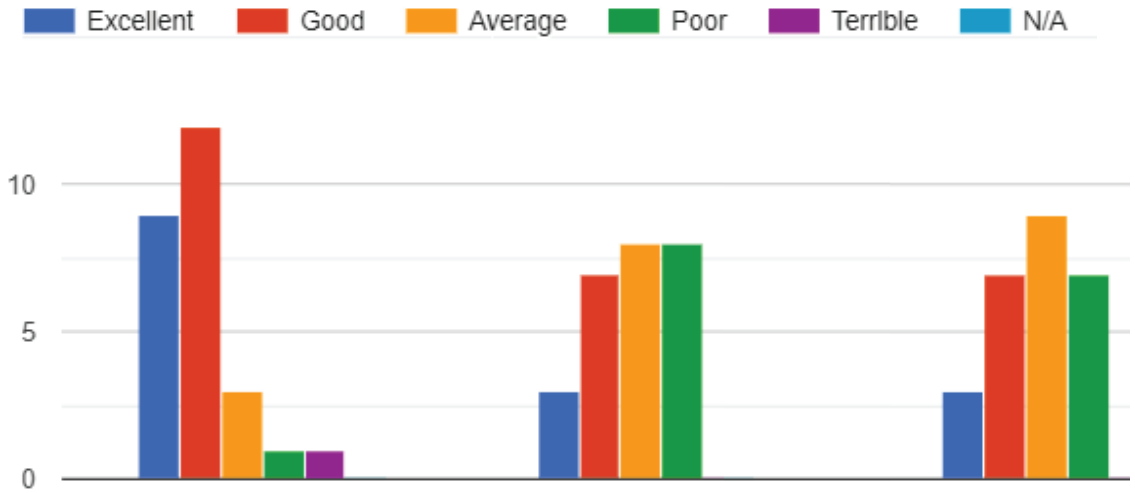


A matrix chart visualization of the 6 categories of barriers to online learning based on the physiological spectrum of potential students // social and technological are highlighted

REASON FOR FOCUS

The largest barrier and discrepancy in online learning and traditional learning based on our findings based on primary and secondary research.

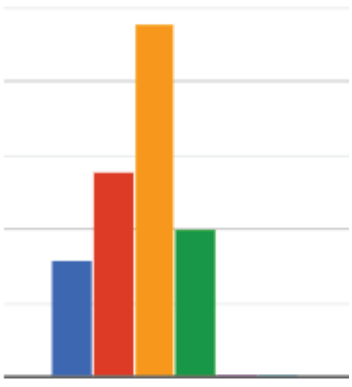
PRIMARY RESEARCH



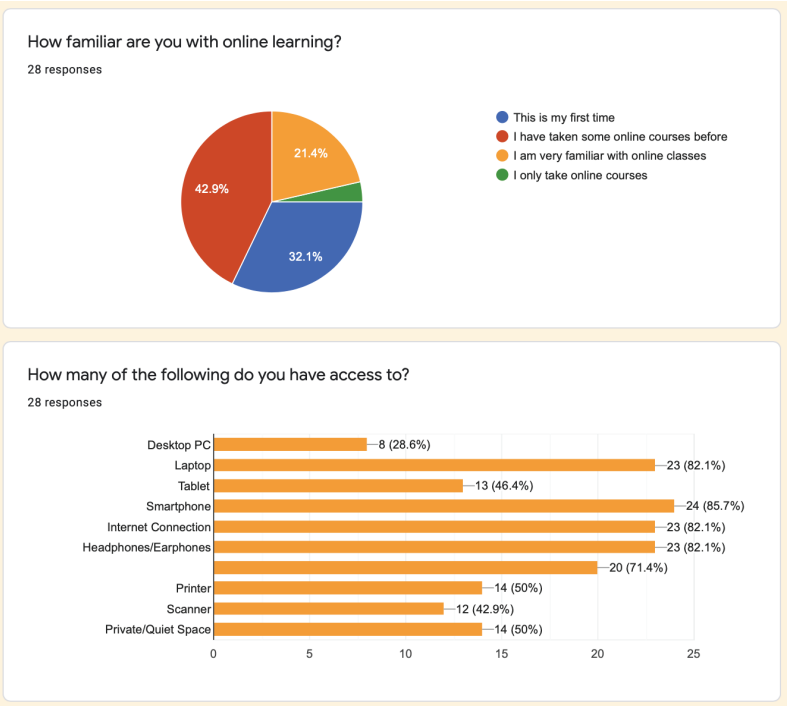
communicating with instructors in person

