ACCESSORIZING ACCESSIBILITY: FLEXIBLE TOOLS FOR YOUR EVERYDAY

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Abstract

Discussions with friends and other allies in the disability community lead to the discovery of barriers related to one of the modern symbols of accessibility, the Electronic Door Opener (EDO). As such my research became concerned with physical accessibility to and through the built environment. To develop a greater understanding of the concern this project initiated a thorough audit of EDOs by reviewing their functionality in the built environment with respect to peoples' bodies. Round table discussions between community members (who identified as being a part of, or allied with the disability community) revealed a range of concerns regarding EDO remotes. Major concerns included how the remote would affect privacy, social stigma, personal security and the risk for abuse. Despite some differences, the discussion satisfied most group concerns and showed strong evidence that the concept could improve environmental access.

Introduction

Accessorizing Accessibility began as part of an initiative to develop a flexible and multidisciplinary environmental access model to give the built environment the ability to adapt to all bodies. Discrimination through the built environment, while not necessarily intentionally malicious, can be felt as such, especially when it fails to consider the natural diversity embodied by human beings. This study recognizes diversity as a natural aspect of human experience. I extend this consideration to all human characteristics (physical, cognitive and beyond). When considering environmental barriers to access, I refer to people and bodies interchangeably to emphasize the importance of acknowledging lived experience and embodied diversity as fundamental concerns. As such, I did not value any combination of characteristics more than any other when attempting to produce this model. I am preoccupied with achieving true physical access which means creating environments that do not present any significantly different challenges and are equally welcoming. Attempting to create environmental solutions to environmental problems was initially difficult to conceptualize and it became evident that the first challenge was to better understand the problems people were experiencing. With some knowledge based on a range of personal experience I could then begin to imagine practical ways to have a positive influence within the constraints of this project. To identify potential solutions which were both architecturally practical and economically possible while at the same time respecting the dignity of people's bodies meant that I would need to involve relevant parties throughout the research. Discussions with friends and other allies in the disability community lead to the discovery of barriers built-in to one of the modern symbols of

accessibility, the Electronic Door Opener (EDO). After some preliminary research (a brief internet search on the history of EDOs and a visual inspection of EDOs in a local shopping mall) I was led to believe that the manner in which they functioned could potentially be improved to support greater access. As such, my research became concerned with physical accessibility to and through the build environment[1].

I initially came up with the idea of using remotes to access spaces by chance when helping to set up a Human Library event at York University. From across a grassy field I was able to help fellow volunteers by opening a car trunk door with the push of a button. The simplicity with which I was able to influence an object that was a few hundred meters away shocked me despite how common the action was in my life. Even with a vast space between myself and the door I was able to initiate motion and influence the built environment autonomously; through my own volition. I asked myself, what could this mean for someone who has difficulty influencing the movement of physical spaces with their body? Would people value being able to make their environment responsive to their will? The project that ensued was undertaken in several phases, each one building on the previous as a way of developing a broad and multifaceted understanding of EDOs and their current implementation at York University. A discussion on the overarching design principles from which environmental accessibility was necessary as a means of understanding the basis for environmental design in North America. Secondly, it was important to assess the current status of EDOs, so as to

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[1] The concept of the human condition is meant to eradicate deplorable idea's that people with disabilities are somehow less human. By using terminology such as 'the human condition' in a laissez-faire manner I can instill a sense of normalcy to the readers' view of disability while at the same time blatantly challenging the idea that people with disabilities are not human.

develop a strong knowledge base from which to inform a community discussion with relevant stakeholders. Finally, the information gathered from these phases culminated in the developing of several wireless remote concepts, each of which is meant to facilitate access in an environment which consists of EDOs as a primary means of accessibility.

An important caveat I wish to disclose at this point involves my own body and physical experience with EDOs. Even though a main theme throughout this paper is in recognizing equal value to all bodies, the fact is that when it comes to addressing these particular accessibility concerns I am not a good candidate from which to draw conclusions about problems with EDOs. I have not used mobility aids for extended periods of time, nor have I encounter any particular difficulty around EDOs and so I have little experiential knowledge of my own from which to inform a discussion around their application. I have however, dedicated over a quarter of my life to disability studies and shared much of that time through work and leisure in the disability community.

Transitioning Accessibility Discourse from Me to We

In order to contribute to discussions with relevant stakeholders it was important for me to develop an understanding of the origins of accessible design models. By reviewing notable templates for accessible designs, I wanted to identify the process through which current models were created, by whom and why? With a basis in accessible design theory I could then look to the built environment to access how the theory was being applied before entering into informed discussions with people in the community.

Innovations in engineering and architectural practices have long since uncovered

practical, quasi-effective solutions for traditionally ableist[2] forms of construction in

approaches such as Universal Design (UD)[3] (Gray, Gould, & Bickenbach, 2003 p. 31),

and visitability (Smith, Rayer, Smith, 2008 p. 291). Unfortunately, the overarching social

bias towards able-bodyism[4] continues to be disseminated through design and construction

practices, that do not provide access to everyone. The lack of attention to the long-term

effects of such environmental biases serves to perpetuate embodied value hierarchies

despite the inevitability of disability. In the words of John Rae[5], "We're all in this

together. Either now or in the future, if you live long enough you too will be a part of the

disability community (2016)." Through this paper I echo the calling for community and

togetherness shared here by John Rae[6]. Even though I believe that considerations toward

disability issues should not be made as a type of pre-emptive resolution, I encourage the

reader to give time for the idea of community to develop and to reflect on their positions

as community members throughout the discussions. Transitioning discussions about

accessibility from me to we, is one way in which I as a writer prefer to reflect upon issues

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[2] The term Ableist is used here to imply processes such as the establishment of the built environment as only inclusive of individuals who embody particular characteristics socially understood as normal (See Gould, 1996 and pages seven and eight of this article). For the purposes of this paper these include: gender male, Eurocentric ethnicity, ability to walk on two legs, and neuro-typical.

[3] Universal design: The idea of universal design refers to the broad spectrum of ideas that attempt to produce the built environment in ways that are inherently accessible to all people, regardless of ability (Gray, Gould, & Bickenbach, 2003 p. 31; Mace, Hardie, & Place, 1990 p. 7; Mace 1997 p. 1).

[4] To engage in able-bodyism is to actively discriminate disabled people in favor of those labeled able-bodied (Bunch, 1990 p. 489).

[5] Disability Rights Activist and Former President of the Alliance for Equality of Blind Canadians speaking at the Critical Disability Studies Student Associations Conference on April 8th, 2016 at York University (Rae, 2016).

[6] The call for community does not seek to eradicate individuals and groups. It also does not intend to speak of disability as existing along a spectrum of humanity. The main goal was to spark a discussion around the idea of community and to imagine a world where fewer divisions exist to accessibility. For a more informed understand of perspectives critical to the concept of community outlined here please reference, *The biopolitics of disability: Neoliberalism, Ablenationalism, and Peripheral Embodiment* by Mitchell & Snyder

in disability studies. If we distinguish ourselves separately according to the presence of impairment, we deny the frail realities that exist along the human life span from birth to old age. Recognizing the aging process as fluctuating between enabling to disabling connects us as temporal beings and allows us to understand that disability issues are in all of our direct interests (Wendell, 1996 p. 19). The concept of community is strongly involved in the problem of access such that we are each involved in the problematic and therefore responsible to some extent for the solution. The problems faced by the disability community around physical accessibility come from beyond our individual selves. It is therefore important to be reminded of our positionality[7] with regards to everything that impacts the theory, design, and construction of access.

I am reminded of the words of Nathaniel Lee (a sixteenth century dramatist confined to Bedlam in 1684), "They called me mad, and I called them mad, and damn them, they outvoted me (Porter, 2002 p. 88)." His quote exposes a difficult reality that as individuals we can sometimes be subject to the powers of others. As a society we can sometimes be complacent in preserving social divisions such as inaccessible environments when we fail to act meaningfully in solidarity with others in the community. Decisions regarding physical accessibility which are made without relevant stakeholders, are disrespectful to-the disability community. I myself still have a lot to learn from Nathaniel's experience and from others like him; marginalized, segregated and othered. I feel the time has come for the phrase, "Nothing about us without us" (Charlton,

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[7] Positionality refers to both the fact of and the specific conditions of a given social situation. So, where I may speak about the "position" of an individual in a social structure, "positionality" focuses attention to the conditions under which such a position arises, the factors that stabilize that position, and the particular implications of that position with reference to the forces that maintain it (Tregaskis, 2004; Glenn, 2009)

1998, p. ix), to be truly embraced in environmental access issues and I believe EDO remotes could help that cause.

Broader than Disability Community: An Aging Population

Another subject that is currently garnering a lot of attention is the aging population. This has brought renewed attention to accessibility and the opportunity for a unique perspective and unique solutions to be develop and advocate toward environmental accessibility. Growing consideration to accessibility related issues across North America has already begun to be made in response to an increase in aging population[8] (StatsCan, 2015). This provides a unique opportunity from which to cultivate awareness of the need for ~~drastic~~ environmental changes and to normalize the variable nature of the human condition across the age groups.

Aging has been a major topic of discussion in the media across several industries including Technology, Construction and Medicine. However, it continues to be overwhelmingly concerned with notions of rehabilitation (Goar, 2016; Saltzman, 2016). Rehabilitation is particularly concerned with making the individual function as close to the normative as possible. This implies that their situation is never good unless it can be molded to another state which devalues their body and creates an atmosphere that is unwelcoming and ignorant of their inherent value.[9] This is problematic because it reinforces the cultural belief that there is an ideal (albeit unrealistic) human condition to

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[8] People over the age of 65 account for nearly 16% of the Canadian population. To put that into perspective one in six Canadians (16.1%)—a record 5,780,900 Canadians—was at least 65 years old, compared with 5,749,400 children aged 0 to 14 years (16.0%) (StatsCan, 2015).

[9] For more information about why rehabilitation is problematic refer to, "*Recovery: The lived experience of rehabilitation*" by Deegan, 1988 and, "*Rethinking the relationships between disability, rehabilitation, and society*" Imrie, 1997).

which we must strive to conform. If the individual is identified as the problem in the

disability and the aging process, then there is no need to reflect on the environments role

in either process.

Changing ability is part of life and the aging process from womb to tomb[10]. If we

can separate our primary concerns from present realities and review what we know about

the life span, then the notion of an ever-evolving body becomes undeniable. It is

important however, to be cognizant of all bodies when conceptualizing how the body

changes over time and arguably more important not to exclude any bodies or impose any

hierarchies on the basis of different characteristics. If this ideal is applied throughout

considerations of community structure, then there would not necessarily be a

consideration for disability issues but rather life issues.

Disability policies and programs often emphasis the desirability of normative

embodiment, which are reminiscent of normative lifestyles and co-define success[11].

Recently, for example, an intergovernmental body composed of Federal, Provincial and

Territorial Ministers published recommendations for adults and seniors that strongly

implied the social desirability of a social constructed normative body, independence and

private residence (HRSDC, 2015). Not only did this fail to recognize the variability of a

person's physical, cognitive or contextual reality, it was presented in a hierarchical way

(most socially desirable state to least), without acknowledging the fact that not everyone

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[10] The phrase, from womb to tomb is meant to express the natural processes of human life from birth to death.

[11] Normative Lifestyles- refers to idealized lifestyles created as a result of adhering to 'normative embodiment' and social values. These ideals are emphasized as the best way to live and often includes rhetoricized idea about independence, quality of life, and dignity (PHS, 2016; LAS, 2016). See Appendix E for examples of organizational pamphlets.

either has the same opportunity to achieve these states or even desires them for that matter. The manner in which desirable aging is presented can be equated to 'normative' ways of describing disabled bodies. Essential it is an attempt to deny each individuals natural aging process all together.

By emphasizing the desirability of avoiding becoming disabled, support programs in the private sector actively devalue different ways of living. Ontario-based personal support organizations, such as Premier Homecare Services and Living Assistance Services, apply a rhetorically ableist perspective to disability and to aging related services, not uncommon among similar organizations. For example, they each perpetuate the idea that "independence makes all the difference" (PHS, 2016). The idea that control and independence are determining factors of a person's quality of life and personal dignity are strong undertones as if to suggest that life is not as valuable otherwise (PHS, 2016; LAS, 2016). There is a clear social objective to delaying or denying the existence of disabled bodies wherever possible.[12] Canada's aging population provides an excellent opportunity to minimize the focus of accessible issues on the disability community and to expand its considerations to society in general. Rather than continue to stratify the issue of equal access, we can create a movement that recognizes it as a fundamentally human concern that no one type of human should control.

Desire for Systemic Solutions

A survey of the workplace populations reveals an overwhelming lack of visibly disabled bodies. Working-age people with disabilities had a much lower employment rate

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[12] Please refer to Appendix E1 for examples of Organizational ableist rhetoric through advertising.

than people without disabilities (Turcotte, 2014). Among people with disabilities between the ages of 15 and 65, 54.8% were unemployed (StatsCan, 2012). The prevailing concern with one's ability to physically access public spaces is perhaps indicative of where we are, as a culture in general, in terms of understanding that people with disabilities should be included in all aspects of daily living. EDOs are now relatively common place in government-funded buildings thanks to the implementation of Regulation 3.8.3.3 in the Ontario Building Code (Building Code, 2013; OntGov, 2013). The code states that barrier-free entrances (e.g. as provide via an EDO, ramp, or elevator) are required at any apartment-style complex, and business services building. Essentially the code is a guide outlining standards about what constitutes an accessible environment. The code also explains where these standards are legally required and to whom the responsibility of implementing it lies.

However improved access maybe, employment opportunities and other socially meaningful activities remain scarce (Statscan, 2012). I argue that part of the reason for these discrepancies are in the manner with which these methods of access are implemented and understood in general. It is important to recognize that an individuals' capacity to contribute is not predetermined by their impairment as much as it is by social misconceptions of it. Despite the importance of being physically present in all social spaces, in order to meaningfully participate in activities such as employment or volunteering, requires the model contributes to access in a non-tokenistic manner. One way these conception of EDO remotes could facilitate equal opportunity for employment, health care, leisure services, politic activism, and more, may be by linking with various

social media and information applications. To be physically present in space and place does not constitute inclusion, especially when the manner through which access is achieved is only design for specific disabled bodies. Being present is one of the first steps towards breaking down social barriers toward the valued aspects of social life, but what if the tools that facilitated one's physical access also gave them information about the weather or their local community in a medium which best suit them.

