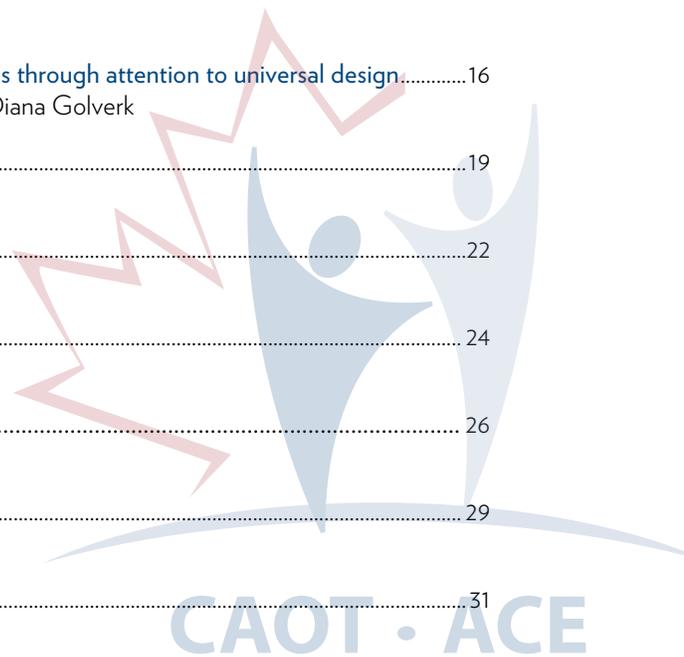


Table of Contents

Evolution of universal design in the context of occupational therapy practice.....	3
Lili Liu	
The relevance and application of universal design in occupational therapy practice.....	5
Liz Ainsworth and Desleigh de Jonge	
Pebbles in the stream: The ripple effect of long-term collaboration to promote universal design in homes and communities of Newfoundland and Labrador.....	8
Shelley Di-Nur	
Resources.....	9
Opening the door one lever handle at a time.....	10
Shelley Thompson	
The journey to becoming a universal design occupational therapist.....	11
Shelley Thompson	
The role of occupational therapists in universal design research.....	13
James Lenker and Brittany Perez	
Promoting accessible physical environments in post-secondary school settings through attention to universal design.....	16
Lisa Klingler, Brittany Moore, Nina Berardi, Erin Miller, Nathania Lukman and Diana Golverk	
The Ottawa Accessibility Scale.....	19
Paulette Guitard and Alex Priest-Brown	
Universal design for learning: What occupational therapy can contribute.....	22
Bethan Collins	
Getting to universal design for the public play space.....	24
Kim Sanderson	
Universal design: A consumer's perspective.....	26
Peter Faid	
Universal housing design and home modification practice in Australia.....	29
Liz Ainsworth and Desleigh de Jonge	
Update from the Canadian Occupational Therapy Foundation.....	31



The intention of this special issue of *Occupational Therapy Now* is to provide a broad audience, including occupational therapists, health professionals, clients, policy makers, the general public and other stakeholders, with information on the role of occupational therapy in universal design.

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Cover image: Public splash pad in Ottawa, Ontario, that accommodates users with physical or sensory impairments. The water is turned on by a light-touch switch that is built into and flush with the walkway.

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Evolution of universal design in the context of occupational therapy practice

Lili Liu

Universal design refers to “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Mace, 2014, para. 2).

Nearly two decades ago, three years after I joined the University of Alberta in 1992, I was approached by an instructor in the Division of Industrial Design to bring together occupational and physical therapy students to collaborate with industrial design students to submit entries to the American Geriatrics Society’s Design for Aging Contest. What began as an optional class project for occupational and physical therapy students in a course on aging, evolved into several years of recognition for our students’ entries that received gold, silver, bronze and honorable mention. After 2001, funding declined and the contest was discontinued. But the universal design bug had bit the instructors. We knew that the collaboration between occupational therapy (physical therapy students no longer took the course with occupational therapy students) and industrial design students was a “winning combination.” We began studying why our designs were so successful. Students were intrigued that both disciplines used the word “function,” yet the concept was applied differently. They developed an appreciation and respect for what each could contribute to addressing the needs of older adults in their environments. This was before interprofessional education became a focus for educational researchers.

I observe that it is only in approximately the past five years that the concept of universal design has entered our common vocabulary. Every year, when I ask a class of more than 100 occupational therapy students whether or not they have heard of universal design, more students raise their hands. In the past two years, more newly graduated occupational therapists than ever have contacted me to seek guidance in incorporating universal design into their practice. Some have pursued post-graduate training in courses or programs in the United States or United Kingdom. Indeed, within Edmonton, one occupational therapist has created a universal design interest group (see Thompson’s article on p. 11).

This special issue of *Occupational Therapy Now* received a large number of worthy submissions, more than we could include. This reinforces for me that, indeed, universal design is part of the common vocabulary of our practice. What is it about universal design that occupational therapists have a

strong affiliation to? I would suggest that the value of taking into consideration the (1) needs of a client and his or her social environment, (2) potential to remove stigma, and (3) power of esthetics in engaging a client contribute to the appeal. The seven principles of universal design (see Lenker & Perez on p. 13) give occupational therapists a broader scope to examine “accessibility” without segregating the client with separate features only they will make use of. As Ainsworth and DeJong describe in the first article of this issue, universal design principles fit well with the occupational therapy scope of practice (see p. 5).

While universal design may be more commonly understood among practitioners, what about the clients and communities that occupational therapists work with? Do they understand universal design? My observation has been that it is not as well understood, or it is commonly equated with “accessible” design. It is a challenge to describe accessibility as a subset of universal design. The tendency is for people to seek or create standards to determine whether or not a product or environment is categorized as universal design. I experienced this dilemma when I served on the Canadian Standards Association’s (CSA) committee on the B659-01 *Design for Aging guideline* (2001; now replaced by B659-08 *Inclusive Design for an Aging Population* [2008]). After considerable discussion, it was agreed that standards could *not* be applied to principles related to universal design. Standards are minimum requirements, and as such, they restrict the need to consider better options. Frequently, I preface the definition of universal design by saying that it goes beyond minimum standards. Universal design refers to a set of principles that *strive* to accommodate the needs of people other than just the client. At the same time, universal design does not profess to accommodate everyone’s needs. Thus, a house that incorporates universal design principles is not assumed to be a single floor bungalow, provided that users can access the other floors if necessary, for example, by using an elevator.

The CSA’s *Inclusive Design for an Aging Population* guidelines (2008) are aligned with universal design, a term that is not used in the guidelines. The document incorporated a focus on service that does not exist in the seven principles of universal design, which focus on products and environment. Recently, the concept of universal design for learning has emerged as a way to examine how universal design principles can be applied to a service (see Collins’ article on p. 22).

Another evolution of universal design has been the

“visitability” movement. Visitability refers to three features of a home that make it accessible to anyone: (1) a no-step entrance at the front, side or back of the house, (2) wide doorways and clear passage, and (3) an accessible main floor bathroom (VisitAble Housing Canada, 2014b). In 2013, the Canadian Centre on Disability Studies (CCDS) launched the *Collaborative Knowledge Building and Action for VisitAble Housing in Canadian Cities Project*, also known as the “VisitAbility Project” (VisitAble Housing Canada, 2014a). This funded three-year national initiative aims to increase understanding and awareness of visitable housing, and to promote visitable housing among buyers, builders, policy-makers and other stakeholders. For some, a focus on the housing stock through visitability criteria is a way to contain universal design for clients and builders. However, the three basic features of visitable homes are not as straightforward as they appear. For example, as a member of the Edmonton task force, I have witnessed countless hours of discourse about how to promote no-step entrances in new homes. We have recognized the importance of land developers in relation to this issue, prior to the design of a home, because successful no-step entrance design relies on a well-designed drainage system. Keep in mind when associating visitability with universal design that visitability focuses on accessibility of individuals with mobility impairments. Universal design principles, on the other hand, include other human factor issues such as sensory and cognitive functions.

Occupational therapy has evolved with evidence-based health care; our Canadian graduates are trained at the masters level and they are consumers of research in their practice. Universal design has also evolved over the years; the seven principles now have accompanying evaluation tools for consumers (The Centre for Universal Design, 2002) and for practitioners (The Centre for Universal Design, 2003). While these tools may appeal to practitioners seeking ways to measure “usability” of a product or environment, the reader is cautioned that these tools are only based on the universal design principles as described by Ron Mace. From a research perspective, these principles have yet to be examined from the perspectives of usability theories. Nevertheless, much research is being conducted on subsets of universal design and this presents opportunities for occupational therapist researchers (see Lenker & Perez’s article on p. 13). Examples of measures of accessibility, a subset of universal design, are presented by Klinger et al. (p. 16), and Guitard and Priest-Brown (p. 19) in this issue.

With evidence and practice experience, occupational therapists can participate in legislation and policy-making. The articles by Dinur (p. 8) and Ainsworth and deJong (p. 29) present perspectives on this topic from Canada and Australia, respectively. Sanderson’s article (p. 24) presents a policy-maker’s perspective as well as a description of local leadership that resulted in guidelines being adopted at the national level.