communicating with instructors in class via video, voice, messenger apps

communicating with instructors via video, voice, messenger apps outside of class time



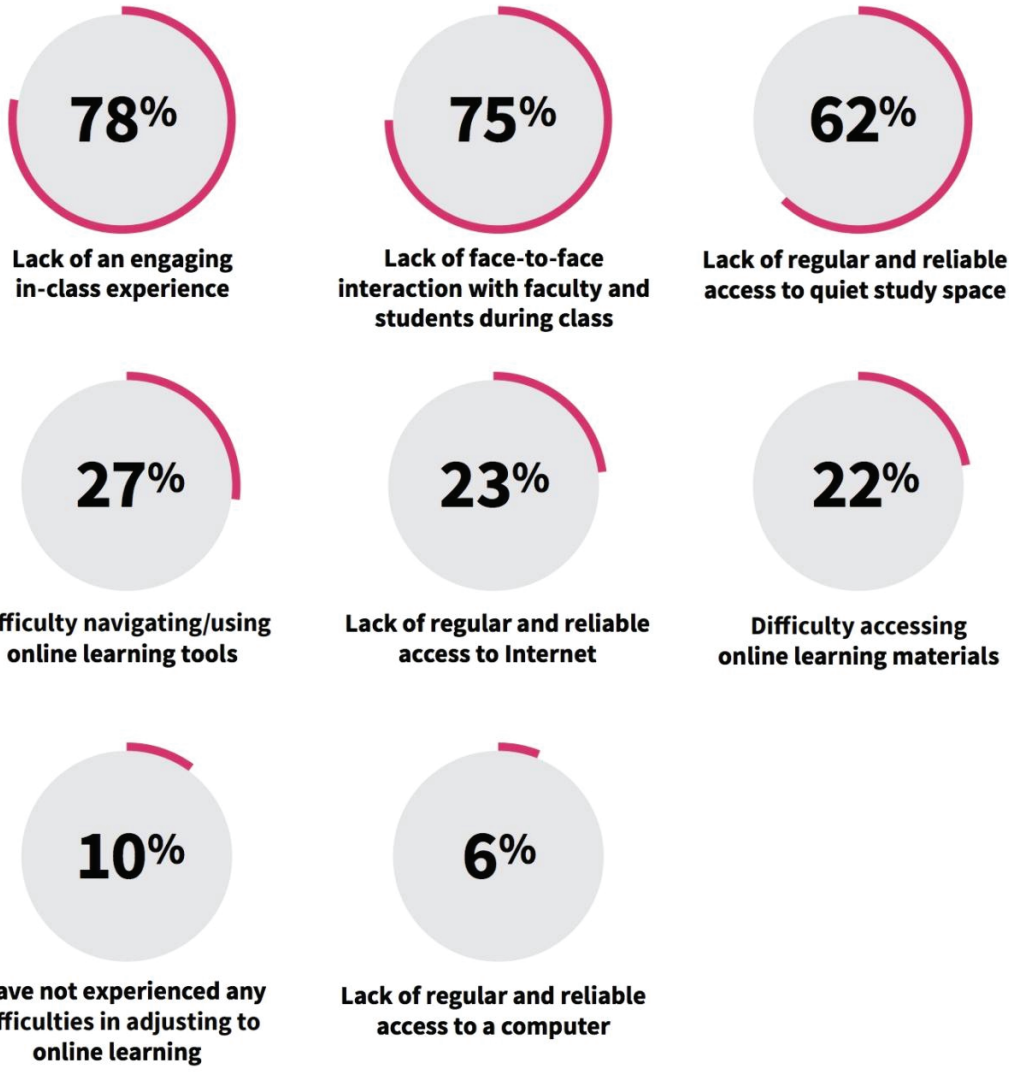
the resources for online learning offered by the school are:



Based on a survey conducted of 28 students on July 2020

SECONDARY RESEARCH

Have you experienced any difficulties adjusting to online learning? Select all that apply.



Results from a survey of more than 3,000 college students in the U.S. and Canada (Selingo, Jeff LinkedIn)

Vision Statement

VIRTUAL REALITY LEARNING

To make online social interactions more accessible

WHAT

Virtual reality real time full immersive online learning

HOW

Help create an optimal social learning environment for students to obtain valuable education and skills

WHY

Lack of accessibility and ineffective online social interaction tools

WHAT IS VIRTUAL REALITY?

Virtual Reality or VR is a three-dimensional, computer generated environment which can be explored and interacted with by any person immersed in it. VR can simulate any type of environment or experience that is very close to reality, or even something that has never been seen before.

How it works is that VR presents our main senses and perception systems (sight, hearing, etc) with some made-up information that can simulate everything else in reality. As such, when users are presented with these kinds of information through their senses, the user experiences another kind of reality that can be perceived as real.

The technology is most popularly being delivered in a form factor of headsets, omni-directional treadmills and haptic gloves which covers the most important senses including sight, hearing, movement and touch.

VIRTUAL REALITY LEARNING

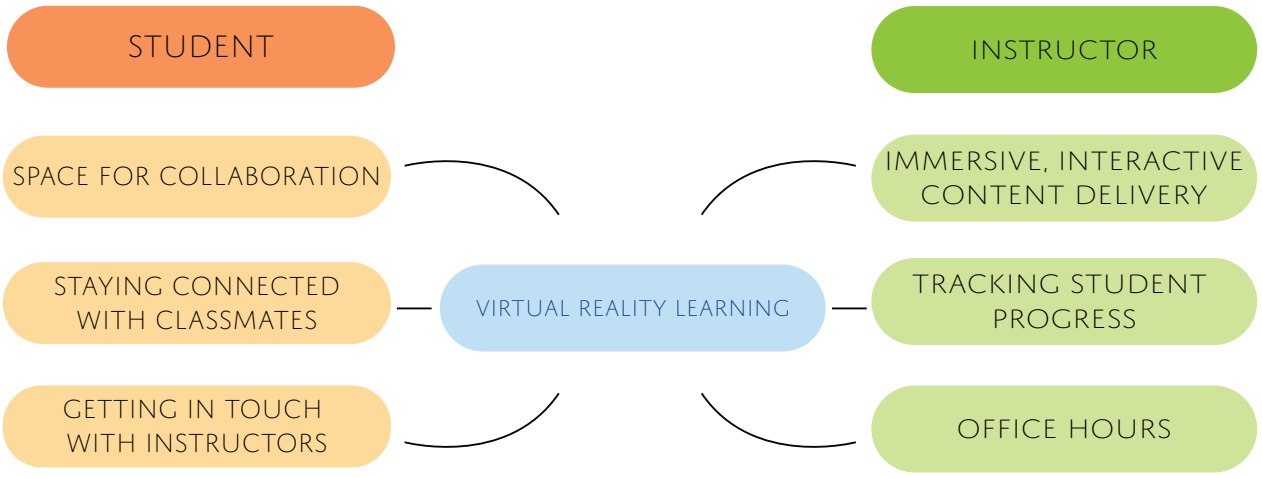
Moving away from the idea that online learning is able to replace or substitute traditional learning environments. Instead, heading toward rebranding the concept of online learning by cultivating a whole new set of expectations, completely new ways of delivering and consuming content, structured and framed within the infinite and ever-growing technological possibilities.