The creation of disability-specific symbols and separate entrances in the midst of generally discriminatory settings may, in fact, be counterproductive. Not only is there no consideration beyond people who are considered neurotypical without mobility related disabilities, there is also no strict enforcement for systematic installation methods for *accessible*[13] door buttons (Monsebraaten, 2014; Monsebraaten, 2015). Despite legislation mandating accessibility, compliance in Ontario is still very much an issue and enforcement is not at all consistent (Monsebraaten, 2014; Monsebraaten, 2015).

> "Where applicable, Ministries shall ensure due consideration and compliance with [Guidelines for Barrier-free Design] during site evaluation and acquisition, pre-planning, and the site plan, design, construction document preparation, approvals, construction and contract administration phases of each project initiated (MOF, 2015).

It is not uncommon to find access buttons requiring variable push strengths, with irregular shapes, opening and closing times, heights, and distances from their respective

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[13] By italicizing the term accessible I am trying to call into question its validity in the movement toward equity in the built environment and to discover whether or not it can manifest into widespread real world change. My thinking is that in reality accessibility cannot be achieved in a universal fashion, in fact attempted it could further marginalize individuals and small groups.

doors at York U. An accessibility audit of several areas' at York University's Keele campus on April 21, 2016 revealed many EDOs either did not function, failed to meet the no step requirement, had no signage, lacked braille translation, failed to open completely, or closed rapidly with no warning[14]. This, in turn, creates a series of unpredictable environments which can be difficult to navigate. People whose entrance and exit should otherwise have been facilitated by EDOs are being impeded. Finding a safe route to travel can become difficult and the uncertainty regarding the availability of a safe path complicates social life. These limitations and the lack of available contingency contributes to a sense of isolation and discourages people from attempting to be physically present in the community.

One way to challenge current methods would be by adopting a more generalizable form of access. Highly-specific and specialized interventions are often discriminatory and ignore the environmental requirements of other bodies. Accessible buttons for instance require persons to physically press upon them which is not a universal ability. People are also required to get right up beside the wall or post where the buttons are located. For many people this is extremely difficult, awkward or not possible and they often require another person's assistance. By recognizing diversity when conceptualizing physical access, we can move towards an environment that is cognizant of all people and their differences.

Another reason to look for alternatives to standardized interpretations of access would be to ally with others in the general population who may not necessarily have a

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[14] Please refer to Appendix F1 for photo's taken on April 21, 2016

physical issue with modern access methods. Solutions which disseminate more broadly

through the disability community[15] to the general community could become more

socially valuably and more readily implemented. By addressing the accessibility concerns

of people who have disabilities, while also involving people without this distinction (i.e.

our mothers, fathers, seniors, children, etc.) we could promote awareness of the issues to

the extent where they are recognized as environmental problems and not personal ones.

Phase One: Are Universal Design Principles Counter Intuitive?

According to Mace (1997 p. 1), UD for accessibility is the design of products and

environments to be used by all people, to the greatest extent possible, without the need

for adaptation or specialized design. This definition implies a specific population; "to be

used by all people" when addressing the purpose of environmental design. From its

inception any design process that adopts UD philosophies as it focal lens are bound by

the need to address all potential users. The end results seem to be lacking in their ability

to adequately serve the full range of biodiversity yet here-in lies the main objective.

Consideration of environments through UD as a design methodology generally

employs seven guiding principles as described by Lusher & Mace (1989). These typically

include categories such as, equitable use, flexibility in use, simple and intuitive use,

perceptible information, tolerance for error, low physical effort and, size and space for

approach (See Appendix G for a description and example of each UD principle). The

language used to develop and describe these guiding principles constructs an image of the

physical environment wherein a person's independence can be affected and accessibility

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[15]Include wheelchair users, cane users, white cane users, walker users, elbow crutch users, forearm crutch users, scooter users, etc. All people with mobility aids, without mobility aids, regardless of label, condition or status.

achieved, through standardization. The concepts of independence and standardization are among several overarching themes appearing throughout UD guidelines that I find problematic. Within UD, independence refers to the capacity of a given space to facilitate an individual's ability to move about with the least amount of resistance possible. Here the term is defined as a persons' ability to perform what are often referred to in the literature as activities of daily living. This definition is taken from the Functional Independence Measure (FIM) by Keith, Granger, Hamilton and Sherwin (1987). Quite directly, it is an 18 item medical model scale that quantitatively assesses how in sync persons with disabilities are at completing culturally normative tasks through culturally normative methods[16]. As a criterion for UD, independence can ultimately be unfavourable to realizing designs that recognize diversity in the human condition. As a cultural value, the concept of independence is reinforced as a milestone in human development. As a former support worker in community group homes and day programs I challenge its importance and suggest that the relentless pursuit of independence as a major requirement in UD takes attention away from people with disabilities who require assistance. This is not to say that being capable of acting independently does not have it benefits, but rather this is a critique on its value as a social norm. By so heavily valuing an independence based model people who prefer a collaborative approach to access are directly marginalized.

When the UD guidelines outline that equitable use of space is a priority and

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[16] The reason it was important to use a prominent medical model definition of independence was because of how it conveys similar attitudes about norms and value that can be identified in North American society. In this way the reader is able to recognize the ideals that inform this social construction.

simultaneously state that designs must be shown to accommodate every body, I begin to

question its practicality. For example, among UD's primary concerns is providing the,

"same means of use for all users," through "simple and intuitive designs which can be

constructed generally across a given environment (Lusher & Mace, 1989). This tendency

towards the creation of standardized solutions to access displays itself as a fully

functional solution to the point where it is difficult to construe it as requiring any further

investigation. The term standardization itself refers to a process by which standards

(norms) are developed and implemented often (but not always) through group consensus.

Take for example the Pediatric Evaluation of Disability Inventory (Haley, Coster,

Ludlow, Haltiwanger, & Andrellos, 1994) from which this understanding is drawn. This

standardized and medically based test ranks children six months to seven years on their

ability to achieve 'normative' scores in three categories. These include the labels,

functional skills, need for caregiver assistance and modifications or adaptive equipment.

As with UD guidelines, these examples typify the tendencies for reverting to standardized

solutions which deny diversity rather then accepting it as valuable. To construct a space

that is fair and impartial in its use would require that space to incorporate a measure of

variability to match that of the human (disability) community. Including a variety of fixed

solutions[17] such as stairs, ramps, elevators and EDOs may increase equitable access but

these solutions are not always feasible. Environmental structures determine the amount of

accessibility based on their combined presence. The danger I perceive, is that UD

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[17] I use the term fixed solutions to describe environmental constructions that are limited to working in the same place where they were built. They are effectively anchored in place and have a limited range of motion.

guidelines can inadvertently deny access and segregate certain bodies by failing to pursue and implement designs that only include large groups of people.

Part of the appeal towards design standards and other socially constructed norms, is in part that they are rhetorically presented as attainable states. Norms often begin through establishing a set of fundamental similarities (for a concise example, see Gould, 1981 p. 156-164). There is an important distinction to be made here with the act of establishing a standard. I use the word *establish* to imply that a norm is largely a creation (rather than a recognition) of characteristics. This distinction is important because it illustrates the subjectivisms involved in conceptualizing a norm. In this way similarities and differences can sometimes be rhetorically implemented without actually being representative. They can also be misinformed and inappositely comparative in that norms are top-down creations from one dominant group to many. As explained by Gould (1981 p. 353) in their critique of genetic differences and social biases, "a few outstanding traits of external appearance 'can' lead to our subjective judgment of important differences," even when there is little or no supporting evidence. In this way, if a someone is identified as *relying* on a mobility aid, they could be characterized as embodying fundamental differences and biological variance compared to someone who does not rely on a mobility aid. This could potentially lead to the categorization of people based on subjective conclusions and comparisons, which would do nothing but segregate people into groups. Categorization is especially irrelevant when these conclusions say nothing about the person themselves; their beliefs, their wants, their needs or their life style. Unfortunately, this manner of establishing a norm also contributes to hierarchical

comparisons about embodied value and social desirability. To be situated outside

established norms can result in social isolation and reinforce the stereotypes of

discernable difference that initiated this segregation process. In the West we have become

increasingly conscious of societal norms. Ethnic customs, traditional practices, personal

mannerisms, and public behaviour are all informed and perpetuated by norms. As

Lennard Davis (1997) explains:

> We live in a world of norms. Each of us endeavors to be normal or else
>
> deliberately tries to avoid that state. We consider what the average person does,
>
> thinks, earns, or consumes, we rank our intelligence, our cholesterol level, our
>
> weight, height, sex drive, bodily dimensions along some conceptual line from
>
> subnormal to above-average… There is probably no area of contemporary life in
>
> which some idea of a norm, mean, or average has not been calculated. (p. 3)

I argue that to be an integral part of contemporary life, the disability community

requires that accessibility models be representative of the entire population. Diverse

access needs should be conveyed as the normative status because it is the only status that

accurately defines the reality of physical access needs across the human condition. What

is encouraging for those in the disability community however, is the relative consistency

with which norms seem to cycle overtime. As Davis (1997), explains above, societies can

experience cyclical social tensions[18]. These tensions eventually produce opportunities for

grand and meaningful social change which should be taken as a source of motivation for

social movements requiring nation-wide adoption. Accessible solutions that work for

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[18] Tension is a force for social change, the product of human time, effort and persistence despite inequality
and social oppression (Davis, 1997).

people with disabilities (acquired or congenital), mothers, fathers, young people, seniors and others who experience disablement under the current status quo need to become the new status quo.

There is an underlying temporal aspect to consider when analyzing socially constructed norms and hierarchies. It is important to recognize one's contextual existence in time and to reflect upon the creation of a specific point in time. As Stephen J. Gould (1981) explains:

> Appeals to reason or to the nature of the universe have been used throughout history to enshrine existing [norms and] hierarchies as proper and inevitable. The hierarchies rarely endure for more than a few generations, but the arguments, refurbished for the next round of social institutions, cycle endlessly. (p. 30)

In an effort to contribute positively toward accessibility that is representative of all bodies, this paper hopes to identify the practicality of a technological solution to discriminatory environments. I take courage in realizing that the way things are today also had beginnings and will inevitably also have ends.

Equity through Diversity Not Equality through Standards

At first, advocating for accessibility models with less emphasis on equality can be interpreted as misguided, but the fact is that the current model is not working for everyone partly because standard solutions do not adequately support diverse bodies. Actively pursuing the interests of relatively small and diverse groups in society could eventually help to produce an accessibility model that responds to every body as much as possible. In essence it would mean combining an array of designs that together respond

to a wider range of abilities.

According to section 15 of the Canadian Charter of Rights and Freedoms (Charter), "[e]very individual is equal before and under the law and has the right to the equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on… mental or physical disability (Act, 2015)." While this section reads well for individual's fundamental human rights such as, democratic rights or, the right to live and seek employment anywhere in Canada, it does not address the diverse methods or abilities available to people with disabilities in terms of physically accessing these rights (Act, 2015). That is why I argue that equality is necessary for fundamental human rights but not as applicable environmental design standards as is the pursuit of equity.

Equity recognizes the diversity present within the human condition and addresses it by responding to individual needs on a per person basis. If applied on a nation scale, the introduction of physical accessibility models that provide equitable results, could theoretical translate into true social equality for people living with a disability. Here it is important to note Subsection (1) to Section15 of the Charter which states, "Subsection (1) does not preclude any law, program or activity that has as its object the amelioration of conditions of disadvantaged individuals or groups including those that are disadvantaged because of …mental or physical disability. Thanks to subsection (1), the pursuit of individualized forms of access could be implemented despite not directly responding to the majority of society.

In UD however, when designs are determined not to be "marketable to [large

groups of] people with diverse abilities (Lusher & Mace, 1989 as cited in Harris, 2016 p.1)," they can be rejected by UD developers thus denying potentially adequate accessibility to a portion of the population[19]. To allow for any of the components of UD (equitability, flexibility, simplicity, tolerance, effort and size) to be applicable to everyone requires less emphasis on the spaces themselves and more on the people using them. That is why I argue that future designs should be conceptualized on a more individualized basis, separate from large population comparisons even in public spaces. The idea that we should prioritize the creation of designs that allow for independent (one person acting alone) access in itself ignores the full range of abilities people can embody. Physical and cognitive diversity is a reality, attention to which supports the physical and cognitive wellbeing of people more broadly. This is a reality with any sort of population of individuals.

These guidelines for UD clearly express that designs must, "[p]rovide the same means of use for all users [and must be] appealing to all users (Harris, 2016 p.1)." This language positions the focus of UD on designs with the ability to accommodate everyone. While it is important not to dismiss or invalidate any of the difficulties that are brought about by environmental structures, circumstances or the situations they put people into, we must acknowledge that curb cuts, EDO buttons, auditory cross-walks and other measures do not satisfy every body. Where ever possible, I believe we should strive to

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[19] The concept of 'a greater good' (i.e. prioritizing with a majority group over minority group's) is present as an underlying theme throughout discussions of environmental adaptation, accessibility and universal design. Unfortunately, adopting this concept helps to create and further infringe not only the disability community but also those people on the fringes of the disability community (intellectual disabilities, and those labelled with rare or uncommon diagnosis). The result is an environmental model that does not suit them.

understand and address individualized concerns. If design models are not made up of the sum of detailed individual analysis, then they cannot be reflective of the state of community accessibility.[20]. I argue that design criteria such as UD will not lead to a physically assessable environment. With so much emphasis placed on pursuing the same means of use there is the assumption that all people share enough in common with respect to mobility, to be able to share the same means in any scenario. Across the disability community this is not the case, as one of the strengths embodied by disabled people is the fact that we are diverse. If embodied difference is a reality than it must be reflected in the environments designs. In failing to accommodate even the smallest of groups there is a risk that ideas about embodied value will continue to propagate. I feel that I must make it clear that these statements are in no way intended to place the onus for social change in or on people who identify as disabled. The rhetoric I am employing here is meant to unravel a cyclical dilemma I have identified while researching the implementation (or lack there of) of accessible designs. Major writers in this field such as Harris (2016), Lusher and Mace (1989) and Gray, Gould, and Bickenbach (2003) each mention stigmatization and segregation as barriers to achieving accessibility for all. Without taking anything away from the real dangers involved and without suggesting that anyone should ever, for any reason, disclose personal information, I argue that there must

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[20] As someone who identifies as a critical thinker and ally with the disability community I feel I must clarify my experience on the matter of oppression. I should clarify that I have no visually distinguishable disability and as such have not experienced frequent amounts of overt or covert discrimination like stigmatization or segregation. I do however have a tremendous appreciation for what people can experience through my friendships and work in and around the disability community. In saying so I do not claim to identify with the full breadth of possible discrimination or institutionalization but rather my position on these matters are informed by my association with discriminated, oppressed and institutionalized friends, family, coworkers and acquaintances.

be a way to live safely and proudly while accessing the community through whatever method accommodates a given person regardless of embodiment. Perhaps rather than striving for independence, one way to eliminate stigmatization and segregation would be to celebrate the role of community support as a meaningful methodology for access. Support from family, friends, neighbours, technology and the broader community can come across as arduous and taxing in some renditions. Independence is a norm I have experienced directly in my own life and through my friends and peers which in itself needs drastic *adaptations*[21].