I began this editorial with my own introduction to universal design two decades ago. Since then, my passion for the concept has grown and so has the interprofessional collaboration that, in addition to industrial design, now includes computing science, pharmacy, architecture and engineering. However, I believe that the most important expert is the consumer because, in the end, it is the consumer who knows what works best for him or her. As an occupational therapist, I may work with experts from other disciplines, but I always learn from my clients. I hope that the reader will find Faid’s article (p. 26) valuable for this reason.

My final message is that universal design can be found anywhere, and existed before Ron Mace coined the term. Long before the controversy over lever door handles (see Thompson’s article on p. 10) in Vancouver, the famous Spanish architect Antoni Gaudi designed his elegant ergonomic lever handles and door knobs molded to his grip. Tourists buy them now for their esthetic value; the fact that they are functional is just a bonus. If we are observant, we can identify products and environments all around us that have universal design features.

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The relevance and application of universal design in occupational therapy practice

Liz Ainsworth and Desleigh de Jonge

Occupational therapists, with their understanding of the interaction of people, their occupations (the activities or tasks that they complete) and the various environments in which they operate (e.g., home, work), are skilled in providing advice on home modifications and new domestic design to older adults and people with a disability who wish to remain living in their own homes and communities. This article discusses emerging architectural design trends that are influencing occupational therapy practice, and the value and application of these to home modification and domestic home design. Examples are provided to illustrate the outcomes that can be achieved using good design principles to support the diversity of human performance.

Aging populations, and the anticipated increase in health-care and caregiver costs, are creating concern for governments. There is an emphasis on providing care in the home rather than in hospital and long-term care settings. Occupational therapists have expertise in enabling people to remain actively engaged in valued roles and meaningful occupations in the family home, while also supporting carers. The family home is a unique private space that reflects the lifestyle of household members and their aspirations for the future — it can make a statement to the community. It provides occupational opportunities, freedom and a lifestyle that enables people to enjoy being at home (de Jonge, Jones, Phillips, & Chung, 2010). Consequently, a range of occupational therapy interventions are focused on and provided within the home (de Jonge, Jones, Phillips, & Chung, 2010).

Traditional housing design does not cater to people as they age or acquire a disability. Various design approaches have emerged over time (see Figure 1) as society has moved from a medical model of disability (i.e., having a focus on illness, disease and the individual's limitations, as well as ways to reduce those impairments or use adaptive technology) to embracing the social model of disability (i.e., seeing disability as the result of the interaction among people living with impairments and physical, attitudinal, communication and social barriers in the environment) to address barriers encountered within the home. These design approaches include:

- Purpose-built design, which tailors domestic design to the specific needs and conditions of an individual or a group of individuals, with a focus on mobility, wheelchair access,

and fixtures and pieces of equipment or furniture that are permanently fixed in place and noticeable.

- Accessible design, which draws on information from public access standards that provide designs based on minimum specifications for independent adult wheelchair users requiring access to and within public buildings. This approach has resulted in homes being oversized, clinical and inelegant with little consideration for a diversity of users.
- Adaptable design, which emphasises environmental features in a home that can be adapted over time using unskilled labour to suit the changing needs of a broad range of users of all ages and abilities. This approach has resulted in homes designed to be usable by and marketable to people of all ages and abilities who want to reside in the home over the lifespan of that dwelling. Designs continue to remain centred around the access requirements of people, but tend to be more elegant than other design approaches.
- VISIBLE design, which includes design features to provide access to and circulation within specific areas of the home, enabling a person with a mobility impairment to visit the home, thus promoting greater social integration and mobility of people within communities.

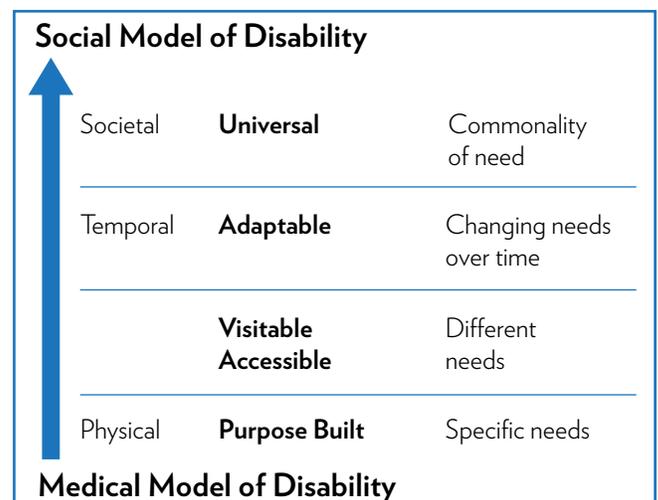


Figure 1. Design through the ages.

The most recent approach embraced by designers is universal design (UD), originally defined as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Mace, 2008, para. 1). UD is based on a set of principles to guide the development, design or selection of products and environments. Similar design concepts have emerged in Europe, using terms such as “design for all,” advocating “design for human diversity, social inclusion and equality” (Design for All Europe, 2008, para. 1). In the United Kingdom, the term “inclusive design” is used to describe “the design of mainstream products or services that are accessible to, and usable by, as many people as reasonably possible ... without the need for specialized adaptation or specialized design” (British Standards Institute, 2005, p. 4). Most recently in the United Kingdom, the term “universalising design” has been developed to describe an evolutionary process leading to greater inclusion of people in society over time (Imrie, 2014). The value of UD has been captured in the most recent definition developed in the United States, that indicates that it “is a process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation” (Steinfeld & Maisel, 2012, p. 29). This definition shifts the focus to using outcomes to direct the development or selection of products or designs.

UD is often naively confused with accessibility, adaptability and visitability. However, rather than to suggest designing to particular access specifications, it emphasises usability and inclusivity. UD requires a fundamental shift in thinking, away from focusing on removing environmental barriers to instead designing to ensure inclusion of all people to the greatest possible extent, regardless of age or ability (Connell & Sanford, 1999). In the design of products and buildings, UD requires:

- An understanding of the broad range of human abilities.
- An appreciation of changes that occur across the lifespan.
- A creative approach to design.
- Consideration of shape, adjustability and placement of features.

Occupational therapists’ expertise complements the development and application of UD in four ways. First, knowledge of the diversity of human performance and the impact of health conditions, disability and aging enables occupational therapists to move beyond a “one size fits all” approach, and instead tailor solutions to anticipate the needs of current and future users (de Jonge, 2011). Second, occupational therapists’ understanding of occupational performance (the ability to perceive, desire, recall, plan and carry out roles, routines, tasks and subtasks for the purpose of self-maintenance, productivity, leisure and rest in response to demands of the internal and external environment [Ranka & Chapparo, 1997]) and the role of the environment in supporting and promoting performance enables them to develop contextually appropriate solutions (Ainsworth & de Jonge, 2006). This includes recognizing the range of ways an

occupation is undertaken by various residents and the range of occupations that need to be supported in areas of the home. Third, occupational therapists’ understanding of the home as a unique and personal haven (de Jonge, Jones, Phillips, & Chung, 2010) allows them to carefully and sensitively develop solutions that support the person’s connection with the home and acknowledge the history and future use of the home (Aplin, de Jonge, & Gustafsson, 2013). Finally, occupational therapists’ understanding of the person, occupation, environment and the transaction among these factors enables them to review products and design solutions in terms of usability to all and inform future inclusive design (de Jonge, 2011).

Occupational therapists have adopted the UD approach within home modification practice to create environments that look homelike, elegant and appealing to all users within the household. The design approach has been important in ensuring solutions are usable, safe and attractive, as well as less noticeable than specialized options. UD principles have been used by occupational therapists as the starting point for creating a range of supportive environments for people with physical, sensory and cognitive impairments, older adults and individuals with mental health issues.

The breadth of application of UD within occupational therapy practice is reflected in the following examples:

- The design and modification of environments to create wider doorways and hallways for a person using a wheelchair in the bariatric range or requiring caregiver assistance.
- The inclusion of a height-adjustable vanity basin and height-adjustable shelving in a bathroom to suit the needs of a child who is continuing to grow and who will change how he or she completes activities and with what equipment over time.
- The incorporation of task lighting over key areas in the bathroom, kitchen and laundry room to assist with activity completion for an elderly woman with low vision.
- The provision of privacy, security and safety for a person with a psychiatric disability by incorporating separate stairwells into each individual entry in a multi-unit building (rather than having a common balcony for a row of entries), front doorways that do not open facing each other, security screens on all openings, sensory lighting, space and distance from neighbours, and good lines of sight from within the home to see visitors approaching the premises.
- The design of low-density accommodation with specific products that absorb sound, or locating housing in an area that has traffic noise to absorb household noise created by residents.
- The use of bright, vibrant paint colours to prevent ongoing damage to walls in a home occupied by a woman with an intellectual disability and a gentleman with autism who had moved from institutional care into the community.