Utilizing software built and made specifically for online learning, the goal is to be able to explore new methods of teaching and new methods of learning; specifically to make online social interactions more accessible -- by facilitating a full, immersive, multi-faceted, multi-sensory mode of interaction and learning.

With Virtual Reality, students will be able to experience a different type of learning environment that is tailored to their specific needs. It enables unique customisation for each individual and allows students to experience learning that fits their own learning style. In addition, VR will enable students from all over the world to come together in the same room, collaborate and learn together.

Core Functionality

MAIN SOCIAL COMPONENTS OF THE SYSTEM



Personas

STUDENT PERSONA

HEATHER ALMANZAR

"I SPEND MY LIFE BUILDING THE WORLD I WANT TO LIVE IN."

- ROBIN CHASE

TECH SKILLS:

INTERNET
SOCIAL NETWORKS
MESSAGING / E-MAIL
ONLINE RESEARCH
HARDWARE KNOWLEDGE
SOFTWARE ADAPTABILITY

DEMOGRAPHICS:

AGE: 22
LOCATION: TORONTO, ON
STATUS: SINGLE
EDUCATION: GEORGE BROWN COLLEGE
GRAPHIC DESIGN

#SOCIAL JUSTICE WARRIOR
#SOCIAL MEDIA INFLUENCER

GOALS

BUILD SKILLSETS TO ENTER WORKFORCE

WANTS TO EXPLORE HER CREATIVITY AND POTENTIAL

SEES SCHOOL AS A NETWORKING OPPORTUNITY

WANTS TO FEEL CHALLENGED

DEMAND MORE FROM HER EDUCATION

CHALLENGES

EASILY DISTRACTED / PRE-OCCUPIED ON SOCIAL MEDIA PLATFORMS

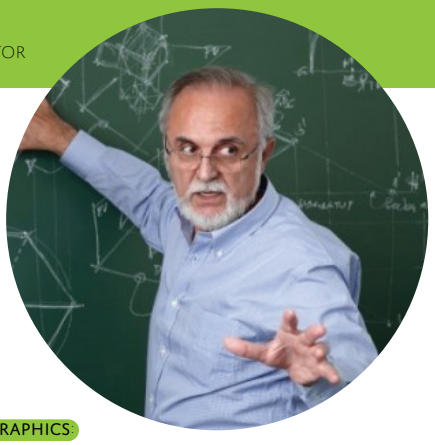
FEELS CHEATED OUT OF A "REAL" SCHOOL EXPERIENCE

FRUSTRATING AND BORED BY UNENGAGING INSTRUCTORS

FEELS LIKE SHE'S NOT GETTING THE ATTENTION AND SUPPORT NEEDED

INSTRUCTOR PERSONA

JUNAID DAWALA



"TRADITION IS NOT THE WORSHIP OF ASHES, BUT THE PRESERVATION OF FIRE."

- GUSTAV MAHLER

TECH SKILLS:

INTERNET
SOCIAL NETWORKS
MESSAGING / E-MAIL
ONLINE RESEARCH
HARDWARE KNOWLEDGE
SOFTWARE ADAPTABILITY

DEMOGRAPHICS:

AGE: 61
LOCATION: PICKERING, ON
STATUS: MARRIED WITH KIDS
EDUCATION: UNIVERSITY OF ALBERTA (1984),
MCGILL UNIVERSITY (1982)
PH.D. CLINICAL PSYCHOLOGY