Visitability

In comparison, *visitability* can be thought of as a condensed version of UD that is supposed to be easier for people to incorporate in their homes. According to Maisel, Smith, & Steinfeld (2008 p. iv) visitability is a movement based out of a design methodology that seeks to increase the accessibility of housing through the inclusion of three structural components; a zero-step entrance, wide doorways, and at least a half bath (toilet and sink only) on the main floor of a house. Highly focused strategies like visitability are excellent alternatives to large scale *universal*[22] designs. Both UD and visitability work to facilitate access, but there are stark differences with the scope and scale of either project. They both reflect a disability model that recognizes the environment as dominant contributing factors for disablement (Maisel et al., 2008 p. 7),

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[21] Adaptations is italicised to imply a play on words between 'adaptation' as a term often directed towards the disability community to imply a need for changes. In this case I am turning the term toward socially normative ideas about the value of individualism and independence in our society. In this way I am implying social norms need to adapt.

[22] Universal is italicized to imply a far reaching attempt toward all-encompassing solutions to everyone's environmental issues. In the same way that the font appears stretched out and thinned so too is UD.

but visitability targets building developers and home owners. The goal of visitability is to provide a few basic accessibility features in order that a person can use and visit the homes of family and friends in the community (Maisel et al., 2008 p. 15). The argument can be made that, in being so focused, visitability design approach is limited in the amount of accessibility it can provide. I argue that the design offers the perfect access model for some bodies and is an excellent blueprint for other accessibility-oriented initiatives. While the guidelines of visitability are not accessible to everyone financially, the fact that they are being implemented as mandatory in state-funded building practice in several US states is cause for celebration. For instance, directors from the Ohio Housing Finance Agency created a policy that made visitable access features a requirement for developers who used federal tax credits for affordable housing. This resulted in over 100 homes being constructed with at least the three basic features of visitability and what's more is that the builders estimated that the added cost was only $75 per home (Smith 1994, as cited by Maisel et al., 2008 p. 11). If ideas toward access fail to providing the same means of use and appeal for all people, they will continue to be overlooked regardless of their relevance to individuals. As a design methodology, visitability does not pursue universal accessibility yet it has had a positive ~~influence on thousands of people~~ in the United States and has been to shown to have great potential in Canada (Maisel et al. 2008; Park, Chornoboy & Mankewich 2003, p. 5-7).

The potential for an amalgamation of similar smaller, more focused initiatives could theoretically do more to forward equity and accessibility. This requires a shift away from the ideas such as majority well-being and move toward a concern for the total well-

being of each individual. With a greater appreciation for ideas (however universal or local) that understand the significance of including human variance in design models perhaps environmental discrimination would cease[23]. Because of the diversity of needs and wants, the ability to customize an EDO remote means that it will be capable of working specifically for the person it serves. For example, if an individual finds it difficult to reach out and press current EDO buttons or if they have a hard time moving through an EDO before it closes, having a personal remote with them would eliminate that problem. In a scenario where a button is hard to find, or invisible, having a EDO remote which calculates distance and signals to the person that the door is open, would also solve this problem. As a supplementary tool the remotes would work alongside current accessible buttons rather than replacing them.

Phase Two: Assessing the Current State of EDOs

In order to assess the current state of EDOs I needed to find a space where I could observe and experience their various adaptations and the challenges that they created. As time was one of the limitations I needed to select a place which represented the variety that exists in the built environment but which was also relatively dense with EDOs. It was also important that the analysis involve some contemporary structures because they offer the best forecast for future versions of buildings and arguably future ways of installing EDOs. To evaluate the scope of their accessibility, a relatively modern and continuously evolving space was identified in York University Keele Campus.

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[23] An amazing aspect of life in and around the disability community is the diversity of life from which it is composed. Celebrating that diversity is a large part of recognizing embodied value and the self. The things that make us physically and/or cognitively unique should be recognized and valued not only in designs but also through access solutions that respect the sum of our embodied selves.

Through accessibility audits of both new and existing buildings on the Keele campus, many of the challenges posed by EDOs were logged and compared to first person experiences. Round table discussions were then conducted in light of this analysis, as a way of further identifying community concerns. Participation by individuals from the disability community, disability allies and university patrons was invaluable when attempting to comprehend the severity of the problems encountered with the use of EDOs and potential solutions.

The following section is a critical analysis that covers how EDOs and associated environmental considerations[24] are integrated into the physical layout of the university, as well as the manner in which they are used or not. The investigation into the aforementioned phases were done within a critical disability perspective and, culminated with a round table discussion to better understand and appreciate the thoughts, feelings and experiences of EDO users at York University[25] and the surrounding Toronto community.

A Critical Analysis of EDOs at York University

York University is the second largest university in Ontario and the third largest in Canada (About York, n.d.). The University's Keele Campus is reminiscent of a modest suburban downtown centre, with a population of over 46, 400 undergraduate and 5,900 graduate students (2015-2016-year data). The university is also equipped with many of

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[24] Associated environmental considerations include such items as materials used to construct adjacent areas, the manner in which the adjacent areas are constructed and the way the surrounding area dictates travel, etc.
[25] While this project was active in the York University Keele campus space, it is my hope that solutions to accessibility issues around the EDO can be generalized broadly to the general community, if not globally. The limited amount of diversity built into EDO's means that there are few variations and that they therefore replicate more or less the same range of motion. The repetitive building practices common throughout North American building standards should also be viewed as allowing for a somewhat generalizable take on the results publish herein.

the amenities one would expect to find in a small town. These including medical clinics,

banks, libraries, sporting arenas, theatres, restaurants, various types of housing and a

large transit terminal (About York, n.d.). With over 45 buildings spread across roughly

one square kilometer of land, moving throughout the campus can be difficult even for a
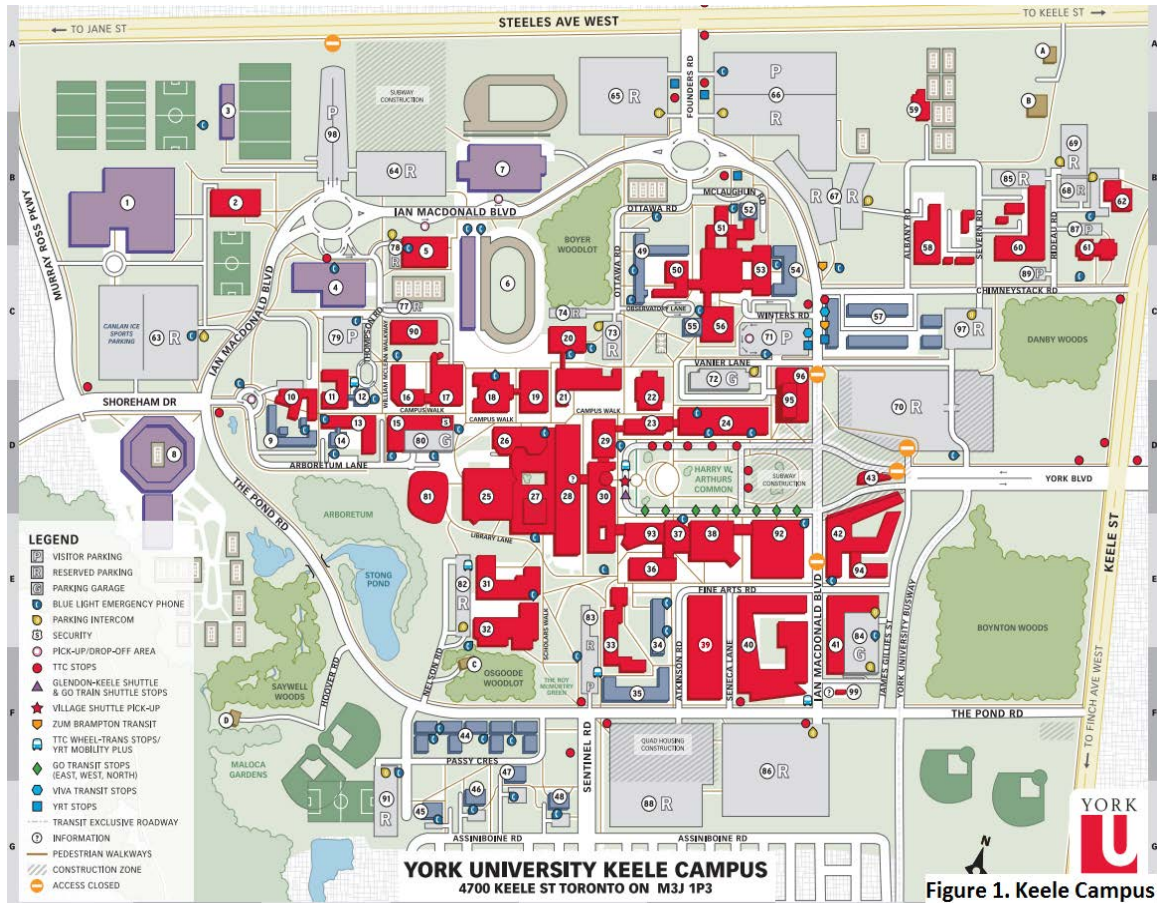
Figure 1. York University Keele Campus Map. This illustration shows all of Keele Campus from an aerial view. The reader will note the large quantity of buildings and their distribution spread across campus grounds.

seasoned student.

Figure 1 (above), shows a coloured campus map of York University with all streets, buildings, sporting facilities, parking lots and green spaces on Keele campus. Facing the page, at the top of the map is Steeles Avenue and on the right border is Keele Street. Just out of range at the very bottom on this map is Finch Avenue West with Jane Street on the extreme left. The majority of the buildings (roughly two thirds) are clustered near the centre of the map around the main transit terminal, while the remaining buildings are scattered closer to campus borders. Despite the apparent proximity of buildings depicted on this map, navigating York University's Keele Campus requires physical stamina, flexible mobility and patience (particularly for patrons with visible and invisible disabilities[26]). This is in addition to, the fact that push button EDOs operate in a very particular way. Put simply, the electronic door openers; which have unfortunately in my opinion become synonymous with accommodation and accessibility, work via push button to complete an electrical circuit which activates a motor that then opens the door. Each case requires physical contact which in itself requires considerations of height from the floor, the slope of the surrounding area, proximity to other objects such as fire alarms or structural beams, all of which say nothing about the diversity of the end users.

Keele Campus Accessibility Audit

On April 21st 2016 an accessibility audit was conducted in and around several buildings at York University's Keele campus to determine the issues, if any, around approaching, using, and retreating from EDOs. Using an accessibility checklist from the

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[26] Several round table participants reported difficulty moving throughout the Keele Campus. Their concerns ranged from the lack of adequate seating, the variable flooring conditions and the functionality of electronic door openers. The full range of concerns and suggestions can be found in the section label Community Round Table Discussion.

Accessibility for Ontarians with Disabilities Act (AODA) website (See Appendix for

copy) as a guide, four members of the newly founded AODA Alliance at York examined

the Student Centre, Main Transit Terminal, Vari Hall and the Osgoode Hall Law school

buildings[27]. The buildings were canvased to uncover any components that impeded

access unnecessarily[28]. The following includes a critique of areas within each building

(Please reference Appendix F1 for each corresponding photo and more detailed photo

descriptions).

Student Centre

Figure 2. EDOs at York. Panoramic photo of York University Keele Campus Student Centre. A central area for university students despite having minimal signage to help with accessibility. I.e., the main public service elevator is located out of sight, through a narrow corridor and behind a pillar. See Appendix F for detailed description.

The Student Centre is celebrated as a "central point for community life at York

University [which] is dedicated primarily to serving the cultural, social, educational,

organizational and recreational interests of the York community (YUSC, n.d.)." A

concern in this multi-level building is signage, specifically signs that indicate where and

how to access the upper floors. Figure 2 (above), is a panoramic photograph at the main

entrance of the student centre. The main public service elevator is located out of sight,

through a narrow corridor behind the first pillar when looking from left to right. After

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[27] These buildings were selected at random prior to the audit and represent a stretch of buildings that span diagonally from the near the campus centre (Student centre) down toward one of the south-western most buildings (Osgoode Hall).

[28] i.e. for safety reasons where an individual could be seriously harmed or killed.

looking across the image, you should notice that lack of signage directing visitors toward either of the buildings two elevators. It was only by chance that we came across the second elevator, all the way on the opposite side at the north-east corner of the building. Not only was there also no signage there but a nearby restaurant had begun using it as a service elevator and cluttered the main floor entrance with supplies, thereby obstructing our path.

The next four photographs depict EDO push buttons located in and around the main entrance. Figure 3 (left), shows a thin EDO box with a red button at its centre located just above the middle point in the image. It is wedged tightly at a 90-degree angle between the door that it opens on the left and two feet of brick wall on the right. The angle at which it is placed makes it very difficult to reach. It means that some users would need to be directly beside the button to use it and, even if they could, they would need to do so quickly enough so not to be hit by the rear end of the door as it opens and closes. Overall the functionality of the door is limited to people who can reach the button from a minimum of one and a half feet away.

Figure 3. EDO's at York. Shows thin EDO box with a red button. See Appendix F for full description.

Figure 4 (below) shows a door on the left and another type of EDO push button near the top right. This time the EDO is a slightly larger rectangular box (about the same

size as a regular single lighting switch box) with a blue button protruding from its centre. In order from top to bottom in this photograph, you will find a large over hanging fire alarm enclosed in a bulky clear plastic box, the EDO, and then a flat square plaque with a wheel chair symbol. This EDO presents a unique challenge for users in that they must be able to reach it at just over two feet off the ground while moving

underneath the fire alarm which effectively blocks it from above. In this example, the position of the EDO means that to use it individuals need to be of a certain height or flexibility to reach it from an angle at the

Figure 4. EDO's at York. EDO push button in student centre obstructed by a fire alarm. See Appendix F for full description.

side or from the floor. Like most EDOs audited as a part of this research, they are accompanied by a small plaque with a maintenance service phone number unless otherwise noted through this audit. In Figure 4, this plaque is obstructed from view as half of it is located behind a fire alarm.

Although maintenance plaques serve no purpose in specifically identifying the EDO they are adjacent to, they serve the rudimentary purpose of informing the public where to contact if there is a concern with its functioning. The fact that this photograph shows a plaque being clearly and unnecessarily obstructed is frustrating to say the least especially when there is ample space beside and around the EDO where it would still be associated to its function.