The above solutions and features would suit anyone, regardless of whether or not a person has a health condition or disability, or is aging. The aim is to avoid stigmatizing the home by avoiding foreign, alien or medical features focused on the disability of an individual. While UD has a role in contributing to the acceptance and ongoing use of features, it is also valuable in helping to ensure the cost of the modifications is contained or minimal, and reducing costs associated with reviewing these at a later date, as in the case of retrofitting (Aplin, de Jonge, & Gustafsson, 2013; Ward, 2011).

Implications for occupational therapy practice

Occupational therapists who focus on UD in their work keep abreast of architectural design trends that influence home modification practice, as well as new product development, to ensure solutions are elegant and appealing to the user and in line with societal expectations of the look and feel of a home. The profession can also assist consumers with making informed choices, and communicate with designers and builders about the relevance and application of UD so that designs and products suit human diversity. Further, occupational therapists are contributing to the ongoing debate concerning incorporating UD into legislation related to the construction of new homes, particularly in our aging communities where there is a growing imperative to keep people in their homes and communities and contain the ballooning costs of residential care.

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Did you know?

Smith, Rayer and Smith (2008) calculated that there is a 60% probability that a house will be occupied by someone with a disability over the course of its use. This emphasizes the benefits universal design can have in terms of cost efficiency, sustainability and being environmentally friendly.

Smith, S. K., Rayer, S., & Smith, E. A. (2008). Aging and disability: Implications for the housing industry and housing policy in the United States. *Journal of the American Planning Association*, 74(3), 289-306.

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Liz and Desleigh co-authored a book: Ainsworth, E. & de Jonge, D. (2011). *An occupational therapist's guide to home modification practice*. Thorofare, NJ: SLACK, Inc.

Editor's note: The authors' book is available at www.caot.ca/store or by contacting publications@caot.ca

Pebbles in the stream: The ripple effect of long-term collaboration to promote universal design in homes and communities of Newfoundland and Labrador

Shelley Di-Nur

In 2012, the Newfoundland and Labrador Housing Corporation (NLHC) became the first provincial housing corporation in the country to require the inclusion of universal design features in all new affordable housing constructions (Government of Newfoundland and Labrador, 2012). This landmark change involved the efforts of many individuals from the public, private and non-profit sectors, including occupational therapists from across the province. In this article I will highlight two long-term collaborations involving contributions to that process from our profession.

In 2004, the Canadian Association of Occupational Therapists, Canada Mortgage and Housing Corporation, and the Newfoundland and Labrador Association of Occupational Therapists co-sponsored two events. The first was a public forum to discuss local accessibility issues and the application of universal design to alternative housing solutions, and the second was a workshop on universal design presented by Kathy Pringle, an occupational therapist.

These events facilitated formative learning opportunities for participants; they also became important stepping stones to change by bringing together a cross-section of stakeholders concerned with accessibility issues. The Universal Design Network was soon born, establishing a mandate to promote universal design and access for all, and to advocate for individuals encountering difficulties with housing or public access due to current building practices and standards.

In its early days, the network included representation from NLHC, several community service groups, one building contractor and a few occupational therapists. Over the years, membership has evolved to include representation from local municipalities and the provincial government, and continues to grow. Since 2004, the network has given presentations to seniors' groups, health-care professionals, government working groups, and architectural and engineering students. Some members have also participated in local building projects.

In 2008, a provincial working group of occupational therapists and NLHC housing officials was also formed. It was a natural fit, bringing together occupational therapists working with homeowners needing home modifications, and housing officials who review, approve, inspect and authorize funding for home

modifications. While the primary focus of this collaboration has been to achieve better, more timely and cost-effective home modifications for funding recipients, joint meetings have also facilitated opportunities for occupational therapists to share and promote universal design information with NLHC colleagues. At the time, universal design had not yet been embraced by NLHC as a viable, or necessary, alternative to traditional housing construction.

In 2012, however, NLHC's decision to require universal design features in the construction of all new affordable housing indicated an important shift (Government of Newfoundland and Labrador, 2012). It now recognizes the benefits homes with universal design features provide — socially, environmentally and financially. Included in the requirements are such features as lever handles on doors, one step-free entrance and a wheelchair accessible bathroom on the main level (NLHC, 2014). It is an important step forward in the province, but many more are needed. Among local homebuilders working in private industry, there is little support for universal design to be mandated. For them, incentives and market demands are too few, costs are too great and, depending on where one lives, by-laws and procedures for obtaining building permits for universal design homes can cause costly delays.

In order to implement change in the mainstream housing industry, incentives are needed, but it is unlikely that voluntary participation will foster sufficient shifts in building practices in the near future unless legislation requires it. A recent Australian study that considered the perspectives of developers, designers and builders supports this view. Study participants "identified that, unless law required them, there was no incentive to change their current practices. ... They said it would also help if housing industry leaders challenged existing practices and demonstrated that universal design was profitable" (Ward, 2012, para. 3).

In Newfoundland and Labrador, the benefits universal design housing initiatives provide have yet to be embraced and supported in the mainstream, but the regulatory changes implemented by NLHC in 2012 are encouraging. It is my hope they will lead the way to further change so that our homes and communities will be inclusive and welcoming for everyone, whatever their abilities and stages of life.

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Universal design resources

Canadian Association of Occupational Therapists

- CAOT Position Statement: *Universal design and occupational therapy* (2009) - <http://www.caot.ca/default.asp?ChangelD=1&pageID=622>
- Fact sheet: *Occupational Therapy and Universal Design* - http://www.caot.ca/otmonth/UDandOT_FS.pdf
- E-card: *Occupational Therapy and Universal Design* - http://www.caot.ca/otmonth/UDandOT_Card.pdf
- Report from the 2002 CAOT Professional Issue Forum: *Universal Design for Growing Through Occupation* - <http://www.caot.ca/default.asp?pageid=577>
- Additional CAOT resources related to universal design - <http://www.caot.ca/default.asp?pageid=4160>

Kathy's picks

We asked Kathy Pringle, an Ontario occupational therapist with many years of experience working in the field of universal design, for her favorite universal design resources. She recommends:

Publications

1. Canada Mortgage and Housing Corporation. *About Your House: Accessible Housing By Design* series – includes publications relating to appliances, bathrooms, exterior spaces, house designs and floor plans, kitchens, living spaces and ramps. Index available at: <https://www03.cmhc-schl.gc.ca/catalog/productList.cfm?cat=17&lang=en&fr=1407968176583>
2. Pierce, D. (2012). *The Accessible Home: Designing for All Ages and Abilities*. Newtown, CT: The Taunton Press.
3. Sanford, J. (2012). *Universal Design as a Rehabilitation Strategy: Design for the Ages*. New York, NY: Springer Publishing Co., Inc.
4. Steinfeld, E., & Maisel, J. (2012). *Universal Design: Creating Inclusive Environments*. Hoboken, NJ: John Wiley & Sons, Inc.

Websites

1. Center for Inclusive Design and Environmental Access (IDEA), University of New York at Buffalo: <http://www.ap.buffalo.edu/idea>
2. The RL Mace Universal Design Institute, Chapel Hill, NC: <http://www.udinstitute.org/>

Home modification resources

Canadian Mortgage and Housing Corporation

The Canadian Mortgage and Housing Corporation (CMHC) is Canada's national housing agency. It provides free and practical information to consumers and professionals, including occupational therapists, to help to create housing that is designed and built to reflect the principles of accessible design, FlexHousing™ and universal design. CMHC has a wealth of resources available on their website (<http://www.cmhc-schl.gc.ca/>). Some of these include:

1. Accessible and adaptable housing information for consumers (includes fact sheets, checklists and guides): <http://www.cmhc-schl.gc.ca/en/co/acho/index.cfm>
2. Programs and financial assistance by province or territory: <http://www.cmhc-schl.gc.ca/en/co/prfinas/index.cfm>
3. Publications and reports on accessible and adaptable housing (e.g., *FlexHousing™ and Maintaining Seniors' Independence: A Guide to Home Adaptations*): <https://www03.cmhc-schl.gc.ca/catalog/productList.cfm?cat=17&lang=en&fr=1407786627254> (click on the Accessible & Adaptable Housing tab)
4. *Housing for Older Canadians* (a guide for housing developers): <http://www.cmhc-schl.gc.ca/en/inpr/bude/hoolca/index.cfm>
5. Research reports (e.g., *Adapting Low-Rise Residential Buildings* and *Adapting Your Home to Living with Dementia*): <https://www03.cmhc-schl.gc.ca/catalog/productList.cfm?cat=123&lang=en&fr=1407768874967>
6. Many Research Highlight reports, such as *Evaluation of Optimal Bath Grab Bar Placement for Seniors* (<https://www03.cmhc-schl.gc.ca/catalog/productDetail.cfm?cat=32&itm=21&lang=en&fr=1407768721467>)

Other resources

Ainsworth, E., & de Jonge, D. (2011). *An occupational therapist's guide to home modification practice*. Thorofare, NJ: SLACK, Inc. Available from: <https://www.caot.ca/store/>

Canadian Standards Association. (2012). *CSA B651-12 Accessible design for the built environment*. Mississauga, Ontario, Canada: Author

Caregiver Omnimedia Incorporated in cooperation with Canadian Association of Occupational Therapists. (2012). *Home and Vehicle Modification Guide 2012*. King City, ON: Author. Available from: <http://www.caregiveromnimedia.com/>

Home Modification Information Clearinghouse (Australia): <http://www.homemods.info>

Wickman, R. (2014). *Accessible Architecture: A Visit from Pops*. Winnipeg, MB: Gemma B. Publishing. Available from: <http://gembab.ca/>

Opening the door one lever handle at a time

Shelley Thompson

Sustainable design really took off with the introduction of energy efficient light bulbs — relatively small, inexpensive items that could make people feel like part of the “green” movement when they installed them in their homes. They were an easy conversation starter, and some jurisdictions required them in every house. A friend once asked what I thought it would take to get the accessible or universal design movement to take off. What would be the conversation starter for this topic? I thought about that question for a long time, and it wasn’t until last year that the answer came to me.