#OLDIE BUT A GOODIE
#LEARNING IS LIVING

GOALS

TO LIVE A FULFILLING LIFE

CONTINUE HIS LIFE-LONG RESEARCH IN THE FIELD

TO SPREAD AS MUCH MEANINGFUL KNOWLEDGE AS POSSIBLE

ENSURE HIS STUDENTS RETAIN AND APPLY THE KNOWLEDGE BEYOND SCHOOL

CHALLENGES

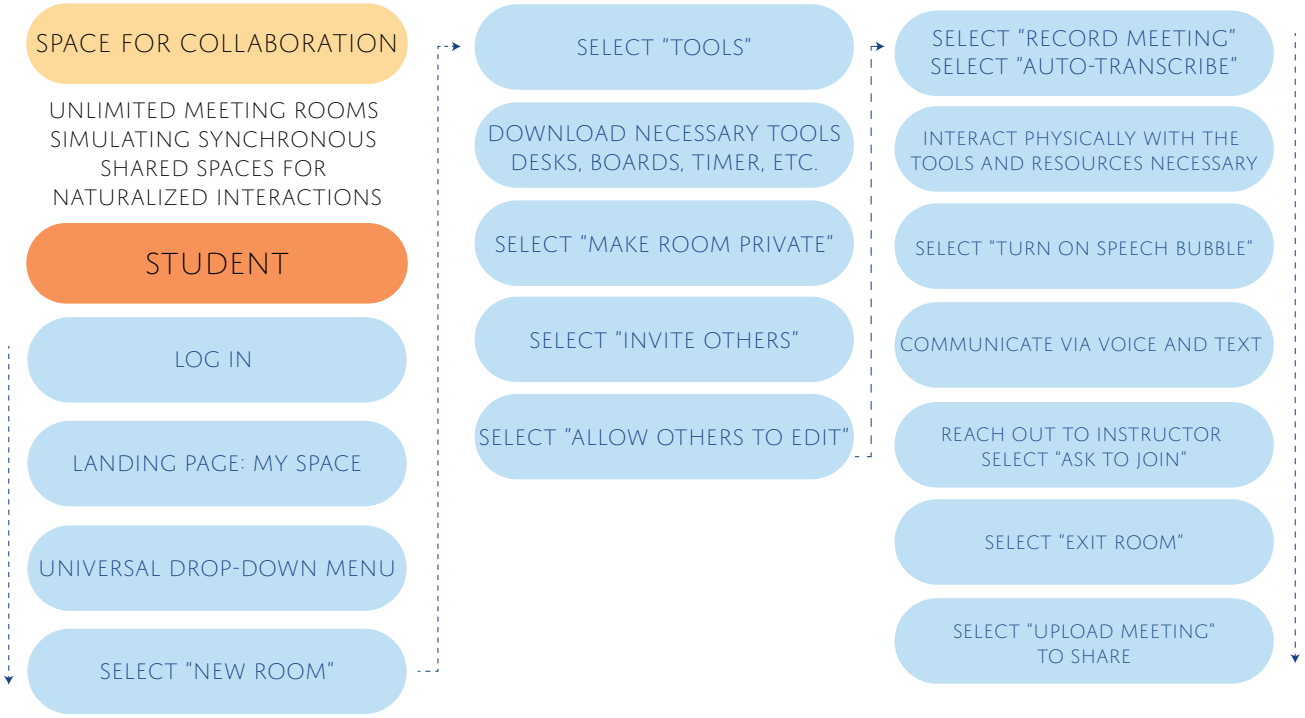
DIFFICULTY TRANSITIONING/ ADAPTING TO NEW TECH

EASILY LOST IN ONLINE DISCUSSIONS

NEED CLOSE + CONSTANT I.T. SUPPORT

HAVE BEEN RELYING HEAVILYON MORE TRADITIONAL METHODS OF TEACHING

User Journey Maps



CUSTOMIZABLE LEARNING SPACE

Visual Impairment:

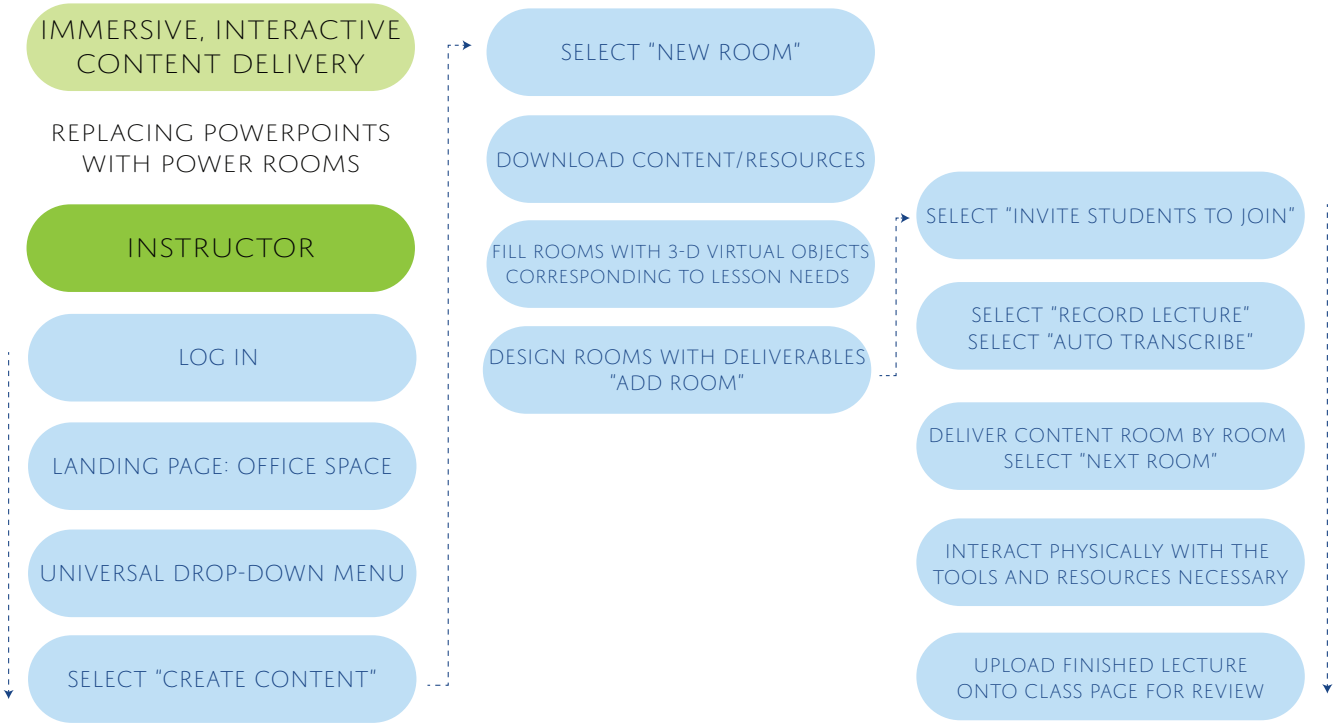
- Voice Assistant: described audio
- Voice command control
- Tactile control

Audible Impairment:

- Auto-generated transcriptions
- Visual ‘speech bubbles’ for synchronous conversations
- Universal keyboard

Physical Impairment:

- Voice command control
- Joystick control



VR POWER ROOMS

"Field trip" based learning

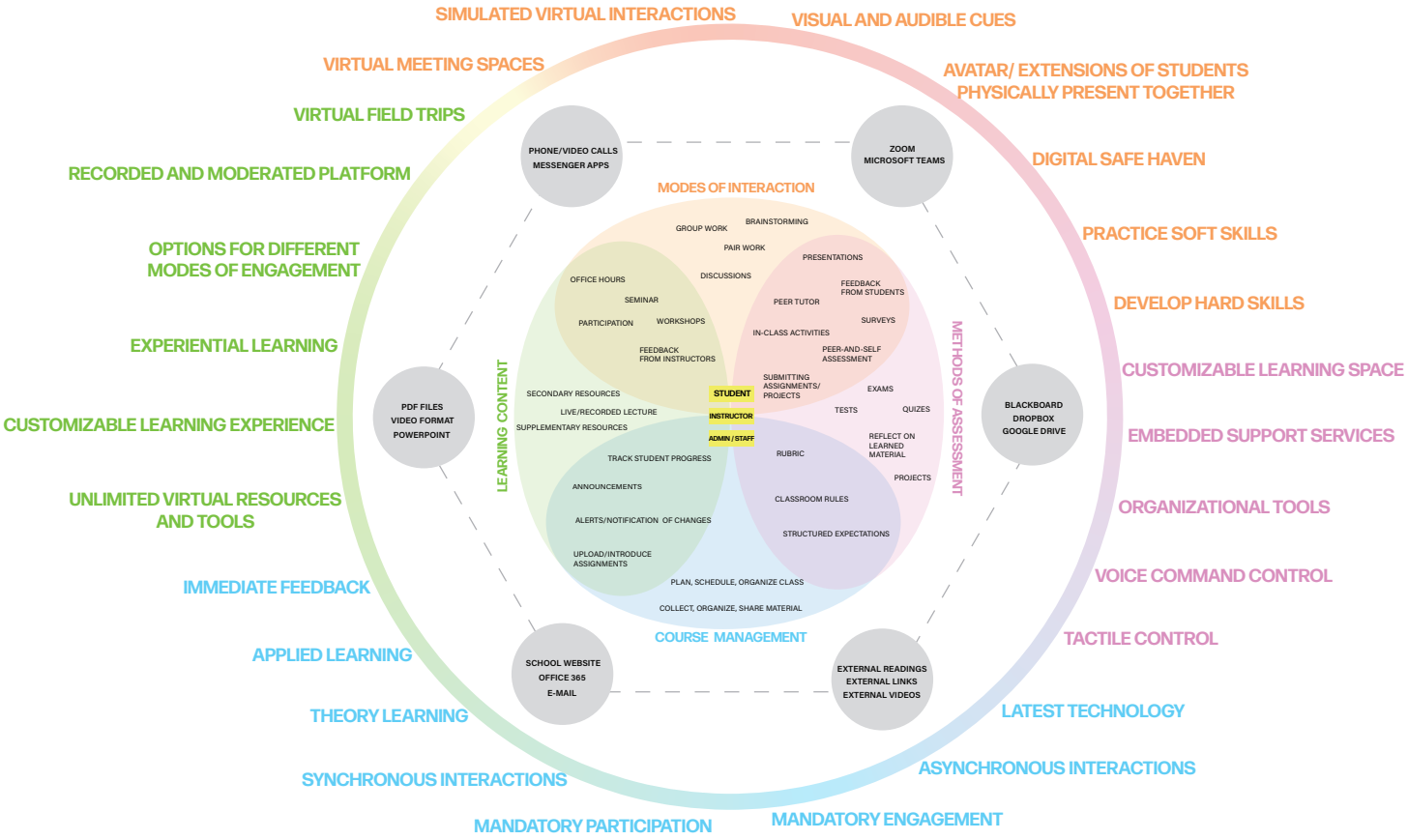
Set up room/environment specifically tailored to the lessons similar to powerpoints but each "room"/slide contains the related resources and tools necessary for learning

Download resources ahead of time

Optional screen engagement for the students who cannot or do not wish to attend fully immersed

Future Scenarios

THE ENVISIONED FUTURE OF VIRTUAL REALITY ONLINE LEARNING



An ecosystem map visualization of the future online learning incorporating Virtual Reality Learning

Reflections & Conclusions

Change is inevitable, but it is not without its opposition. Newly emerging technologies have historically faced initial societal resistance despite its eventual embrace and adaptation into our daily lives. Evidently, VR is not immune to such challenges.