Figure 5 (below, right), shows the first pillar identified in the panoramic image of figure 2. In this photo is a close-up of the post with a square push button version of the EDO in the centre with a wheelchair symbol embossed in blue. There are several issues with this EDO, beginning with its position in the Student Centre. If you take another look at figure 2 (Ctrl + click here, Figure 2) you can tell that the pillar stands alone in the centre of an entrance foyer with no obvious attachment to any section of the surrounding area know which door the EDO services because all three door opening to different rooms. When the user faces the EDO button, their back is to the door. This, combined with the distance away from the door and the speed at which it opens and closes, means that the individual using the door would need to push the button, turn around, move roughly 14 feet around the pillar and through the door in the 16 seconds it takes for the door to open and close.

Figure 5. EDO's at York. Shows a pillar in the middle of a large foyer with no signage. See Appendix F for full description.

Figure 6 through 9 focus specifically on the approach to, use of, and retreat from the washrooms in the Student Centre. The first photograph (figure.6 on the right), depicts a second floor washroom view from the inside. From left to right are the washroom sink, push-down paper towel dispenser, large circular
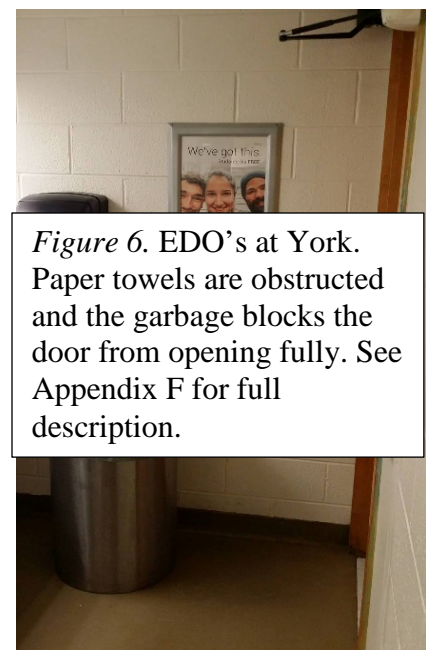
Figure 6. EDO's at York. Paper towels are obstructed and the garbage blocks the door from opening fully. See Appendix F for full description.

garbage disposal, main entrance door, and large square EDO. The photograph documents

several concerns beginning with the positioning of the garbage disposal. Not only is it

obstructing the use of the push-down paper towel dispenser and the sink counter area, it

also restricts someone who is entering from having a clear and unobstructed route of

travel. Unfortunately, these types of obstruction were common in other washrooms across

Figure 7. EDO's at York. Another washroom where the paper towels are obstructed and the soap dispenser is off to the side.

See Appendix F for full description.

campus (see figures 7,8, and 9 for other examples of obstruction by a garbage receptacle).

In figure 7 (below), the push bar liquid soap dispenser is a foot and a half above the

counter, making it on the extreme far left of the counter; out of reach for anyone using the

sink itself.

Figure 8 (below), was particularly problematic because this washroom EDO

functioned from the outside but not from the inside. Located on the western end of the

student centre and on the second floor away from major traffic areas, it could easily

become a real trap. Attempts were made by the AODA Alliance on April 21st, 2016 to
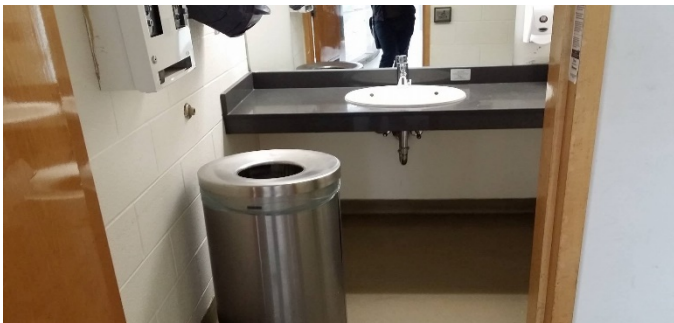
Figure 8. EDO's at York. Washroom where EDO functioned upon entering and failed to function from the inside to get out.

See Appendix F for full description.

inform the main university maintenance office of the issue but unfortunately upon re-inspection a week later on April 28th, 2016 the issue still remained unfixed. A follow up inspection on October 18th, 2016 revealed the same issue persisted. Whether the EDO had been repaired and some time later fell into disrepair remains to be proven. Whatever the case may have been, the scarcity of documentation tracking ordinary EDO failures in the environment makes it difficult to draw conclusions. This is an example of the need for general maintenance and upgrades to EDO's and other physical access related devices to be made readily available to the public.

Figure 9 (right), is a second floor washroom where the EDO is hidden from view as you approach the door. Located on the back of the post, an individual would need to circle around a narrow gap to find the EDO button and access the door. This in turn leads to another issue, which is the direction that the door swings. Looking closely at the extreme right edge of figure. 9, notice the hinges on the right side of the door. This indicates that the door swings towards the main hall way (out from the left side of the door to the garbage disposal), effectively making the garbage disposal and the pillar into a partition, blocking direct access. Some of these may come across as inconveniences, but to many they are unnecessary and potentially dangerous oversights which could be solved with greater consideration of people with disabilities.

One of the questions becomes, who is responsible for identifying and improving these obstructions as well as to find out whether or not they are the resources and willingness to make the necessary changes? An argument can be made that the parties responsible for creating and maintaining physically inclusive spaces (in this case York University), simply were not aware the issue existed. In these situations, similar audits may have some promise in bringing awareness to these issues. In figure 11 demonstrates an organizations willingness to act plays a crucial role in whether ~~or not~~ a problem is resolved. This is another reason that establishing an open and consistent dialogue with relevant community members is so important to the equitable development of spaces.

Main Transit Terminal

Often referred to as a commuter school, many of York University's students and faculty commute using public transit and rely on accessing the University's major transit hub each time the visit. In total, four public transit systems serve the

> *Figure 9.* EDO's at York. EDO is hidden behind pillar away from the door. See Appendix F for full description.

university along York Blvd. as it loops around the centre of the school (CPTDB, 2016). From this central point, visitors can theoretically fan out to any of the surrounding buildings, but, as the campus audit revealed, this was not necessarily possible. Figures 10 through 12 were taken at various locations from the transit terminal toward university buildings.

Figure 10 (below), shows a 10-feet-high by 21-feet-wide glass panel wall with two EDO enabled doors in the centre leading away from a Toronto Transit Commission (TTC) bus stop on the far northwest side of the terminal. Close inspection reveals there is a small rectangular EDO with a red push button in the middle, located seven and a half feet from the centre of the door which it operates. Rather unnecessarily, there is a small pillar located directly between the door and the EDO button. This is made worse by the fact that even after discovering the button, the individual must move around the pillar and avoid the door in 11 seconds it takes before the door begins to close. In total, from the time the button is pushed to the time the door closes, the individual has 16 seconds before this heavy steel frame door is completely closed.

At the southwest end of the terminal an EDO was spotted in disrepair. As figure 11 (right) shows, this circular push button EDO was dangling from wires outside of the pillar to which is was attached. Perhaps

Figure 11. EDO's at York. Push button EDO hanging by exposed wires off the side of a post. See Appendix F for full description.

foot pillar.

See Appendix F for full description.

quite fittingly, the garbage on the upper rim says much about the current state of EDOs

not only in their appearance but also in their functioning. Despite contacting maintenance

regarding this matter, exactly one week later the button was seen in a similar state. Even

though we did manage to start the EDO, it was not responsive for every attempt and

required specific manipulations with two hands. In retrospect this was very dangerous as

the wires behind were exposed.

Figure 12 (below) shows the floor between two sides of an open door, located a

few feet away from hanging EDO button in figure. 11. In the photo one can see a gap

which ranges from approximately 1 to 2-inches along the width of the door opening.

Figure 12. EDO's at York. Shows a height difference of between 1 and 2 inches between the base of the door and the platform beneath.

See Appendix F for full description.

either side of the door. While this does not

necessarily concern the mechanical function of the EDO itself, it demonstrates that

sequential and contingent nature of physical access and the multiple considerations that

need to be made to work together if people are going to be able to move around safely to

activate EDOs effectively and move through the spaces safely. These considerations

should be made to all areas, before and after the door as well as to the materials used in

their construction[29].

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[29] Figure 12 shows paving stones used in the floor construction on either side of the door. Given that this is an exterior door, exposed to rain and snow this is not recommended. Over time it is inevitable that the stones will move and an even greater gap may emerge.

Vari Hall

Figure 13. EDO's at York. Iconic main entrance to Vari Hall at York University Keele Campus. Photo taken from the inside facing out into the courtyard and fountain. See Appendix F for full description.

Vari Hall is located at the centre of campus and is often featured on the university website and advertisements. Its two-story cylindrical-shaped hall may give the university a modern aesthetic appeal, but its issues with EDOs unfortunately continue the negative trend we experienced throughout this campus audit. Despite being used to host job fairs, protests, and social events such as York's very own birthday party, Vari Hall does have accessibility concerns. One example, as depicted in figure 13 (below), reveals that not all

main entrances are equipped with EDOs. The main doors of the iconic Vari Hall (seen

here from the inside facing out) do not have an EDO. Rather than attracting community

members to the school, the first impression of Vari Hall is that some are not welcome.

Upon closure inspection, you may notice a yellow piece of rectangular paper posted

diagonally on the glass panel beside the door. This is what is known as a TTC Wheel-

Trans late slip, which is the Transit Commissions way of informing riders that they have

missed scheduled pick up time. As figure 14 (right) explains, this same entrance (which

by today's standards would be deemed inaccessible) also doubles as the designated

waiting area for the terminals accessible transit cars. The image of a light post on the

outside entrance way toward Vari Hall depicts signage to indicate the direction toward

the designated waiting area. From top to bottom is a square university plaque with a

wheel chair symbol reading waiting area followed by

signage for both York and Toronto region transits.

Figure 14. EDO's at York. Push button EDO hanging by exposed wires off the side of a post.
See Appendix F for full description.

Figure 15. EDO's at York.
Located at the in Vari Hall, this EDO failed to activate any of the surrounding doors.

See Appendix F for full description.

Other areas of the building revealed several EDOs in disrepair. Figures 15 and 16 show examples of EDOs that did not function as expected. In the first photograph, (figure 15 above) the EDO located at southeast corner of Vari Hall failed to activate any doors at all. In figure 16 (below), five doors line the ends of two corridors as they meet at a 90-degree angle at the southwest corner of the building. The EDO on the right of the photograph (distinguishable by a circular yellow signage on it glass) takes roughly nine seconds to open fully yet almost no time at all to close. The weight of the door and lack of resistance make for a dangerous combination giving this EDO the potential to harm someone. One of the EDOs at this location opens half way, and is difficult to operate manually given the resistance present due the mechanical components of the door. These example calls into question the unpredictable nature of EDOs, and can spark the debate about whether it would be beneficial to standardize the amount of time and the speed

Figure 16. EDO's at York. Located at the in Vari Hall, this image shows a hallway with five EDOs. Each one operating differently.

See Appendix F for full description.

with which they operate. While admittedly of great value in terms of facilitating access, I will leave the discussion portion of this debate for the round table discussion later in this paper.

The large proportion of EDOs on campus with some issue suggests that something needs to change. Some EDOs are out of reach, difficult to find, obstructed by other objects or simply missing, to name a few issues uncovered here. This, combined with the manner in which they are manufactured, installed, and maintained further suggests that they are not fully adequate for the needs of today's disability population. An EDO, as it exists today, stands relatively alone in the environment where is it installed rather than working together with it. The next part of this project looks at possible solutions that could see EDOs function in unison with its surroundings.

Evidence of the Need for Community Discussion around EDOs

Drawing from people's experiences offers the opportunity to understand the relationality between the environment and the body as we age across the lifespan (Beazley, Moore, & Benzie, 1997). Rather than relying on scaled maps to infer directionality, energy expenditure or accessibility, there is a real need for first person accounts that are not limited by bipedal[30] individuals, neuro-typical[31] individuals or bipedal neuro-typical individuals. These relationships provide an excellent opportunity from which to identify the role of the built environment in creating disability (Beazley,

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[30] I propose the use of the word Bipedal. Bipedal (when referring to mobility related disabilities) is meant to be a respectful way of describing individuals who rely on the use of two legs (biological or prosthetic) to move around the environment. To my knowledge this term is not used in reference to disability or accessibility in the literature. It is used here as a way of more accurately describing exactly the kinds of mobility that are included in the socially constructed normative.

[31] Neuro-typical is defined as someone who does not typically display or characterized by autistic or other neurologically atypical patterns of thought or behavior (Owren, & Stenhammer, 2013 p. 35).

Moore, & Benzie, 1997). To consider this relationship to be unique to people with disabilities, however, is patronizing to say the least. Physical access has traditionally been labeled a disability and aging in place issue ~~labeled~~. I argue that this idea is ultimately detrimental to the pursuit of equality in that it further establishes discriminatory access methods as normative and perpetuates the idea that disabled people are unnecessarily burdensome and taxing. As John Stuart Mills explains, it can be difficult to apply a social phenomenon directly to ourselves unless we are socially labeled or categorized within that same phenomenon.

> "The tendency has always been strong to believe that whatever received a name must be an entity or being, having an independent existence of its own. And if no real entity answering to the name could be found, men did not for that reason suppose that none existed, but imagined that it was something peculiarly abstruse and mysterious (as cited in Gould, 1981 p.320)."

We are all in constant negotiation with the built environment anytime we contemplate or initiate movement. Negotiating with the environment refers to the process of engaging with our surrounds wherein we must adapt, conform, and overcome it to accomplish a task. Negotiating is both a static and dynamic process which is present to some extent whenever we are in the physical environment and is not exclusively a human objective. If we can begin to understand our individual relationships with the world as existing on a fluid spectrum where several personal and environment factors move in flux with relation to each other, we should begin to identify access as a concern which effects each of us differently in various capacities, at different times in our lives. As Mills described (in Gould, 1981 p.320), failure to conceptualize social phenomenon as relative outside the self can eventually contort our ability to identify anything outside of our

subjective experiences. The advent of the social model (in particular through the 1980's), has helped to focus critical research on the built environment as a means for creating disability with discriminatory physical, cultural, and social barriers (Oliver, 1996 p. 6; Barnes, 2001 p. 3; Shakespeare, 2006). I recognize that it is important to emphasize the notion of disability in its entirety (away from ideas of the 'isolated body'), to allow for critiques of broader systemic modes of oppression to be explored and substantiated (Oliver, 1996; Shakespeare & Watson, 1997). In solidarity with similar social movements and initiatives taken up by others in the disability community (Rioux & Bach, 1994; Barnes & Mercer, 1997), central principles of emancipatory research[32] will combine with a community based research approach in this study. These processes problematize aspects of the built environment that maybe have previously been necessary for the 'normal functioning of civilization' (Cherney, 2011 p. 5). At the same time, as a researcher I am committed to remain accountable to the disability community, breakdown any researcher/participant power structures, and work towards practical outcomes that can affect change.