On September 25, 2013, Vancouver City Council unanimously passed changes to the city’s accessible housing bylaw that would take effect starting in March of 2014. All new housing within Vancouver city limits, including single family dwellings and multiple unit buildings such as apartments and condominiums, would be required to have some of the following accessible features (City of Vancouver, 2013):

- Two peep holes in the front door, one at wheelchair height
- Wider doors, stairways and halls
- Lower light switches and higher outlets
- A bathroom on the lowest inhabitable level of a home
- Wall reinforcement for bathroom grab bars to be added if necessary in the future
- Modified bathtub plumbing to allow for future replacement of tubs with easy entry showers
- Lever handles on all doors and plumbing fixtures

It is what happened after this announcement that really made me think. Vancouver is the only Canadian city with its own building codes (Lee, 2013), and is the only municipality in British Columbia that has the authority to create its own bylaws to regulate the design and construction of buildings (MacPherson, 2013). This allows the council to make quick changes and be ahead of the curve, but what happens in Vancouver does not stay in Vancouver, as other areas of Canada soon start demanding the same standards. These bylaw changes started a discussion across the country, but what took centre stage and was most discussed was the requirement for doors to have lever handles. (For example, listen to “Doorknobs are dead in Vancouver,” which aired on CBC Radio One’s *The Current*, at: <http://www.cbc.ca/player/Radio/The+Current/ID/2420440484/>)

This was it — this was our light bulb. Reactions across the country ranged from some people thinking it was “about time”

to others feeling forced into the change. Some expressed incomprehension as to why they needed lever handles if they didn’t have disabilities, and others said levers were ugly, or worried their dogs would be able to operate them and get out on their own. Few talked about the functionality. If ever there was a time for occupational therapists to get into the conversation about universal design, it is now. People know what the purpose of a lever handle is, but few understand its inclusive functionality. The lever handle requires less gripping and twisting of the hand than a doorknob, and doors can be opened with less force, using everything from the corner of a laundry basket to a forearm or knee. This flexibility and ease of use by a larger number of people makes the lever handle the mechanism of choice. Occupational therapists who are experts at finding ways to make people as functional as possible can bring this message forward. While the energy efficient light bulb lit the way for the green movement, maybe the lever handle can open doors to an inclusive new world. We just have to push to open an exciting new conversation.

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The journey to becoming a universal design occupational therapist

Shelley Thompson

As my occupational therapy career developed, I became acutely aware that many everyday products and aspects of built environments did not function well, or at all, for many of my clients. Coming from a family of three construction engineers, I was constantly asking the same question: “Why is it designed or built that way?” I can remember my dad saying that maybe I should have become an engineer, but I replied, “In essence I am an engineer. If you could see all the product modifications and environment redesigns that I have done for my clients in the past 12 years, even you would be impressed.” It was at this moment, sometime around 1998, that I finally realized that maybe occupational therapy had a role in design — more specifically, in universal design. In this article, I will share the steps of my journey as I plunged into the world of universal design.

One of my first steps was to meet with three mentors and ask them all the same question: “What do I need on my resume to make you hire me as an occupational therapist consultant in universal design?” Tom Sutherland, national managing principal with DIALOG, an architectural and design firm formerly known as Cohos Evamy; Lili Liu, professor and chair of the Department of Occupational Therapy at the University of Alberta; and architect Ron Wickman, who works exclusively in barrier-free design; offered the following answers:

- Increase your knowledge in universal design, disabilities, residential construction, project management, building codes, standards and guidelines.
- Establish a network of various organizations and different types of professionals in the field; join interest groups and committees.
- Work with and get to know individuals in other disciplines, especially engineers, architects, designers, planners, developers, builders and city policy makers.
- Be seen as an expert: write articles, give seminars and get your name “out there.”
- Associate and surround yourself with people who are doing a good job at what you want to do.
- Work on a variety of projects from small to big.
- Just do it!

My first big break came in 2007. Hired by Alberta Health Services, primarily for my enthusiasm, I became the clinical

coordinator for the \$495 million Edmonton Clinic project, involving a nine-story building that was to house over 200 different outpatient clinics. I learned about schematic design, project management, issue resolution, building codes, wayfinding, mock-ups, how to read blueprints and, most importantly, how to communicate and work with other non-health professionals and tradespeople. When a revolving door was recommended for the front entrance, the design team was happy with its look, capacity level and low heat requirements. I was able to help them become aware of and sensitive to the difficulties associated with the use of such a door by those with timing and mobility issues, claustrophobia or low vision. In the end, a compromise was made, and a single accessible powered door was placed next to the revolving one. Similar discussions occurred frequently, and I quickly learned that as an occupational therapist I have a unique perspective regarding how people, especially those with functional limitations, function in and interact with their environments.

In 2009, I decided to explore this notion in more depth while travelling the world on my own for a year. I travelled to attend an Australia meeting of occupational therapists who work in the area of universal design in housing. In London, England, I had the opportunity to join a guided visit of the 2012 Summer Olympics site with the Southern Alberta Construction Association and see the design considerations required to build an accessible Olympics and Paralympics venue. I had similar experiences while touring the site of the 2010 FIFA World Cup venue in South Africa. I marvelled at Turkey’s accessible outdoor playground gyms that cater to both children and adults. Additionally, my trips to Singapore and Amsterdam solidified my understanding of the importance of good wayfinding when I observed these countries’ use of inclusive signage and excellent mapping.

During this time abroad I met two fantastic occupational therapist role models who work in universal design — Liz Ainsworth from Australia and Kathy Pringle from Ontario, Canada. Meeting these two women, combined with the publication of the Canadian Association of Occupational Therapists’ position paper on universal design (2009), motivated me to start my own occupational therapy private practice.

I turned to my provincial and national occupational therapy associations for help. Answers to questions about putting together a business plan, billing, record-keeping, insurance and

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fees all seemed hard to find. With the help of my best friend and fellow occupational therapist, Susan Waldron, and many outside sources, I was slowly able to put together my business plan, develop a web page, design business cards and finally register my business on April 28, 2011.

So, I had a business, but still had not incorporated all of my three mentors' recommendations. I started to volunteer for anything associated with universal design and to get involved with other professions. I joined the following organizations and committees:

- Age Friendly Parks and Outdoor Spaces, www.edmonton.ca/agefriendly
- City of Edmonton Advisory Board on Services for Persons with Disabilities (ABSPD), <http://www.edmonton.ca/disability>
- Edmonton Fire Chief's Community Services Liaison Committee
- Edmonton VisitAbility Task Group, Canadian Center on Disabilities Studies, <http://visitablehousingcanada.com/>
- Edmonton Wayfinding Project, www.edmontonwayfindingproject.com
- Home for Life™ Action Committee, www.homeforlife.ca
- Media Architect Design Edmonton (MADE), www.joinmade.org

Each organization or committee expanded my horizons by giving me multiple opportunities to network with individuals in different professions, work with others who were passionate about universal design and increase my knowledge of the subject. I also

started regularly taking courses from the Centre for Inclusive Design and Environmental Access (IDEA) through the University at Buffalo and attending conferences, such as the Festival of International Conferences on Caregiving, Disability, Aging and Technology (FICCDAT) in Toronto in 2012. Date nights now consist of going to see speakers present on urban planning, sustainability and design. I write articles and give lectures with increasing frequency, and I am starting to get more involved in policy-making. My business package has come together.

That said, when creating a new business, it takes time to acquire knowledge, gain credibility and build a solid foundation from which to launch. Keeping this in mind, I have to continue my "day job" and work casual hours with Alberta Health Services until such time that my business becomes sustainable. Recently, I started a universal design interest group for occupational therapists in Edmonton. Its purpose is not only to help support and educate members, but also to increase the recognition of the importance of occupational therapy's contribution to universal design.