Nevertheless, there have already been important technological breakthroughs with VR technology that have transformed markets, and shown promising trends beyond the entertainment fields made by tech giants such as Microsoft, Facebook, Amazon, and Google, with plenty of room for newly emerging players.

As VR hardware and software continues to improve, along with a stronger 5G network, becomes dematerialized as a stand-alone device, and becomes more affordable, the technology is definitely heading toward a seamless integration into our daily lives-- and as we move toward a technologically immersed future, education, too, must follow suit.

The vision for Virtual Reality Learning presents a future where VR has become as essential as the internet. It will be a technology ingrained in society in which most of the current economic and social functions will depend on.

Envisioning VR as a collaborative tool for learning that will enable its users to collaborate regardless of currently existing physical barriers such as location, or disabilities, is a vision in making the most out of our human abilities --to learn, create, socialize, and cooperate.

Faced with reality, it will undoubtedly take many hardware modifications and software iterations for VR to be able to fulfill our expectations. But when it does, we will most likely already find ourselves accustomed to our new ways of existence, within the realm of infinite virtual possibilities.

Bibliography

Allan, Jim. "Learning Disabilities and Visual Impairments Workshop." Texas School for the Blind and Visually Impaired, 2010, www.tsbvi.edu/instructional-resources/105-learning-disabilties-and-visual-impairments-workshop.

Borg, Kyra. "What Is Virtual Reality And How Is It Going To Change Our Future?" Digital Agency Network, 18 June 2019, digitalagencynetwork.com/what-is-virtual-reality-and-how-is-it-going-to-change-our-future/.

Cook, Robin A, and Marsha A Gladhart. A Survey Of Online Instructional Issues And Strategies For Postsecondary Students With Learning Disabilities, 1 Jan. 2002, easi.cc/itd/volume8/number1/gladhart.html.

Diamandis, Peter H. "5 Breakthroughs Coming Soon in Augmented and Virtual Reality." Singularity Hub, 22 Nov. 2019, singularityhub.com/2019/05/10/5-breakthroughs-coming-soon-in-augmented-and-virtual-reality/.

Grey, Jess. "The WIRED Guide to Virtual Reality." Edited by Peter Rubin, Wired, Conde Nast, 8 Mar. 2020, 7:00AM, www.wired.com/story/wired-guide-to-virtual-reality/.

Henriques, Gregg. "The College Student Mental Health Crisis." Psychology Today, Sussex Publishers, 15 Feb. 2014, www.psychologytoday.com/us/blog/theory-knowledge/201402/the-college-student-mental-health-crisis.
"Inclusive Teaching: Deaf and Hard of Hearing." ADCET, www.adcet.edu.au/inclusive-teaching/specific-disabilities/deaf-hearing-impaired/.

"Inclusive Teaching: Physical Disability." ADCET, www.adcet.edu.au/inclusive-teaching/specific-disabilities/physical-disability/.

Morin, Amanda. "What Is Universal Design for Learning (UDL)?" What Is Universal Design for Learning?, Understood, 5 Aug. 2019, www.understood.org/en/learning-thinking-differences/treatments-approaches/educational-strategies/universal-design-for-learning-what-it-is-and-how-it-works.

Posey, Allison. "Universal Design for Learning (UDL): A Teacher's Guide." Universal Design for Learning, Understood, 27 May 2020, www.understood.org/en/school-learning/for-educators/universal-design-for-learning/understanding-universal-design-for-learning.

"The Top 10 Mental Health Challenges Facing College Students Today." Best Counseling Degrees, Mar. 2017, www.bestcounselingdegrees.net/top-10-mental-health-challenges-facing-college-students-today/.

"What Is Virtual Reality?" Virtual Reality Society, 2 June 2017, www.vrs.org.uk/virtual-reality/what-is-virtual-reality.html.

"Yuval Noah Harari: Why We Dominate the Earth." Farnam Street, 2 Mar. 2020, fs.blog/2019/01/yuval-noah-harari-dominate-earth/.