Social consideration for embodied diversity in the built environment is not fulfilled when access is restricted as exemplified through audits such as the one conducted here at York University Keele Campus. The primary function of EDOs themselves, which is to open and close, is only diverse in its timing and speed; a fact I consider to be more of a malfunction than an attribute. There is no built-in flexibility with which to address the various bodies who desire to move through the EDO, nor is the

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[32] Central Principles include: accountability, social model of disability perspective, prioritizing experience, and working towards practical outcomes (Barnes, 2001).

EDO able to respond to variations of people who come to operate it. Essentially all EDOs are made to operate using the same mechanical principles and serve the same function. Any variations to the doors, such as size, speed, and location that happen outside of private spaces, I argue are cause for concern. Having EDOs with extremely slow opening speeds or rapid closing speeds are not ideal, not to mention potentially dangerous. Nevertheless, these issues provide an excellent opportunity from which to imagine access. While random non-standardized door movements can cause problems, the same concept in a controlled environment could in fact do the opposite. Added variable opening and closing times and speeds that are control by a preprogrammed setting on an EDO remote could make travel much less stressful and unpredictable.

Alliance

Although systemic pressures still exert their influence for the marginalization, segregation and extermination of diverse bodies, there is still hope. I strongly feel that there is a need for large united movement, one which does not pit disability groups against each other but rather fosters discussions towards mutually beneficial outcomes that support alliances. Continuing to specialize and to distinguish ourselves through separate public interest groups (while important sources of personal identity and social solidarity) may leave the disability community as a whole in a somewhat weaker and more vulnerable position. It is important to be cognizant that any given groups agenda should never come at the expense of another's. It is unfortunately a pattern which occurs regularly, often with devastating marginalizing effects. As recently as 2013, diagnostic

criteria changes in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) (an authoritative biomedical text used to diagnose individuals with abnormality's) threatened to make it increasingly difficult for families to get funding for therapeutic resources if they had a child with autism. As well as threatening funding, the changes also directly impacted what it meant to identify as someone who has autism. In the DSM-V, four previously separate disorders (autistic disorder, Asperger's, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified) became amalgamated into one diagnosis (APA, 2013). These changes exemplify the ease with which whole groups of people could be erased and medically redefined. According to the new DSM-V these four diagnosis are virtually diagnostically indistinguishable and so they were placed along a spectrum. As a basis for understanding oneself, diagnostic criteria can (beneficially or otherwise) influence how we view ourselves compared to others and, our sense of belonging in the community.

Many factors contribute to a persons' choice (or lack thereof) to identify in a particular way especially when it comes to disability. Social markers can follow people around and disclose personal information about them, further contributing to their categorization and sometimes forcing them to adopt a social identity. For example, a pair of shoes can disclose a persons' ability to walk if one sole was larger than the other in much the same way that a pair of glasses (shaded, clear, thin or thick) can disclose information about a persons' ability to see. The idea of carrying around a remote also has the potential to say something about the carrier. Fortunately, what the remotes say and whether they say anything can be dictated by the person carrying it. Thanks to the

flexibility of design options, remotes could be produced the resemble all manner of devices and even be concealed in existing mobility aids such as the handle of a walking stick or on the tray of a scooter. This analysis does not seek to question a persons' decision to identify in any particular way, but it does seek to challenge the processes that influenced their decisions while at the same time exploring solutions to satisfy either sides preferences[33].

Methodology

This section of the paper considers data taken from a round-table discussion with seven people. The inclusion criteria were that all participants either needed identified as someone who was a part of, or allied with the disability community. The entire discussion followed the same format and lasted approximately two and a half hours. The discussion centered around two main situations: (1) the participant's experience of EDOs in the built environment, and (2) how these experiences would be impacted by the introduction of an EDO remote. The discussion was not formally organized, consisting of the researcher asking participants to ''talk about either negative or positive experiences with EDO'' and to ''talk about what an EDO remote could mean [for them] or someone [they] now''. The entire discussion was audio-recorded and transcribed prior to analysis. All transcripts have since been anonymized.

A variation of discourse analysis based on emancipatory research principles (Barnes, 2001) was used to understand and develop ideas and themes from the round

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[33] For more information regarding the bases of my position on this matter reference, *"Identity, positionality and power: Issues for disabled researchers"* by Tregaskis (2004).

table.[34] The analysis devoted a particular focus to identifying recurring themes, with personal experiences involving EDOs as well as suggestions and concerns regarding the addition of remote access tools.

Phase Three: Round Table Discussion

"Nothing about us without us" (Charlton, 1998, p. ix), is a critical step along the way to realizing the goals set out by this paper[35]. As such, round table discussions regarding the proposal of adapting EDO doors with remote technologies were held in room 010 of the Health, Nursing and Social Studies building at York University on July 7th 2016. The main goal of the round table was to understand, explain and explore the influence of the built environment on individual's social experiences involving EDO use and to contemplate how those experiences would change with the introductions of remote access. In total, eight community members participated in the discussions which lasted about two and a half hours. Out of respect for their privacy and in accordance with the ethics guidelines any names mentioned in this paper have been changed. During the discussion, I posited the general use of remote technologies as a potential next step in the pursuit of an environmental accessibility model that provides greater access to more people in ways that they can feel comfortable using. At the beginning of the discussion, participants were informed of the project's main objectives and the importance of their opinions (as well as those in future discussions) were emphasized as the single greatest

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[34] See *'Emancipatory disability research': project or process?* by Barnes (2001) for a detailed explanation on emancipatory research principles.

[35] Despite their importance, round-table discussions and other similar research models such as focus groups and community meetings are not popular should be emphasized for the influential part they play. It is important to remember not to let them become tokenistic events by committing to being open to the guidance and criticism provided. At this point I want the reader to know that I am cognisant of this reality and despite my vested interest in this projects and the work that I have conducted, I am committed to the pursuing the thoughts, desires and opinions of every person who uses EDO's.

factor in its overall direction. I was clear that my position on the use of remote technologies was not an attempt to address human ability but rather it revolved around the issues of immobility in the environment. Members[36] were encouraged to be as openly critical as possible and reminded that my desire was not to create remotes as it was to assess their relevance members of the disability community. The word member was used in place of participants as a way of further detaching the discussion away from more structured scientific studies to remind the group of the community focus through the project.

Round Table Discussion Analysis

In total four major themes were identified during the discussion. These include privacy and stigma, security, abuse, and personalization. Each was identified when comparing across members within the transcript looking for patterns (consistent or otherwise) in the discourse. What follows are excerpts from the round table that were selected as they concisely express the major themes presented. Each conveys a strong sense of how closely the round table members associated themselves to each theme. Each theme will be followed by a discussion and analysis after which point an open-ended discussion around the suitableness of EDO remotes will be presented.

Stigma

A concern shared by all group members were issues around privacy and stigma. In being a physical tool, the wide spread use of remotes could potentially become an

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[36] The word members will be used in place of participants as a way of detaching the discussion further away from heavily structured systematic studies and to remind us of the community focus of this discourse.

identifier of individuals with diverse access needs[37]. As an identifier, individuals were right to be concerned about their right to privacy and their risk associated with being stigmatized. During the round table, members were encouraged to express their concerns. Extract 1 below emphasizes these concerns.

Extract 1

"… I really don't want people to know which buildings and which kind of services, and what kinds of things I've done in a day… I REALLY don't want people to know where I've been! … There is a privilege in being able to be invisible that not everybody has a choice in having but, umm there are also risks to, to identifying and being outed…"

Unfortunately, there are many examples within the disability community that justify this level of unrest and anxiety around being identified and outed as a person with a disability. As Erving Goffman (1963 p. 12-13), explains, the very anticipation of disclosing one's diagnosis or disability can be stressful, not to mention having that information be disclosed unintentionally and in a public space with strangers. In extract 1, the individual very clearly values their privacy especially in social situations where they mentioned the buildings they frequent, the services they use and their daily routines. It was a point which resonated throughout the entire group. This member also mentioned their strong desirability of being 'invisible' with regards to their disability. To be invisible means to being able to successfully withhold personal information from others. In the disability community the term invisible is also used to describe personal characteristics such as cognitive impairment, physical disability or otherwise, that are not

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[37] This sentence is written purposefully to imply biological needs rather than environmental needs. Although my position on this matter has clearly been that environmental constructions are the focal point requiring assistance, I feel it is important to remember the influence of others who are informed by discourses which blame the disability community.

obviously apparent to an observer (Matthews & Harrington, 2000).

Take the word stigma for example. To possess a stigma, is to embody some socially undesired differentness from what is anticipated by others in a given group (Goffman, 1963 p. 5). To stigmatize therefore means to treat someone differently based on the perceived presence or assumption of differentness from a category of norms that the observer themselves identifies with. It is also important to acknowledge that people do also vary from the norm. With this understanding, stigma is given (not embodied) based on the subjective understanding that certain norms within a given group are distributed. (Goffman, 1963 p. 7) Stigma is assigned without any preauthorized consent on the part of the person being stigmatized. Also, by perpetuating biased normatives the person who stigmatizes is indirectly validating their own presence within a group.

Although the act of stigmatizing is beyond the stigmatized persons control, there is some measure of choice for what can be done preemptively and/or afterwards. Social pressures that result from stigmas can limit choice and force people to conform and to behave in ways they may not have chosen to otherwise. Rather than entering into debates about whether it is best to adopt a disability pride perspective[38] or to attempt to deny the socially undesirable characteristic that contribute to our identity, I suggest the reader choose and be assured that their choice be respected. You may be wondering how a model for accessibility in the built environment can allow for individuals to commute without disclosing a disability while simultaneously being embraced as a source of pride and identity?

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[38] Embracing one's disability as a valid and valuable part of their personal identity; having a sense of pride in ourselves (Morris, 1991).

Remote technologies are at a point where they can be made to take many forms, for various applications. Remotes are already commonly found in various shapes, sizes, and materials. Cars, televisions, radios, cell phones, lights, furnaces, air conditioners, robots, and doors of all types have been shown to work with remote technology. By developing a system which allows individuals to participate in the design process or at least to be able to choose from a selection which includes both distinct and indistinct models, the use of remotes in social spaces can remain respectful to each person's philosophy[39]. The spread of 3D printing has also meant that this technology is becoming increasingly user friendly and less costly (Aspler, 2014).

Security

The second extract expresses the groups security concerns and their desire to feel safe when out in the community. A major part to achieving accessibility is that it cannot have a physical end because if that happens at any point access is compromised. As one of the members explains, the potential safety risks; should anything malfunction, are frightening.

Excerpt 2

"There was a woman who I meant who umm... who was experiencing some difficulties with mobility and using a walker and she said that was just the last four months of her life. That she had never really thought about access issues before, and she had gone to the bathroom at a café and because they didn't have a button- first of all they used door locks, with a key that you have to go get from the cashier- so she couldn't maneuver the key. So she had to get someone to let her in. And then there is music playing in the café and stuff, and nobody [could hear her]. There's no way she could get out. There was no button, there was no way for her to get out of the washroom. She was a prisoner in there... If I can open up a door this way [with an EDO remote] how [is she] going to be able to open up the door?"

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[39] Please reference Appendix D for illustrations of remotes informed by round table feedback.

Regrettably for the individual mentioned in this excerpt the environment was not conducive to their method of movement and the result was unnecessary confinement[40]. Multiple factors came together in this scenario to produce a terrible result, though none these factors were particularly unlikely especially when considered individually. With minimal personal experience using a walker to facilitate mobility, perhaps the individual did not recognize the risks of becoming trapped. This could conceivably even happen to someone who has always used a mobility aid or experienced environments that admit limited types of movement. The washroom's inaccessible design and the cafe's vibrant atmosphere[41] also increased the chances of this happening. The lack of an EDO was problematic in and of itself, but the issues around personal security bring other relevant security questions. Making sure to assess whether EDOs are an effective part of a national accessibility model would require a thorough investigate regarding the potential for malfunction. A consideration could also be made as to incorporate a form of distress or support alert, whereby the person can signal for help. Similar to existing medical alert devices that provide a link to emergence services such as DirectAlert (2016) and AlarmCare (2016), EDO remotes could be made with the same abilities. Having the ability to choose how a distress signal is circulated can also help diminish the chance of further security risks. For example, activating the distress function could send a silent alarm to a predetermined aid depending on the individual's choice, such as police,

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[40] The only necessary confinement would be when someone is a life threatening danger to others and/or themselves

[41] The café is described as having a vibrant atmosphere because that implies it is full of energy and enthusiasm. While it can be argued the this is true, the lack of consideration of potential customers with diverse access methods means that they are not conceptualized in what constitutes a lively café experience. In this way the sentence is meant to be ironic and expose parts of society that do not include people with disabilities.

emergency medical technician, a spouse or friend. If EDOs provide the best solutions to adapt inaccessible spaces then they should be incorporated in more places, while insuring proper general maintenance and responding effectively to item malfunctions become important considerations in this discourse around personal security.

As mentioned in the sections of this paper regarding the accessibility audit of York University campus buildings, EDOs have the ability to breakdown both physically (e.g. loose and eroded parts, etc.) and functionally (e.g. mechanical errors). Obviously the introduction of an EDO remote without an EDO in place would make the addition of the latter irrelevant and therefore a primary consideration would be more EDOs. In scenarios where a traditional push button EDO is already in place, would the addition of remotes increase personal security? Just like in the excerpt the end result depends on several factors working together.

For one, EDOs need to be installed in proper working condition, routine maintenance needs to be performed and a system for identifying malfunctioning items needs to be put into place with the same considerations to be applied to EDO remotes. Round table participants found it conceivable that remotes could have features such as flashlights, personalized distress signals, even GPS. There could also be a function which alerts the person of the presence or absence of EDOs in a given space.

Abuse

Although the possibilities for positive consequences are encouraging, several members pointed out the potential for the abuse of EDO remote users. A growing concern among members was the idea that they could be targeted and mistreated if they

used the remotes.

Excerpt 3

"What about abuse from the other side? Depending on how this technology works is there the potential for doors to be shut off, so that you know you can no longer [use it]? Could something happen where all of a sudden all of the doors are non-openable for whatever reason...? Can this lead to people with disabilities [being] more vulnerable to being captured in spaces or having their movements regulated"?