Reflecting on my journey, I have come to the important conclusion that occupational therapists do have a huge role in universal design. I encourage all occupational therapists to take the plunge into this area. As for my next steps, it's time to just do it!

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Ten reasons to involve an occupational therapist in the construction or renovation of your home or commercial project

Kathy Pringle, B.Sc.(OT), OT Reg. (Ont.), Dipl.Arch.Tech.

An occupational therapist with experience working in universal design ...

1. is knowledgeable about universal design, and can apply these principles appropriately to your specific project so that your home or building will meet the needs of current occupants or users, as well as visitors and future owners.
2. is knowledgeable about guidelines and voluntary codes, aside from legislated building codes, that will improve outcomes for people with disabilities.
3. will assist with interpretation of building codes and, where they allow choice, can assist with decision making for greatest user safety and satisfaction.
4. will provide advice when minimum building code standards regarding barrier-free design are not adequate for the intended users (e.g., ramp slope, doorway widths).
5. can help source accessibility-related products, or choose between similar products, for the most effective solution.
6. can provide advice regarding the needs of users with visual, hearing and cognitive impairments – information that is lacking in our building codes.
7. can assess your disability-related housing and access needs, using medical information as appropriate, in order to make specific recommendations that will improve safety and independence.
8. can offer advice regarding modifications and equipment that will make caregiver tasks easier and safer.
9. can not only address any current disability-related needs, but also help you plan for the future. Planning ahead now can prevent the need for additional future renovations and expenditures.
10. has experience writing letters and reports to charities, government-sponsored programs, lawyers and insurance companies (e.g., auto insurance, worker's compensation, extended health), describing your needs and the benefits of any disability-related items, so you can access available funding assistance.

The role of occupational therapists in universal design research

James Lenker and Brittany Perez

Universal design, sometimes referred to as inclusive design, has historically been defined as the “design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Mace, 2014, para. 2). This definition led to the development of a conceptual framework summarized in the form of seven principles of universal design that were published in 1997:

The principles of universal design (Center for Universal Design, 1997)

1. Equitable use
2. Flexibility in use
3. Simple and intuitive use
4. Perceptible information
5. Tolerance for error
6. Low physical effort
7. Size and space for approach and use

While the principles are useful as an introduction to the topic, they have been criticized for their abstraction and the lack of a concrete strategy for operationalizing them in the context of real-world product design teams. Greater emphasis was also needed on social integration goals that would appeal beyond the design community to diverse professionals and to the public. Internationally, universal design is considered “design for human diversity, social inclusion, and equality” (Design for All Europe, 2008, para. 1). With an increased focus on health and wellness, active living, and sustainability initiatives across professional fields, universal design must be able to evolve with a changing population’s needs. Thus, Steinfeld and

Maisel (2012) proposed an adapted definition of universal design: “A process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation” (p. 29).

In short, universal design involves making things easier, healthier, and friendlier to use (Steinfeld and Maisel, 2012). To exemplify the expanded scope of this new definition, the eight Goals of Universal Design were developed. Examples and detailed explanations of these goals can be found in the book *Universal Design: Creating Inclusive Environments*.

The Goals of Universal Design (Steinfeld & Maisel, 2012)

1. Body fit: Accommodating a wide range of body sizes and abilities
2. Comfort: Keeping demands within desirable limits of body function
3. Awareness: Ensuring that critical information for use is easily perceived
4. Understanding: Making methods of operation and use intuitive, clear, and unambiguous
5. Wellness: Contributing to health promotion, avoidance of disease, and prevention of injury
6. Social integration: Treating all groups with dignity and respect
7. Personalization: Incorporating opportunities for choice and the expression of individual preferences
8. Cultural appropriateness: Respecting and reinforcing cultural values and the social and environmental context of any design project (p. 90)

The fields of occupational therapy and universal design share much common ground. Both fields are fundamentally oriented to optimizing person-environment interactions. As occupational therapists, we typically focus on maximizing the functional performance of individual clients in the context of one or more everyday environments. In contrast, designers consider the person-environment interaction more abstractly, often having limited contact with the end user while striving to create products and environments that are as usable as possible for the greatest breadth of people. The two fields intersect with their shared goal of maximizing human performance by minimizing unnecessary environmental complexity — that is, reducing the physical, sensory and cognitive demands of the physical and social environment. Occupational therapists have a skill set that naturally lends itself to making collaborative contributions in the field of universal design.

This collaboration is exemplified at the Center for Inclusive

Design and Environmental Access (IDEA Center) at the University at Buffalo in the United States. The IDEA Center is an interdisciplinary collective that includes faculty, staff and students from three schools: Architecture and Planning, Engineering and Applied Sciences, and Public Health and Health Professions. The core group of eight faculty and staff includes representatives of five different disciplines: architecture, human factors engineering, urban planning, digital media and occupational therapy. The Center’s activities include a variety of projects: two federally funded research centres (one addressing universal design in the built environment, and the other targeting accessible public transportation), home modifications services, evaluations of public accommodations in accordance with the Americans with Disabilities Act, and product usability assessments for private sector companies in banking and transportation.

Although occupational therapy plays a substantial role in virtually

all IDEA Center activities, this article will focus on the contributions of occupational therapy to universal design-related research projects. Table 1 summarizes the unique occupational therapy contributions to the various key stages of typical human subjects-based research studies involving person-environment interactions.

Table 1. Occupational Therapy Contributions to the IDEA Center’s Research Process

Research phase	Examples of occupational therapy contribution
Knowledge base	Understanding body structures and functions, health conditions, disease processes and disabilities Person-environment interactions affecting the individual and their activities Insights on service delivery systems and reimbursement structures that impact people with disabilities
Sampling	Forming sensible inclusion and exclusion criteria for the population being studied based on the research questions
Participant recruitment	Identifying community-based agencies through which participants can be recruited
Data collection tools	Identifying demographic categories that have relevance to data interpretation Identifying measurement tools that are appropriate for the population and research questions being studied.
Protocol development	Anticipating functional limitations of participants that may be taxed by the data collection procedure
Pilot testing	Simulating disability as a “participant” in order to refine the data collection protocol
Data analysis	Identifying meaningful statistical comparisons that will yield the most functionally significant and relevant findings
Data interpretation	Contextualizing the clinical relevance of the results based on the population and intervention being studied
Limitations	Identifying the practical constraints of a study’s research design that are threats to its real-world applicability
Discussion	Contextualizing a study’s findings in broader contexts and identifying areas that need future research

Occupational therapy contributions to the universal design research process

Occupational therapists have a core knowledge base that spans a variety of body structures and functions, health conditions and disabilities. An occupational therapist’s understanding of person-environment interactions can help designers fully incorporate universal design strategies in their work. From their training and practice experiences, occupational therapists understand functional implications of disability, rehabilitation strategies, service delivery systems and social policies that might impact participants with disabilities in a research context.

Occupational therapists can assert their influence throughout the cycle of a universal design research project. At the outset, occupational therapists can identify meaningful inclusion and exclusion criteria for participant recruitment. Using their task analysis skills, they can identify the physical, cognitive, sensory and perceptual demands that a research protocol will place on participants and then translate those activity demands into meaningful screening criteria. Likewise, occupational therapists can identify salient demographic characteristics (e.g., age, gender, number of years post-rehabilitation, familial environment, use of assistive technology) that are potential grouping variables for statistical analyses and interpretation of results. They are a valuable resource for identifying community-based agencies (e.g., vocational rehabilitation, independent living centres, centres for blindness, developmental disability service organizations, adaptive recreation groups) through which to recruit participants.

Occupational therapists can also employ their knowledge base to enhance a research team’s implementation of the research protocol. Occupational therapists know appropriate terminology and etiquette associated with various health conditions and disabilities, which can sensitize other research team members from different disciplines and help to create a more welcoming and comfortable research environment for participants. For example, an occupational therapist at the Center recently organized a staff training to familiarize team members with functional implications of vision impairment that might affect execution of the data protocol for participants who have vision loss. Trainings such as these often result in environmental modifications, identification of verbal cues, and other valuable adaptations to a data collection protocol.

Throughout data collection, occupational therapists anticipate

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how various functional limitations (e.g., strength, endurance, cognition) might influence participant performance during a protocol, grading tasks as needed to accommodate unique participant needs. For example, occupational therapists may anticipate the need for transportation accommodations for participants traveling to and from the study site, accommodations necessary in the lab environment for protocol administration, the need for rest breaks for participants and implications for participants who use mobility or communication devices.

Occupational therapists can affect the selection of appropriate data collection instruments and outcome measures that match the physical, cognitive and sensory capabilities of the populations participating in the study. They provide insight about the respondent burden of particular measures to help the research team select measures with appropriate physical and mental load. After data collection and analysis, an occupational therapist can broaden the scope of data interpretation to include the larger contexts of participation, inclusion and health and wellness literature. In summary, the presence of an occupational therapist on an interdisciplinary research team can influence and strengthen the entirety of a study's research methodology.

The IDEA Center has conducted usability trials for consumer products in the home, a new automated teller machine (ATM) design and a new shuttle bus access ramp design. In each of these studies, occupational therapists played a substantial role in all project phases, as described above. In addition, occupational therapists were crucial in the analysis phases of the studies to help recognize and functionally integrate the variety of recommendations for product design improvement with the design professionals on the research team.

How can you get involved?

The contributions occupational therapists make to universal design research projects can be generalized to other contexts. Opportunities exist within many universities to create interdisciplinary teams that foster inclusive research methods and design. Occupational therapists can promote themselves as valuable collaborators to researchers in human factors engineering, architecture and design programs. Occupational therapists who are already practicing in the universal design field can educate the larger occupational therapy community about additional ways occupational therapists can contribute to research teams engaged in person-environment evaluations. Occupational therapists may independently initiate universal design-related research in settings where none currently exists. These opportunities begin for students during their occupational therapy educational programs and continue throughout their careers.

Students

Occupational therapy students may take interdisciplinary electives with students from related disciplines (e.g., architecture, engineering, urban planning), benefiting from the diverse perspectives offered by students in other programs while enriching the perspectives on people with disabilities among those same peers. Similarly, occupational therapy students can seek collaborative opportunities with students in design or engineering programs that encourage projects involving people with disabilities. Capstone apprenticeship opportunities, required in American doctoral programs, may also

be created for occupational therapy students wishing to gain experience with universal design applications and research methods within existing centres and professional teams.

Faculty

Occupational therapy faculty can promote an interdisciplinary perspective on inclusive design in their courses by inviting guest lecturers with backgrounds in architecture, urban planning, engineering and industrial design. Likewise, occupational therapy faculty can offer to provide guest lectures for faculty in other departments. Occupational therapy faculty with a universal design background can also be a resource for occupational therapy practitioners and disability advocates in their local communities.

Practitioners

Community-based occupational therapy practitioners can promote universal design by participating in university-based research projects, providing insight on current clinical practices that may impact a particular research study. Practicing occupational therapists in medical, educational or other settings may also identify areas of need as research and development opportunities for university-based students and faculty. Community-based occupational therapists can involve engineering and design students on projects to create devices that would address areas of need for their clients.

Regardless of the context, occupational therapist participation in interdisciplinary projects promotes the field to professionals and scholars in other disciplines, many of whom might not otherwise interact with rehabilitation professionals. The collaborative research experience at the IDEA Center demonstrates the potential for occupational therapists to make contributions outside of the medical services model, specifically as research and usability consultants. Universal design researchers lead these efforts with other design professions, and it is critical that current and future occupational therapists realize the importance of their role as students, faculty and practitioners in the movement.

Benefits disclosure

James Lenker and Brittany Perez are both employed by the IDEA Center, which has a financial interest in the content of this article and the broader field of universal design.

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Promoting accessible physical environments in post-secondary school settings through attention to universal design

Lisa Klinger, Brittany Moore, Nina Berardi, Erin Miller, Nathania Lukman and Diana Golverk

Access to education is considered a right in Canada (Ontario Education Act, 1990). There is strong evidence that higher education contributes to a more productive and satisfying life, greater financial success and improved vocational opportunities (Brown & Herbert Emery, 2010; Christ & Stodden, 2005; National Council on Disability, 2003). Young adults with disabilities often experience difficulty attending post-secondary institutions due to inaccessible physical environments (Statistics Canada, 2006). Designing and modifying architectural elements on campuses using principles of universal design would enable post-secondary education for those with mobility impairments and assist these students to achieve the resultant benefits.

Occupational therapists can have an important role in assessing and advocating for more accessible environments on university and college campuses (Christ & Stodden, 2005). Post-secondary educational institutions are known to harbour various barriers, including those that are architectural, attitudinal (e.g., believing that service animals should not be allowed in a classroom), informational (e.g., lack of written resources that can be read by text to voice software) and systemic (e.g., a system of organizing classes that doesn't allow students with disabilities enough time to get from one class to another) (Johnson, Stodden, Emanuel, Luecking, & Mack, 2002). By definition, barriers are factors in an individual's environment that, through their absence or presence, limit functioning, promote disability and prevent full participation of the individual in society (World Health Organization, 2001). Evidence indicates that mobility impairments account for the largest proportion of disabilities experienced by students (Statistics Canada, 2006). Ensuring that physical environments are accommodating is fundamental to ensuring universal access to school environments and may be considered a first step in enabling all young adults to participate in post-secondary educational and social activities. This article

will report on a recent systematic scoping literature review completed by the authors and discuss an assessment that may be used to evaluate the physical accessibility of post-secondary educational environments.

Scoping literature review

The systematic scoping literature review used methodology described by Arskey and O'Malley (2005) and examined the evidence regarding barriers and facilitators to the physical accessibility of post-secondary educational institutions for students with mobility impairments (Moore, Berardi, Miller, Lukman, & Klinger, 2013). Findings revealed that many barriers still exist, but also that many facilitators are either in place or possible to implement. The scoping review was limited to English language sources published since 1990, when the Americans with Disabilities Act came into force (ADA, 1990), from the following interdisciplinary databases: Ovid Medline, CINAHL, PubMed and Scopus (Health Sciences); ProQuest, ERIC and CBCA Education (Education); PsychInfo and SocINDEX (Social Sciences) and Engineering Village (Engineering). Grey literature, defined as literature produced by academics, business, industry and all levels of government that is not peer-reviewed and is not controlled by commercial publishers, was sourced using Google. A building block search strategy was employed, using three primary search terms, "accessibility," "school" and "mobility impairment" and their synonyms (see Table 1). Terms were searched individually, then combined systematically using Boolean operators to locate articles.

Articles that did not focus on mobility impairments and post-secondary education, or those that focused on distance or online education were excluded. Articles relating to other aspects of universal design, such as those relating to sensory and cognitive impairment, were also excluded. During the search, in order to ascertain whether an article

Table 1. Search Terms

Accessibility	School	Mobility impairment
Barrier-free design	Post-secondary	Physical disability
Universal design	University	Gait disturbance
Inclusive environment	College	Walking impairment
Physical access	Education	Wheelchair
Architecture	Campus	Handicap
		Disabled

Table 2. Findings from Scoping Literature Review Regarding Accessibility on Post-Secondary Campuses

ICF Category	Barriers	Facilitators
Design, construction and building products and technology for gaining access to facilities inside buildings for public use	n=83, for example: Lack of elevators (n=15) Inaccessible washrooms (n=12) Inaccessible libraries, labs, classrooms (n=19) Multi-level buildings & stairs (n=6)	n=67, for example: Elevators & lifts (n=12) Accessible washrooms (n=10) Accessible classrooms, labs (n=9) Accessible doors (n=8)
Design, construction and building products and technology for entering and exiting buildings for public use	n=56, for example: Inaccessible doors (n=23) Stairs with no ramps (n=19) Absent or poorly located entrances (n=7)	n=37, for example: Automatic doors (n=12) Ramps or lifts (n=11) Choice of accessible entrances (n=5) Barrier-free pathways (n=4)
General products and technology for personal indoor and outdoor mobility and transportation	n=10, for example: Limited availability of accessible public transportation (n=6) Inaccessible transit stops (n=3)	n=8, for example: An accessible, dedicated mini-bus service (n=7)
Design, construction and building products and technology for way finding, path routing and designation of locations in buildings for public use	n=15, for example: Narrow hallways and paths within campus buildings (n=4) No maps of accessible routes (n=3) Inadequate maintenance (n=2)	n=11, for example: Accessible signage present (n=3) Inclusive campus maps (n=3) Clear pathways (n=3)
Design, construction and building products and technology for gaining access to facilities in buildings for private use	n=22, for example: Inaccessible dorm rooms (n=7) Furniture design & placement (n=4) Inaccessible washrooms (n=4) Narrow dorm room hallways (n=2)	n=24, for example: Modified housing and dorm rooms (n=8) Accessible washrooms (n=5) Accessible laundry, dining halls, furniture (n=5)
Products and technology of urban land development	n=38, for example: No designated accessible parking spaces near entrances (n=11) Dispersed campus layout (n=7) Lack of curb cuts; uneven pavement (n=7)	n=27, for example: Designated accessible parking spaces near entrances (n=12) Concentrated campus layout (n=5) Curb cuts (n=5)
Land forms and precipitation	n=15, for example: Hilly campuses (n=8) Snow and ice buildup on pathways (n=3)	n=2, for example: Sheltered passageways (n=1)
Population density	n=5, for example: Crowding (n=5)	n=0

met title, abstract and full-text relevancy criteria, each article was independently screened by two reviewers. In cases of disagreement, a third reviewer was used to establish consensus. Forty-nine sources met the criteria for review. The International Classification of Functioning, Disability and Health (ICF) Environmental Factors (World Health Organization, 2001) allowed organization and tabulation of the frequency with which specific barriers and facilitators were identified.