The concept of the other side is one which evoked dislikes toward feelings of imposed segregation in the built environment. Ramped stairwells, elevators, side entrances, etc. effectively herd people toward specific avenues for access; limiting choice and isolating disabled bodies. Do EDO remotes solve this problem?

Unfortunately, the EDO remotes discussed to this point do nothing to eradicate the segregation of spaces based on physical ability. Under the current framework they would function as a facilitating devices for existing spaces and would have no bearing on any structural design. There is no reason not to suggest that the addition of EDO remotes would limit accessibility beyond what people are encountered now.

There are very limited scenarios where concerns about the technology being controlled by an external party can be supported. For example, it is conceivable that EDOs be disconnected from electrical outlets which by extension would mean that the remote signals would have no door to activate. There is the opportunity for malicious behaviour such as disconnecting an EDO after someone has used it to enter a space. As terrible as that sounds, the risk is not augmented by the presence of an EDO remote.

Given that EDO remotes would work as a wireless system it is conceivable for the receiver to get overwhelmed with repeat transmissions. Hostile actors could use this

method or hack the receiver in other ways which would need to be safeguarded against as they become known. Beyond that the only other plausible opportunities for remotes to stop working or fail would involve the actual remote itself (its hardware and software). Again, I do not pretend to know the full understand the potential for interfering with the signals between remotes and doors which means this is a question for future research to investigate further.

Personalization

The final common theme that was expressed among members was that of personalizing the remotes themselves. Everything from the aesthetic design, structural material, and potential functionality were suggested during the round table. Most items included have already been discussed at the beginning of this paper but a few offered further insight into the potential for even more applications.

Excerpt 4

"…there are other things that I use buttons for. It would be awesome if I could use the [remote] for the elevator…crossing lights…maybe it knows I need a few extra seconds to cross in the timing?"

The idea of having an environment with the ability to respond in multiple ways without a person having to physical interact directly with it was cause for much of the discussion. The excerpt expresses a desire to expand this idea to different areas of daily life. While some are arguably more difficult than others to be conceivable, the truth is we do not yet know their true potential. If a system of remote receivers operating on the same frequency where developed, then cross walks, elevators, EDOs, stair lifts, movable

walkways, transit stop buttons and another other button-enabled means of transport could work with the same device.

Despite the potential for positive outcomes on the individual level, there is some concern that personalization may have negative consequences for the broader community. For example, a person could potentially control the crossing light, giving themselves more or less time to safely cross the street. It is conceivable that someone would choose ten minutes from one side to the other. If the individual needs this time to travel safely, is it ethical to deny them? What about the other people waiting to use the intersection, how would they be affected? Similar issues, such as the amount of time a door remains open or the speed with which it closes, suggest that a gate keeper or at least a way to resolve the tensions that arise among multiple users of a common resource may be necessary. Such discussions would need to be informed by evidence about the extent to which people desire personalization, for which features and under which circumstances.

Research-Oriented Design Not Design-Oriented Research

When discussing people and the built environment, the people are sometimes positioned as consumers/users, especially when the discussion involves mobility aids. This has the potential to take the focus away from the person (their needs and wants) and the discourse may have an overly market-oriented focus[42] often in the form of financial restrictions involving cost benefit analysis and political evaluations. Physical accessibility

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[42] Market-oriented refers to the motivation for, and direction of a discourse toward financial profit in a market economy. It is a philosophy focused on discovering and meeting the needs and desires of customers through its products but that first and for most has an obligation to its own survival through monetary gains (Harris, & Ogbonna, 1999 p. 181).

involves many factors and contexts which require consideration and because of that it was important that this study put the people first. For that reason, while financial cost and political assessments are important they do not comprise the main body of research or discussion. My position is clear on these topics in that they are always secondary concerns to identifying, understanding and addressing human issues. Discussions regarding the material construction of remotes were intended to inform the idea of wireless technologies potential for contributing to positive changes in accessibility for persons with disabilities. Remote basics, design and application do not take precedent over personal wants or need. Put simply discussions of EDO remotes served to inform the development of these ideas toward person centric objectives.

The ideas presented below describe potential EDO remote designs, functions and applications as informed by the above critical analysis of EDOs at York University and round table discussions. While I believe these ideas could be beneficial, I know that in order to come to any conclusion as to whether or not EDO remotes are appropriate and respectful tools, would need further development and research trials by computer and electrical engineers, designers and people with disabilities.

Phase Four: Concept Designs

The EDO remote is meant to be a tool analogous to the standard push button system which electronic doors currently use to operate. As such, several different working models of remotes where designed, each addressing specific aspects of embodied diversity while completing the function of the push button. Put simply, the electronic door openers; which have unfortunately in my opinion become synonymous

with accommodation and accessibility, work via push button to complete an electrical circuit which activates a motor that then opens the door. Each case requires physical contact which requires considerations of height from the floor, the slope of the surrounding area, proximity to other objects such as fire alarms or structural beams, all of which say nothing about the diversity of the end users. The project has since become a person centric process that is primarily preoccupied with developing the idea of wireless accessibility together with disability community members. Rather than eliminate the current push button system, wireless technologies are posited as analogs; independent substitutes which function alongside push buttons for individuals for whom the buttons do not work. Together a discussion of remotes concluded incorporating it in daily life was plausible and a range of possible features for the remotes were identified with the intention that people would be able to choose any combination that suited their lifestyle and ability. The following represents a conceptual background from which to inform the reader of EDO remotes as they exist in this paper. I do not pretend to have a full fundamental understanding of the mechanical make-up or physics of remotes, but I do however, see an opportunity for improved access through this method.

Remote Basics

People are increasingly carrying computerized devices that are capable of communicating with the built environment. These include devices like cellular phones, pagers, personal digital assistants (PDAs), tablets and other devices that can communicate wirelessly using various methods. Through a system of short distance radio networks such as 802.11b, RF-Lite, and Bluetooth, these devices are enabled to

communicate with other devices that are within close range (Nichols, Myers, Higgins, Hughes, Harris, Rosenfeld, & Pignol, 2002). As this project is not immediately concerned with the construction of remote controls for accessibility, what is essentially important to note at this stage is that there are two major components which communicate with each other; (a) the transmitter and (b) the receiver. The transmitter (remote) sends a wireless signal to the receiver (in this case the door), which then activates the receiver (door) to open. For the purposes of this project the process between transmitter and receiver will be referred to as the function of an electronic door opener (EDO) remote.

The reader is encouraged to envision how the functions of EDO remotes could facilitate other areas of community life. For example, try to envision the environmental barriers you experience not as they are but as they would be if they best suited who you are as a person. If you move at a relatively slow pace perhaps you would like the environment to respect your speed and range of motion by holding the door a few seconds longer than the present amount. Envisioning an environment with such alterations that respects the person you are; body, mind and spirit, is one way to identify solutions which we can than work to realize as a community.

Design

There are several motivations for having different types of remote. Aside from the electronic components required for the remote to be functional (i.e. send signals), the design could take on virtually any shape and size and be customizable for any body. Remotes currently have many applications from electronic devices such as televisions and radios, to heating units and water sprinklers, and they have already even been show

to work with doors (Power. (n.d.). They are a proven tool that can facilitate independent accessibility in residential spaces (Power. (n.d.).

The remotes proposed in this paper would theoretically have a greater social application than EDOs alone by contributing to more than just physical access. Among the potential designs, remotes could be made in the likeness of push button keys, wheelchair joysticks, TV/radio remotes, light switches, etc. The remotes could be adapted to fit mobility devices such as white canes, wheelchairs, walkers, strollers, shoulder and forearm crutches, scooter, service animals, etc. (For illustrations of potential remotes see Appendix D). The effort required to activate each remote could come on a range across the different remotes to respond to the pressure of a person's touch. This could include hard plastic buttons or switches and soft silicone sensor pads that respond to temperature rather than pressure. I accept my limitations to imaging all the possible combinations of disability and space which is why I do not claim the ability to conceptualize every design. One way to reduce the number of people not represented by this mode of access will be to introduce this technology as form of open source software.

Open source software means that the information (software) would be available to everyone online (Lakhani, & Von Hippel, 2003). Anyone could download, modify or enhance the software to better reflect their needs and wants. By combining open source software with predesigned 3D models, people would have the opportunity to make their own remote. Although 3D printing is becoming more financially and intellectually accessible through institutions such as public libraries, it still requires the ability to access those spaces and to have some knowledge of computers, hence it is not completely

accessible in its application. Nevertheless, 3D printing does represent a chance for some individuals to create or even just envision a form of remote access that suits them. Continuous growth and fostering new ideas are a large part of this project. An important underlying assumption to this research is that no two people are exactly the same and it should not be assumed that anyone will prefer to adopt the exact same method to physical access.

Applications

Another way to diminish the effects of environmental barriers would be by facilitating the transfer of information between people and the environment. In an environment where information and technology are increasingly being merged, having this option as a function on personal remotes could help people navigate their environments in such a way that they could engage in a dialogue.

Information in the community is not always equally available which means that many people are missing certain aspects of community life. For example, public transit and store front signs written in small font, brail signs placed in inaccessible locations and, inadequate colour contrasts are common issues that hinder the communication of information (See Appendix F for photographs of such issues). Lack of information means that the individual is not able to make an informed decision and again has lost the opportunity to be more fully engaged in community life. One-way information can be transmitted is through communication between wireless devices.

EDO remotes could be programmed to communicate a variety of information from a persons' current location, to the distance between the remote and their desired

location, the types of services provided at the persons' current location, hours of operation of the desired location and even how much time they have to safely cross the street. Because of the diversity of needs and wants, the ability to customize an EDO remote means that it will be capable of working specifically for the person it serves. Take again the example, of an individual who finds it difficult to reach out and press a current EDO buttons. If they have a hard time moving through an EDO before it closes, having a personal remote with them would eliminate that problem. In a scenario where a button is hard to find, or invisible, having a EDO remote which calculates distance and signals to the person that the door is open, would also solve this problem. As a supplementary tool the remotes would work alongside current accessible buttons rather than replacing them.

People will have the option of incorporating any combination of the following in EDO remotes:

- Tactile / Vibration Signals
- Auditory Signals
- Visual/ Coloured Signals

These sensory signals will be able to discretely inform the person using them. For example, an individual who is blind or partially blind could take advantage of a tactile signal through progressively faster pulsing vibrations from the remote. Suppose they are approaching a washroom. A likely scenario could involve the remote vibrating progressively faster as they approach ten meters, five meters, 2 meters and then the door. This information could be discretely passed on in the persons' hand, pocket or wrist. Similarly, auditory signals could also be discretely communicated through headphones or Bluetooth devices. The remote would also be able communicate whether the washroom

was occupied at the moment, out of order or if no EDO capabilities were found in that particular door.

Consider this next scenario. You wish to engage with the community but find it difficult to communicate your intentions or interpret those of others around you. Having an EDO remote with the ability to relay information through text or symbols may help you move through your environment and be more informed. Colour's can also help to communicate meaning. For example, if you approach an EDO that is locked having a small red signal to inform you of that could save you time and frustration. In the same way other colour's could signal that the door is malfunctioning, has restricted access or does not have EDO capabilities.

EDO remotes could also conceivably inform the person of much more than the working status of an electronic door. Consider the information available in the general area around EDO buttons. People accessing these come across building information such as the types of services offered, current promotions, or even if the owner is hiring; the possibilities are never-ending when the information is accessible. Unfortunately, much of that information will never be communicated because it is not delivered in a manner that is suitably to every person. By taking advantage of the physical position of EDO buttons at the entrances to restaurants, shops, churches, historic building, entertainment venues, educational facilities and more, most if not all of that information can be communicated. By adding a locations relevant information as a set of audio recordings or electronic texts, the EDO remote could be programmed in ways that increase environmental access. For example, if you are exploring a large university campus or downtown district and the

building signage is made in a way that you cannot clearly understand, having an EDO which can relay the building name and category could assist navigation by making you more informed. This type of EDO can encourage and facilitate physical access to community spaces may not otherwise have been explored.

Whether someone is unable to ask for assistance, or if they prefer not to engage with strangers, or if others are not capable of understanding them, EDO remotes could contribute to their access of information in the built environment. So much of the information present in the community is not shared with the disability community. A community that communicates poorly to people with diverse abilities can never be inclusive of them.

Conclusion

This relatively small scale project, was initial part of a larger ambition to realize a true opportunity for social inclusivity by developing infrastructure blueprints and working EDO remotes which could generalized from the micro environment (i.e., York University Keele Campus) to potentially nationwide implementation. However, due to my ever growing interest in the physical accessibility issues, I opted for developing research based in disabilities studies as opposed to a designing and building model, at this time. It was also important to have a design that did not impede on other accessibility methods that worked well, but rather the idea was to create a supplementary tool which added to the level of accessibility. Recognizing the problem of access as a systemic issue and not an individual or personal one, this project was consciously undertaken as an intermediary measure to adapt established EDOs in the built environment while

advocating for future environments where no such adaptations would be needed.

A key aspect of this project was to identify whether EDO accessibility could be improved upon by introducing EDO remotes to work alongside the push buttons. Through an accessibility audit of EDOs, this study identified their status at York University Keele campus as lacking the ability to provide reliable access to users in their current form. The audit highlighted several problems with EDOs on campus, including irregular opening and closing speeds and times, hard to reach push buttons, broken push buttons and, doors that only opened part way. The problems were encountered in each of the buildings visited during the audit which suggested other areas on campus may have similar problems. With this information the study went on to gather the perspectives of locale community members as to the viability and practicality of introducing EDO remotes. Given that the campus audit revealed many variations of EDO push buttons, each with unique problems, it was important to determine whether these posed challenges to advocates and members of the disability community. The evidence from the audit was presented to discussion participants, all of which supported the argument that current EDOs do not provide adequate accessibility. The round table discussions revealed that participants were cautiously optimistic about EDO remotes as a solution. Primarily, as expressed in excerpt #1, participants were concerned with the potential of being surveilled if they adopted an EDO remote. Surveillance in particular, provided the greatest cause for concern among participants, especially with regards to privacy, personal safety and social stigma. In order to address this issue, safe guards need to be put into place which oversee who produces the EDO remotes and maintains the system

through which it would operate. An ethics review committee would also be beneficial as a way of establishing a model which respects each user living together in the same social spaces. Nevertheless, surveillance is something that needs to be strongly pursued in the future research of the EDO remote before they could ethically be adopted throughout our society.