Findings

The findings from the scoping literature review are summarized in Table 2. The full text of the scoping review can be found at: <http://ir.lib.uwo.ca/otpub/>

The evidence from this scoping literature review suggests that architectural barriers to physical accessibility continue to pose substantial problems for post-secondary students with mobility impairments. Resolution of many of these barriers can require complex and expensive renovations such as the installation of elevators, best done when older buildings are

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retrofitted or replaced. Conversely, implementing many facilitators requires potentially less costly modifications, such as enlarging designated parking spaces or providing specialized on-campus transportation.

The review also suggests that screening for architectural barriers and facilitators on post-secondary campuses continues to be useful. The University Campus Accessibility Measurement (UCAM; Lee et al., 2001), developed by amalgamating principles of universal architectural design, standards from building codes and several recognized accessibility checklists, is a comprehensive tool for evaluating accessibility specifically within post-secondary schools. The UCAM addresses the multiple interior and exterior elements of post-secondary campuses. It is laid out clearly, and allows documentation of all measurements and provides space for a usability summary for each element. The tool has a comprehensive manual which explains how to carry out the measurements. Considerations for hearing and visual impairments were added in 2010. The UCAM has been used to assess all buildings, classrooms and housing at Western University. Reports arising from the UCAM assessment assisted in enhancing awareness of universal design for architects and designers at the university, and guided prioritization and planning of modifications to make the campus more accessible. The UCAM, along with its sister tool, the Physical Accessibility Measure for Schools (PAMS), is publicly available at: <http://ir.lib.uwo.ca/otpub/>

Assessments of post-secondary school environments using the UCAM will detail specific areas in which campuses meet and do not meet accessible architectural design standards. We hope that occupational therapists and other professionals who are interested in improving access to post-secondary education for students with mobility impairments can use data from the scoping literature review and make use of the UCAM to advocate for change.

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The Ottawa Accessibility Scale

Paulette Guitard and Alex Priest-Brown

Hospitals, which are regularly visited by people of all ages and with all possible mental or physical conditions, would ideally be spaces that exemplify the tenants of universal design. While it may be difficult to renovate such a large facility to meet the needs of all users, working toward a facility that is more usable to as many people as possible would enable fuller participation by all users. This article presents a tool that has been developed and refined over the past five years in order to assess the accessibility of the built environment in public spaces of a hospital for individuals with physical or sensory disabilities. Although the scale was designed in Ontario, it is based on seven Canadian documents, and can therefore be used across Canada.

For several years now, the Ontario government has been considering the concept of accessibility. In 2001, the Ontarians with Disabilities Act (ODA) was enacted (2001), making it mandatory for public sector establishments, such as hospitals, to submit annual accessibility plans that indicate both the current status of access and the actions planned to address shortcomings. In 2005, the Accessibility for Ontarians with Disabilities Act was adopted (AODA; 2005). It stipulates that by 2025 the province must be fully accessible in five key sectors: customer service, access to information and communications, the built environment, access to employment, and transportation (AODA, 2005). The government has been working on establishing standards for each of the sectors; institutions are setting up accessibility committees and drawing up their annual plans in order to comply with the law.

Accessibility committees must ensure that the built environment is accessible to individuals with physical and sensory disabilities. Accessibility of the built environment is defined as the interaction between the abilities of a person or group of people and the design as well as the demands of the physical environment (Iwarsson et al., 2004). An accessible environment promotes the full participation of people with disabilities.

Recognizing that occupational therapists are qualified to assess the physical environment and develop an action plan in order to lower barriers that might affect user participation (Canadian Association of Occupational Therapists, 2011), in 2009 two occupational therapists from The Ottawa Hospital Accessibility Committee were asked to assess the built environment within The Ottawa Hospital campuses, although a specific government standard was not yet available. Given the magnitude of the task, they sought assistance from the Occupational Therapy Program at the University of Ottawa. Under the supervision of the two

professionals and a professor, a group of students was asked to first identify a tool to assess the hospital's public spaces, then carry out the assessment and make recommendations to the committee aimed at improving accessibility and promoting the full participation of users. The objective was to assess the spaces used by outpatients and visitors, including washrooms, parking areas, entrances, telephones, elevators, stairs, ramps, signage and cafeterias.

A literature review revealed that few studies have been done on the accessibility of the built environment in public places (Iwarsson et al., 2004). Some public places have been assessed, including fitness and recreational facilities (Arbour-Nicitopoulos & Ginis, 2011), markets (Kutintara et al., 2010) and a variety of public buildings (Welage & Liu, 2011). According to a number of studies, it appears that newer public buildings have become more accessible to individuals in wheelchairs with the enforcement of building codes (Welage & Liu, 2011). Nevertheless, studies indicate that the physical environment continues to pose obstacles for people with physical disabilities, regardless of the type of environment assessed. These obstacles include the absence of handrails, maneuvering space in washrooms, ramps and reserved parking spaces for wheelchair users, as well as doors that are too narrow, slippery floors and obstructed pathways (Arbour-Nicitopoulos & Ginis, 2011; Kutintara et al., 2010; Welage & Liu, 2011). According to the studies, "accessible" facilities, as indicated by signage in designated accessible facilities (Siu, 2008), better meet the needs of people in wheelchairs but tend to ignore the needs of those with other disabilities, particularly those with visual impairment (Ringaert, 2003). According to Siu (2008), this is especially apparent in public washrooms where sharp edges and movable objects have often been identified as potential hazards for individuals with visual impairment. Finally, it is surprising to note that little literature exists on accessibility in hospitals. The only studies that specifically assess the hospital environment are limited to toilets in patient rooms (Travers, Burns, Penn, Mitchell, & Mulley, 1992), building entrances and access routes for people in wheelchairs (Welage & Liu, 2010).

The literature review was unable to identify a tool designed to assess the accessibility of a hospital. However, it did help identify five tools that could be used to assess the accessibility of the built environment in various public places, including the *2006 Building Code Compendium* (Ministry of Municipal Affairs and Housing,

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2009), *Accessible Design for the Built Environment* (Canadian Standards Association, 2004), *The Source Book: Architectural Guidelines for Barrier-free Design* (Kelly & Snell, 1987), *The University Campus Accessibility Measure* (Miller, Bartlett, & Klinger, 2010) and *Clearing Our Path* (Canadian National Institute for the Blind, 1998). These documents are useful for rehabilitation professionals as they help design and promote the accessibility of the built environment in public facilities. They propose standards for certain populations (people with motor or sensory disabilities), for specific public places (such as university campuses) and for all public places, in order to promote truly accessible design. Since none of these tools addressed the project's entire target population or assessed every place used by visitors to the hospital, all of them were used in developing the Ottawa Accessibility Scale.

The items in these tools were compared in order to draw up six different grids to assess washrooms, elevators, stairs, entrances, telephones and signage. The comparison revealed that the tools did not always use the same criteria to assess the same item. Since hospitals are places that are used on a daily basis by people with disabilities, and given the role they play in health promotion, they should theoretically serve as models of accessibility. Everyone, no matter what their disability, should be able to make full use of the public spaces in a hospital. Therefore, where the measures proposed in the five documents differed, those that promoted full access to the largest number of people were used. For example, the Canadian Standards Association (2004) recommends that the width of a manual door to a washroom should be 900 mm to 1100 mm, whereas *The Source Book* recommends a width of 810 mm to 900 mm. In this case, the larger measure of 900 to 1100 mm was used for the new assessment scale.

Since the initial grids were drawn up, two new government documents have been published: the *Final Proposed Accessible Built Environment Standard* (Accessible Built Environment Standards Development Committee, 2010) and the *Guide pratique d'accessibilité universelle* [Practical Guide to Universal Accessibility] (Service de l'aménagement du territoire de la Ville de Québec [Quebec City urban planning service], 2010). Each item in the six grids was reviewed in light of this new information. As a result, two new grids were created, one for parking and another for cafeterias. The Ottawa Accessibility Scale thus has a total of seven grids, for (a) washrooms, (b) elevators, (c) stairs, (d) entrances, (e) telephones, (f) parking areas and (g) cafeterias. Signage has been included in each of the grids rather than being placed in a separate one, so that all the relevant information for each assessed area is in one place. The Ottawa Accessibility Scale includes a total of 332 items to assess: 177 for washrooms, 43 for elevators, 24 for stairs, 31 for entrances, eight for telephones, 16 for parking areas and 33 for cafeterias.

The grids thus make it possible to identify gaps in accessibility. Once a grid has been filled out, the problem items identified can be grouped into three categories: safety, primary architectural barriers and secondary architectural barriers. The safety category includes items in the built environment that compromise user safety (e.g., insulation on plumbing, delayed door opening or lack of a handrail). The primary architectural barrier category covers items that limit access to the primary function of the

facility without compromising user safety (for example, the width of a doorframe or lack of visual or audio signals in an elevator to identify the floor and indicate whether the elevator is going up or down). The secondary architectural barrier category includes items that limit access to secondary functions without limiting access to the facility's primary functions (e.g., the height of the disposable towel dispenser does not compromise access to or use of the toilet). Items in the safety category should be given first priority, followed by primary architectural barriers and then secondary architectural barriers.