When discussing EDOs in relation to facilitating different people's mobility and lifestyle, participants all agreed that the remote had the potential to improve accessibility. With respect to the viability (i.e., can the design/tool actually function) and practicality (i.e., does the design/tool help people get around better in their daily lives) of introducing a multifunctional, multipurpose remote to facilitate EDO access, each individual's opinions contributed to the development of the designs and applications found in this study.

The advent of wireless and wearable technologies presents many new and exciting avenues to imagine the future of accessibility. I believe that these forms of technology offer the opportunity to bridge physical, cognitive and emotional gaps created within the built environment and that actively marginalize people. For example, voice and video calling as well as instant messaging programs allow individuals and groups to communicate in real-time regardless of the physical distance between them in space. Internet forums and dating sites allow for people to share interests and connect on an emotional level across the globe. Mobility is no longer strictly contingent on one's ability to be physiologically mobile[43] but rather in their abilities to access and manipulate

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[43] i.e. physically move through space using leverage between one's muscles and bones.

technology-based software programs. Although these technological methods for access still require a degree of physical[44] financial[45], academic[46] and gender privilege[47][48], they move many of us a lot closure to each other than we could have thought possible even 25 years ago[49]. I believe that analysis of technological solutions relating to the embodied access of individuals in the disability community requires first and foremost a thorough understanding of those bodies through a critical disability perspective in order to better understand and explore the requirements for environmental change. The idea is that the future of accessibility will likely involve an even greater interactive partnership between humans and technology[50].

I want to encourage the reader to feel comfortable and safe in imagining moving around private and public spaces in whatever way works for them. Consider the environment is malleable to your will and it, not you, is the focal point of change. Freedom to imagine an environment should not be an outrageous concept. After all, as societies we are constantly shaping the world around us, so why not do it from a disability perspective?

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[44] Having the ability to manipulate one's own body and the environment

[45] Having the ability to afford technological applications and products.

[46] Having the cognitive ability to use existing technologies which can often be complex and intellectually biased

[47] Having the opportunity to living among culturally accepting members who recognize a level of equity between genders and gender choice.

[48] Privilege does not imply a value hierarchy between the items listed and those that are not. The word privilege comes into play out of the current state in which we find most of the build environment. In this instance the built environment forms the bases of discussion and only it (the build environment) is responsible from creating any distinction between what is privileged and what is not.

[49] I use 25 years ago in my example because it was a little over 25 years ago when in 1990 Tim Berners invented the World Wide Web (Andrews, 2013).

[50] At this time, I feel compelled to encourage the reader to be open to the idea that being human is not contingent on one's proximity to accessible devices and by extension neither should their perception be in the social ethos. The battle for social equality will depend upon consistent vigilance to promote and protect human value regardless of individual involvement with the use of adaptive technology.

Future Research

Overall the round table revealed much initial speculation as described through the four major themes. Although the subsequent discussion satisfied most of the groups concerns, everyone agreed that more needed to be done before anyone could see widespread EDO remotes becoming a reality. An EDO remotes functional potential (as described herein) was generally well received by members of the round table. Despite concerns regarding how the remote would affect privacy, stigma, security and abuse members where very optimistic of the devices potential to facilitate access.

In light of support for such a project, there were still many unanswered questions which need to be worked out first. There was some concern about who would pay for such a device, who would profit and how much they would cost? Given that a large portion of the disability population are unemployed, having to pay out of pocket for such a device could make it inaccessible. Even if the product were subsidized by a government agency, there are questions about who would be approved, how they would be approved and by whom? Some suggested there could be a governmental concern with people abusing the system to attain free remotes to the extent that a gate keeper may need to be implemented. In that case we must also consider whether establishing a gate keeper would create an ethical dilemma around who gets access and why? If EDO remotes are shown to significantly improve accessibility than would denying someone the opportunity to use them be equivalent to denying them a human right?

Aside from the product cost there is also the issue of navigating the political processes required to approve the installation of a system of remote receivers into all

applicable buttons. A consideration must be made for private sector businesses and employers regarding their role in complying with new methods should remotes be approved (for a more detailed description of private sector perspective on accessibility reference, *"Americans with Disabilities Act: Undue hardship for private sector employers?"* by Kelly, & Alberts, 1990). Getting through all of these obstacles would require more quantitative evidence of the benefits such a device would have. One thing is for sure, if the idea is to be developed any further, more people who use EDOs would need to approve the basic concept to establish its popularity and, agree to participate in systematic trials to perfect its application.

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Appendices

Appendix A1: Round Table Outline

The main goal of these round tables was to understand, explain and explore the influence of the built environment on individual's social experiences and how those experiences would be improved by an EDO remote.

Round Table Discussion Program

3:00 pm	Arrival
3:05	Greeting and Researcher Introduction
3:10	Informed Consent and Confidentiality
3:15	Brief Member Introductions
3:25	General Discussion
4:30	Ten-minute food and washroom break
4:40	Discussion continued
5:30	Researcher contact information and Thank you message
5:45	Discussion finished

Total meeting time: 2 hour and 37 minutes

Total members: 8

Each participant was invited to receive follow-up information about future research and developments by contacting me via email at jason01@yorku.ca

Appendix A2: Introductory Script

"Hello everyone, my name is Jason Ferreirinha. Just to tell you a little bit about myself, I prefer the pronouns he, him or his. I am 26 years old and in my other life I am a contractor, soccer fanatic, and personal support worker. Having worked on numerous construction projects over the past nine years, I have been able to gather an appreciation for the way accessibility can be implemented. My experiences have helped to inform my understanding of these processes and their unique challenges in providing adequate access to every 'body'.

I want to thank each and every one of you for taking time out of your day to share in this study with me. One of the central aspects of my program is to apply a critical lens to social and cultural phenomenon and ask questions like why they exist? Who do they benefit? And what can be done to expand those benefits to all bodies equally?

The concept of embodied diversity is especially fascinating to me in my role as a contractor. I have worked along side my father for many years and it only recently occurred to me just how big a role the built environment plays in determining not only physical access, but also all of the benefits that come with physical access such as lived experience, social capital, academic, professional, occupational and vocational experience and fulfillment. Many of the things which are socially valued have there start in just showing up and being present.

But what if the manner in which you able to be present is itself inherently discriminatory and othering? What being physically present in a space evokes a sense of

accommodation our undue hardship from those around you? Would that constitute

access in the broadest sense of the word?

The reason I have gathered you all here today is because I believe that there are

access solutions available with the potential to bring about true social inclusion and

access. If we can adapt and create environments that respond to every "body" equally,

then we can relieve ourselves of current discriminatory normatives and embrace a space

that recognize inherent value in all.

Debriefing Statement

"The purpose of this research was to bring attention to environmental

discrimination towards embodied diversity and to use first person accounts to try and

understand this relational process. Thanks to your participation I will be able to apply

multiple perspectives to the problem of access on the York University Keele campus and

potential Toronto in general.

The findings could potentially lead to the future study and/or implementation of

access models that are representative of all people. I encourage anyone who is interested

in any subsequent projects to please fill in your name and contact information at the

bottom of your pamphlet. In keeping with our emancipatory research goals we want to

stay in touch and foster our relationship in future studies, scholarships or business

ventures that may ensue.

Thank you all again for sharing your time and opinions. I really appreciate you

being a part of this journey!

Appendix B: Informed Consent for Round Table Discussion

Researchers: This study is being conducted by Jason Ferreirinha under the supervision of Professor nancy halifax, and Professor Melanie Baljko.

Purpose of the Research: You are being asked to participate in a round table. We hope to learn more about ways the built environment can be improved to respond respectfully and effectively to all bodies.

What you will be Asked to do in the Research: As a participant in this research you will be asked to participate in group sessions to discuss possible solutions to improve accessibility in the built environment. A particular focus will be given to improving accessible doors.

Risks and Discomforts: There are no risks in participating in this research beyond those experienced in everyday life.

Benefits of the Research and Benefits to You: You may not benefit personally from participation in this study. However, the information obtained may be helpful to advancing environmental designs to a state of equal inclusion for all people regardless of ability.

Voluntary Participation: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future. You may refrain from answering any question you prefer not to answer.

Withdrawal from the Study: You can stop participating in the round table at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, York University, or any other group associated with this project.

Confidentiality: All information you supply during the research will be held in confidence and your name will not appear in any report or publication of the research. Your data will be safely stored in a locked facility and only I and my supervisor will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

Questions about the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Professor nancy halifax either by e-mail at: nhalifax@yorku.ca.). The proposal of this research has been reviewed and approved by the Ethics Review Committee of Critical Disability Studies Graduate Program and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Critical Disability Studies Graduate Program Office (Tel: 416-736-2100 extension 44494; Email: gradcds@yorku.ca).

Legal Rights and Signatures:

I _____, consent to participate in *Accessorizing Accessibility* conducted by *Jason Ferreirinha.* I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form; however, I understand that unless I provide a "fake name" as below, I am waiving the right to be anonymous in any report or publication of the research. My signature below indicates my consent.

To be filled out by the Participant: **To be filled out by the Principal Investigator:**

_____   _____
Name of Participant   **Name of Principal Investigator**

_____   _____
Signature of Participant   **Signature of Principal Investigator**

_____   _____
Participant's "fake name" (please print)   **Date**

_____
Date

Informed Consent for Accessorizing Accessibility Round Table Discussion

Researchers: This study is being conducted by Jason Ferreirinha under the supervision of Professor_____, and advisor Professor_____.

Purpose of the Research: You are being asked to participate in a research study. We hope to learn more about _____

_____.

What you will be Asked to do in the Research: As a participant in this research you will be asked to participate in group sessions to discuss possible solutions to improve accessibility in the built environment. A particular focus will be given to improving accessible doors.

Risks and Discomforts: There are no risks in participating in this research beyond those experienced in everyday life.

Benefits of the Research and Benefits to You: You may not benefit personally from participation in this study. However, the information obtained may be helpful to individuals considering volunteering in the future. In

appreciate for your time, you may select a chocolate and enter into a draw for one of six Tim Horton's gift cards.

Voluntary Participation: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future. You may leave unanswered any question you prefer not to answer.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed.

Confidentiality: All information you supply during the research will be held in confidence and your name will not appear in any report or publication of the research. Your data will be safely stored in a locked facility and only I and my supervisor will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

Questions about the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Dr. _____ either by telephone at (416) 736-2100, extension 123456 or by e-mail (_____@yorku.ca). This research has been approved by the Ethics Committee of the Department of Psychology, York University, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ consent to participate in the _____ _____ study conducted by Jason Ferreirinha. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____**Date**_____
              Participant

Signature_____   **Date**_____
              Researcher

Appendix D: Accessories

The following is a list of EDO remotes concepts made to work alone or together with conventional mobility aids.

1) Key Model
2) Pad Model
3) Switch Model
4) Smart Phone, Tablet and Smart Watch App Model
5) Fixed Model

The following is a list of mobility aids that can theoretical be made to incorporate an EDO remote control.

1) Cane
2) White Cane
3) Wheelchair
4) Walker
5) Stroller
6) Mechanized Wheelchair
7) Shoulder Crutches
8) Forearm crutches
9) Walker Cane Hybrid
10) Gait Trainer
11) Scooter
12) Stair lift
13) Elevator
14) Knee Scooter
15) Service Animal

Note: every item identified in the search for this list was found to be compatible with our concept of remote technology. If you find that there are any mobility aids not listed here that could potential be adapted with an EDO remote, please kindly inform me so that I may access its compatibility. My email address is jason01@yorku.ca. Thank you.)

Appendix D: Accessories

1) Key Model
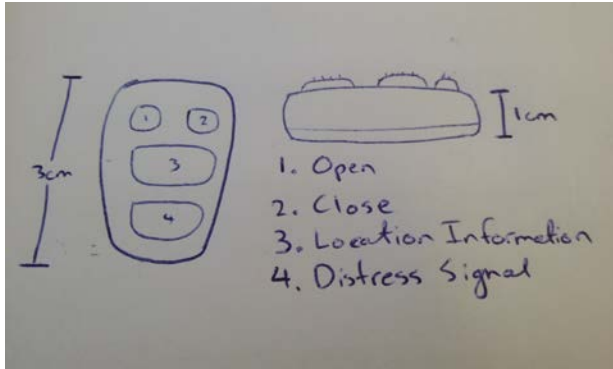
The first imagine shows an EDO remote concept that resembles an electronic car key. On the left there is a frontal view and on the right a profile view. This model has four buttons. One for opening another for closing, a third for location information and a fourth which emits a distress signal which the individual can have customized. The size is three centimeter (cm) long, 2 cm wide and one cm high.

The second image on the left shows a more simplified version of the car key concept. There is a door open button, hazard/distress button, rubberized grip along the sides and front, and a raised piece of silicone rubber outlining the button to make them more easily identifiable.

2) Pad Model

The following image (above) shows a EDO remote resembling a computer mouse pad. The pad is flat except for a raised area for which to comfortably during use. Spread across the pad from top left to right are the open and close sensors. Below these from left to right is the location information sensor and the distress signal sensor. Other concepts could include a screen for text to increase its accessibility. On the far right of the image is a profile view of the EDO pad.

3) Switch Model
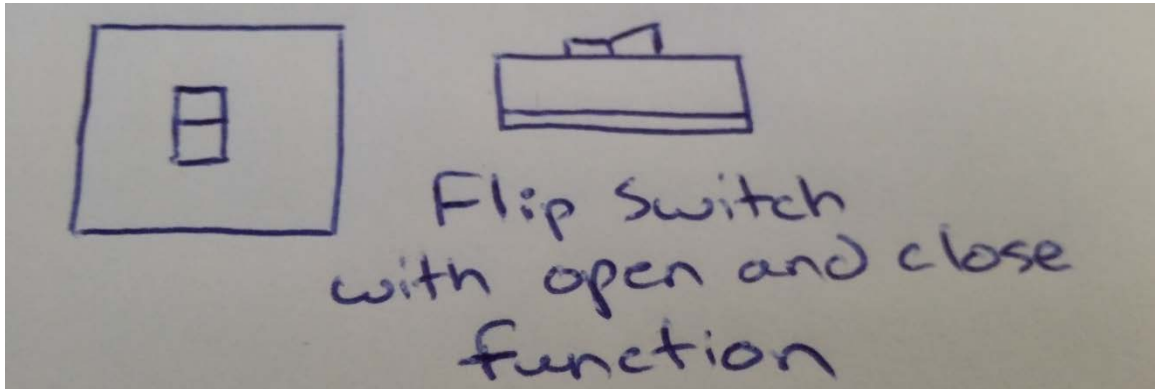
This image shows an EDO concept flip switch. On the left the switch is present in a forward view and to the left in a profile view. The switch is a raised square box with a switch in the center resembling a light switch. This button provides only open and close functions but can be place conveniently on scooters and wheelchairs for example, without occupying large amounts of space.

4) Smart Phone, Tablet and Smart Watch App Model

This image shows a drawing of a Smart Phone on the left and the title Smart Phone Application (app) on the right. As most smart phones already come with built in wireless and remote capabilities, an app could theoretically be made to make use of these functions with EDOs. The range of possibilities for an app are vast and could be made to work together with emergency services, location information, social networking and more. The possibilities are very encouraging yet there is still the question of financial and intellectual accessibility with this concept.

5) Joy Stick Model

This image shows two concepts for an EDO Remote joy stick. The model on the left is slightly thicker and has grooves to facilitate gripping. The image on the left has a thin cylindrical shaft with a rounded ball top. These remotes could work my assigning direction to function. For example, pushing the stick to the right could open a door while pushing forward may signal to close it. These functions could be unique to each persons' ability thereby increasing the accessibility.

6) Clamp on Remote
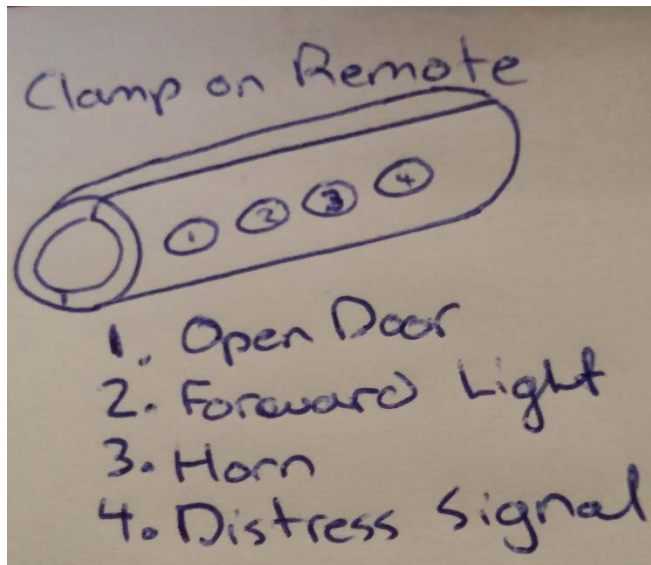
The following two images show concept drawings of EDO remotes which can clamp on to various mobility devices.

The first image on the left shows a cylindrical tube with four buttons along one side. In order the buttons can, open an EDO door, shine a forward facing light, signal to people nearby that they are obstructing one's path and lastly a distress signal.
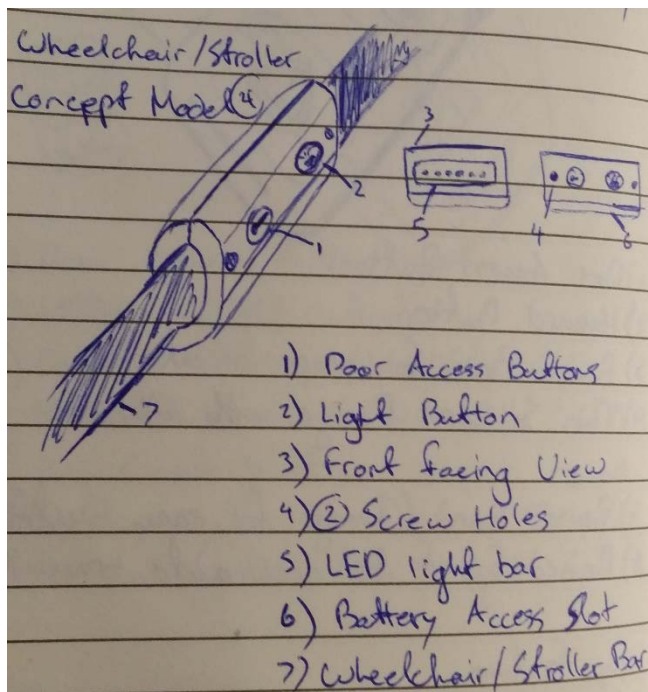
In the second concept the functions are the same but they are incorporated differently. For example, the front panel now only includes two buttons (door opening and light buttons) in order to accommodate the screws which secure the model in place. There is still a light which can be accessed from the front. This model would be battery powered and capable of fitting on wheelchairs, strollers, white canes, shoulder and fore arm crutches and potentially much more.

Appendix E1: Advertising Personal Support Services

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— Colin C., Client

"It is wonderful to work with a locally based company. I am delighted to have a caring PSW come to my home each day."
— Carol, Client

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- Personal Care Assistance
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- Companionship
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- Respite & Palliative Care

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Enjoy the freedom of your home while getting the help you need. That's the service we promise you. Sometimes just a little bit of help can make a big difference.

Making it easy for you

Asking for the help you need is a simple process with Premier Homecare Services. Whether you or a loved one need support right away or are just thinking about adding some help, together we can establish what's best for your needs, be it in a private home, retirement facility, nursing home or hospital.

- No Obligation, free in-home consultation
- Flexible schedules, customized with you in mind
- Available anytime 24 hours a day, 7 days a week
- Personalized one-on-one care provided by bonded and insured PSW's

Appendix E2: Living Assistance Services

Appendix F1: EDOs at York: Accessibility Audit of York Univ. Keele Campus

Figure 2. Panorama of the Student Centre (Above)

This is a panoramic photograph at the main entrance of the student centre. From left to right there is a glass wall with two doors leading out into a three story atrium. Two university organizations are adjacent to the main entrance before reaching a circular pillar. Beyond the pillar there is a circular staircase leading to the upper floors. Across the hall there are several steps leading to a raised seating area before the image ends at the glass walled entrance on the opposite side of the building. Although this is a central area for university groups and political movements not to mention one of the few which serve food there is little to no signage to help with accessibility. The main public service elevator, which is located out of sight through a narrow corridor behind the first pillar when looking from left to right, is hard to find and tucked away out of sight.

Note; To better view the photo graph please save and open with your default image program for increased zoom and focus.

Figure 3 (Left)

This image shows a thin EDO box with a red button at its centre located just above the middle point in the image. From left to right in the image you have an angled view of the door, the corner where the Edo is tucked in and the brick wall jetting out towards the viewer. A maintenance plaque is also present at the same height as the EDO, on the right side of the image. The EDO itself is wedged so tightly in the 90-degree angle between the door and the wall that it is difficult to reach.

Figure 4 (Left)

This image shows a door on the left and another type of EDO push button near the centre. This time the EDO is a slightly larger rectangular box (about the same size as a regular single lighting switch box) with a blue button protruding out its centre. In order from top to bottom in the centre of this photograph you will find a large over hanging fire alarm enclosed in a bulky clear plastic box, the EDO, and then a flat square plaque with a wheel chair symbol. It is worth noting that from the angle the photo was taken almost half of the plaque and about one quarter of the EDO are obstructed from view. This EDO presents a unique challenge for it users in that they must be able to reach it at just over two feet off the ground while moving underneath the fire alarm which effectively blocks it from above.

Figure 5 (Left)

This is an image of the first pillar identified in the panoramic image of figure. 1. In the centre is a close up of the post with a square push button version of the EDO in the centre with a wheelchair symbol embossed in blue. The pillar stands alone in the centre of an entrance foyer with no obvious attachment to any section of the surrounding area. This means that the EDO cannot be easily perceived to service any of the three doors which are in the same general area.

Figure 6 (Left)
This image depicts a second floor washroom view from the inside. From left to right are the washroom sink, push down paper towel dispenser (slightly raised on the wall, large circular garbage disposal (half of which is directly under the towel dispenser), an advertisement plaque in the centre of the wall with three people smiling with the title, "we've got this" above their heads, followed by the only entrance door and large square EDO. The paper towels are obstructed and the garbage blocks the door from opening fully.

Figure 7 (Below)
Another washroom in the student centre with a similar issue. In this image from left to right there is a push bar liquid soap dispenser on a block wall about a foot and a half above the counter on the which has one single in the centre. To the extreme far left of the counter; there is a push down paper towel dispenser. Underneath that an also blocking half of the counter and sink access space is a cylindrical metal garbage disposal bin.

Figure 8 (Above)

From left to right in this image is the inside of the door, a dispenser for female hygiene products raised on the wall beside a push down paper towel dispenser (also raised on the wall). Directly underneath the towel dispenser is the same circular garbage disposal. Directly in front from the photo perspective is a single sink and counter. The garbage disposal can be seen blocking access to half of it. This washroom is problematic because this washroom EDO functioned from the outside but not from the inside and could easily trap someone inside.

Figure 9 (Right)

From left to right, there is a pillar with a garbage bin adjacent. A short distance away in the room there is a wall mounted water fountain beside a washroom door on the right of the picture. Despite having several signs indicating it is equipped with an EDO there is no sign of one. The EDO is hidden from view as you approach the door. Being located on the back side of the post, an individual would need to circle around a narrow gap in order to find the EDO button and eventually access the door.

Figure 10 (Above) This doorway has a small EDO button on the extreme left of the photo. From left to right, there is an Edo located about two and a half feet off the ground. In front of the panel wall, slightly of center is a pillar followed by two glass doors. The glass wall continues after the glass doors until the photo ends on the right. The left door (photo perspective) swings outward towards the area where the pillar is located blocking the user from a direct path between the Edo and the opening. The door begins to close after 11 seconds making it even more difficult to access.


Figure 11 (Left)

This is a photo close up of an EDO post outside the transit terminal. The EDO button is hanging on by live wires which are expose to the elements. As if that wasn't enough it now appears to double as a garbage bin.

Close inspection behind the round EDO push button reveals the edges of a candy bar rapper. This EDO now doubles as a garbage disposal.

Figure 12 (Above) This is a close up of the floor under an EDO door made of loose set stone blocks. In the photo either side differ by about 2 inches in height. Zero clearance is a must for all doorways and entrances yet here we have a 2-inch gap.
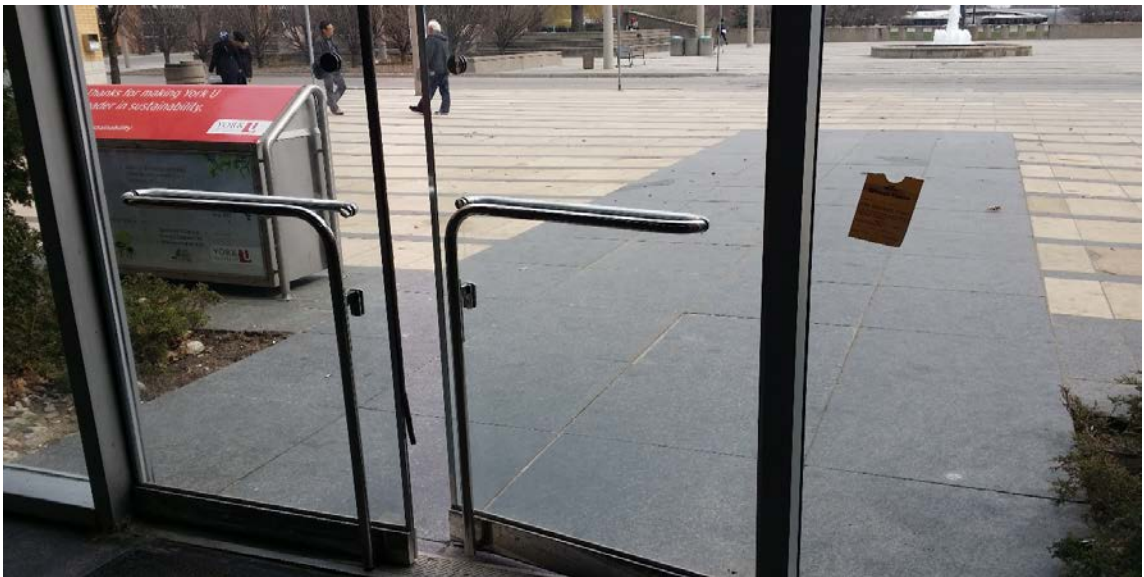
Figure 13 (Above) From left to right this image is a view from the inside looking out through two glass doors in Vari Hall. The door on the left is closed while the on the right is in the process of closing. Beside that is a glass wall panel with a Wheel-Trans memo affixed to it informing someone they were late. These are the iconic Vari Hall entrance seen on several university ad's does not have an EDO despite being the designated TTC Wheel-trans pick up and waiting area.

Figure 14 (Below) This image of the iconic Vari Hall entrance seen on university commercials and propaganda shows a poll with three signs (One university and two public transit signs) indicating that the waiting area is through the same Vari Hall entrance not equipped with an EDO. The signs are all relatively small and between 5 and 9 feet of the ground as well as without braille. There are two buildings which are of in the distance behind the pillar.

Figure 15 (Below)

From left to right there is a hall way that stops at the corner wall located in the center of the photo. The central wall has a red button Edo at the center and a maintenance plaque slightly above it and to the left. To the right of the Edo the wall continues as a glass partition. This particular EDO did not function at all.

Figure 16 (Below)

From left to right there are five doors lining the ends of two converging corridors. They meet at a 90-degree angle at the south west corner of the building. The EDO on the right of the photograph (distinguishable by a circular yellow signage on glass portion of the door) is located on the extreme right of the photo about two feet off the ground.

Appendix G: Seven Components of Universal Design

Equitable use; concerned with providing the same means of use for all users with a particular focus on avoiding any forms of segregation. An example would be designs which are not constrained to one particular method and appeal to all users.

Flexibility in use; implies the design must be able to accommodate a wide range of individual characteristics and abilities without impeding on others. This can include incorporating various choices which still achieve the same end such as elevators and escalators in the main sections of buildings.

Simple and intuitive use; concerned with intellectual accessibility through the elimination of all unnecessary complexities. For example, using an element of consistency across designs of a similar structure could potential facilitate the usability of an environment and decrees levels of anxiety.

Perceptible information; refers to the use of multiple modes (pictorial, verbal, tactile, olfactory) of communication from the environment to each user. For example, insuring adequate contrasts between red emergency buttons and red accessible door buttons can make it safer and easier for people to access various parts of the community.

Tolerance for error; attempts to minimize the potential for adverse consequences due to accidental or unintended actions. For example, one could potentially minimize the chances that someone could over exert themselves while using a ramp or staircase by using height appropriate railing and a roof covering.

Low physical effort; insuring the comfortable use of a space without requiring the individual to exert strenuous amounts of physical force. For example, limiting the amount

of force required to move aside a door by installing appropriate ball bearing hinges that swivel with minimal resistance.

Size and space for approach and use; gives consideration both the individuals body and the space their in and the full range of actions possible in that space. For example, when designing the layout of a washroom, consideration should be given to each stage (i.e. from the initial approach to and operation/use of the facilities and then again to departure (Lusher & Mace, 1989).