Since the grid system was created in 2009, the five campuses of The Ottawa Hospital have been assessed, including a total of 185 washrooms, 38 elevators, 35 telephones, 18 entrances, 10 parking lots, nine stairways, three ramps and three cafeterias. As a result, many physical obstacles have been identified that prevent individuals with physical disabilities from making full use of the hospital facility. Contrary to what one might expect, given the purpose of hospitals and the needs of their clientele, the problematic results are in line with those reported by Arbour-Nicitopoulos and Ginis (2011), Kutintara et al. (2010), Welage and Liu (2011) and Iwarsson et al. (2004), as described above. The various hospital campuses failed to meet all the established criteria and therefore had significant accessibility gaps. The accessibility committee has approved the measure and is currently giving priority to the design of accessible washrooms and signage. Architects and engineers now consult the occupational therapist on the committee about all renovations and complaints related to accessibility.

Each profession has its own particular body of knowledge and has a certain perspective on accessibility. Occupational therapy is among the professions with key roles to play in ensuring accessibility of the built environment (Canadian Association of Occupational Therapists, 2003). Indeed, occupational therapists have the knowledge, expertise and tools necessary to actively promote awareness of accessibility issues and bring about change (Malpage, Pei-En, & Klinger, 2009). It is now more obvious than ever that problems with the accessibility of the built environment cannot be properly addressed by approaching them from a single perspective. It is necessary to combine the knowledge and expertise of a range of professionals (e.g., engineers, architects, occupational therapists and signage coordinators) and to include suggestions from individuals with disabilities in order to draw up standards and develop strategies aimed at a common goal: equal accessibility for all. Although this scale was drawn up for a hospital in Ontario, it can be used elsewhere in Canada. Considering the purpose that they serve, hospitals should seek to be models of accessibility and not merely to meet the minimum standards identified in the scale. In conclusion, occupational therapists' expertise in accessibility led to the creation of the Ottawa Accessibility Scale, the first scale designed specifically to assess the accessibility of hospitals. The scale is available in French and English from the lead authors; having it applied in other hospitals will help advance the validation process.

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Ontario's Accessibility for Ontarians with Disabilities Act: Moving forward with legislation for the built environment

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Ontario is one of the first jurisdictions in the world to mandate accessibility. With the implementation of the Accessibility for Ontarians with Disabilities Act (AODA) in 2005, Ontario set out to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures and premises by January 1, 2025. The Ontario experience provides policy makers and therapists in other provinces and jurisdictions with a sneak preview of how these issues could evolve where they live.

On January 1, 2015, an amendment to the Ontario Building Code that includes new accessibility requirements comes into effect (Government of Ontario, 2014). It applies to new buildings and existing buildings undergoing extensive renovations. Houses are not affected by most of the new accessibility requirements, with the exception of visual smoke alarms, and reinforcement in bathroom walls for future grab bar installation.

New requirements that are of interest to occupational therapists include:

- 1) More power door operators at entrances and key interior rooms.
- 2) Door openings will be 10 mm wider.
- 3) Improved elevator access in many buildings; floors with no elevator access will still require basic accessibility features (e.g., lever handles, wider doors).
- 4) There will be more visitable suites in apartment buildings (15%, up from 10%).
- 5) All smoke alarms will include a visual component.
- 6) Fold-down grab bars can be installed at toilets.
- 7) The grab bar mounted on the wall beside the toilet, or in a shower or tub enclosure, must be L-shaped (diagonal is no longer allowed).
- 8) Walls around bathtubs, showers and toilets must be reinforced for future grab bar installation.

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Universal design for learning: What occupational therapy can contribute

Bethan Collins

As an occupational therapist supporting disabled students¹ in higher education, I frequently came across barriers that impacted on students' ability to succeed in university. I recognised that many issues were due to an inaccessible educational environment rather than impairment, that modifications for diverse learners supported all students and how my occupational therapy perspective could contribute to affecting institutional change through promoting and explaining universal design for learning.

This article presents a perspective on how occupational therapy could contribute to universal design for learning (UDL), a specific educational application of universal design. It first explains the basic principles of UDL and then explores the contribution that occupational therapy could make to this area and how we could all benefit from it.

Universal design for learning

Universal design for learning is an approach to education broadly based on universal design; its key features relate to creating an environment where all learners have equal access to the curriculum, regardless of learning style or needs (Rose & Meyer, 2006). As with universal design more broadly, UDL is underpinned by a social model of disability, in which the problem is understood to be in the environment — inaccessible curricula (rather than individual learners) are described as “disabled” (Center for Applied Special Technology [CAST], 2011).

According to CAST (2011), the key principles of UDL include:

- Providing multiple means of representation, for example, providing information in text, video, audio, diagrams, etc. Ideally, the same information should be provided in different formats.
- Providing multiple means of action and expression, for example, enabling students to express their understanding through different media such as text, speech, practice, etc.
- Providing multiple means of engagement, for example, providing a mix of structure and spontaneous activities, including working with peers or alone, working through active experimentation and working through text.

As with universal design, UDL is based on the understanding that design for an “average” is inherently problematic, as those with differences are more significantly disadvantaged (Rose

& Meyer, 2006); the “average” does not suit many learners. Also, as with universal design, a UDL approach needs to be adopted from the outset; retrofitting or providing adjustments or accommodations for a poorly designed curriculum is inadequate and inelegant, in the same way that retrofitting a ramp to an inaccessible building is far inferior to designing an accessible building at the outset.

Unlike traditional curricula that focus on knowledge and skill acquisition, UDL aims to develop “expert learners” who are: a) resourceful, able to apply learning to prior knowledge and able to select appropriate strategies to assimilate new learning; b) strategic and goal-directed, able to plan and evaluate their own learning and c) are purposeful, motivated and can sustain the effort required for success (CAST, 2011). These attributes mirror what we aim to achieve with occupational therapy clients: the ability to be resourceful, to solve problems and select strategies to resolve performance issues and the motivation to engage in occupations.

There is some evidence to support UDL as an approach to education (Higbee, 2003), but this is currently limited. While the evidence base is still developing, there is much anecdotal evidence to support UDL. The field of occupational therapy, with its own specific knowledge base and professional values, has much to offer.

How occupational therapy could enhance universal design for learning

As occupational therapists focus on enabling clients to engage in daily occupations, activities and tasks (Townsend & Polatajko, 2007), occupational therapy could enhance universal design for learning. This is not only because of expertise in environmental design and adaptation but also our understanding of the importance of occupation (everyday activities that are meaningful for individuals) in daily life (Wilcock, 2003).

As a disability officer, I met students who were struggling with aspects of university; some due to the inaccessibility of classrooms and reading material, others due to their inability to engage with social aspects of university, such as making friends and working in groups. UDL recognises the need to make the learner's environment accessible and to promote different modes of engagement, but it does not specifically discuss the importance of engagement in a range of occupations around

¹ “Disabled students” is used in respect of the social model of disability, where it is respected that people are disabled by the environment.

learning. As occupational therapists, we recognise that students' social occupations may be as important as those in the classroom. Our philosophical, theoretical and scientific base informs us that people are occupational beings (Wilcock, 2003), and engaging in occupations can be meaningful and help to form our internalized roles (Kielhofner, 2008) and identities, including that of student. Thus, if one aspect of a student's life is affected, this may have consequences for other aspects.

One student with whom I worked loved debating. She confided that without debating, she may not have continued with her humanities course; it required a lot of independent reading and she felt isolated. Despite severe fatigue, it was important to her to invest energy in debating, which was poorly understood by her lecturers. UDL would approach this by providing a wider variety of options of ways for students to learn. Debating texts, rather than solely reading, could form part of the curriculum, so the student could feel socially engaged within the course. In occupational therapy, we appreciate that balance and variety are important, thus adding this knowledge base to UDL could strengthen its argument for multiple means of engagement.

In traditional curricula, disabled students may be accommodated, (for example by being provided with a specific guided tour of the campus or a different examination venue) but this does not necessarily mean that they are *included* (Higbee, 2002). One student with whom I worked said she didn't share the class experience of an exam because she was in a different building, and another felt isolated by being accommodated on a separate campus tour. As occupational therapists, we acknowledge the meaning derived from occupations and the multifaceted nature of occupation (Polatajko, 1994), so, for example, we understand that an inherent part of a campus tour is the social contact, rather than it just being about learning where the toilets are. We could contribute to UDL by providing our expertise, knowledge and theory about the complexity of occupation to support the aim to *include* rather than *accommodate*.

The concept of an expert student in UDL neatly fits with client-centred occupational therapy philosophy (e.g., Sumsion, 2006). The expert student concept focuses on the process of learning rather than on the end-product of knowledge, neatly paralleled by many occupational therapy interventions—the process of engaging in occupation is considered important, rather than, or as well as, the end product of being able to do a task or activity (occupational performance).

Universal design for learning: Benefits for occupational therapy

Just as occupational therapy can contribute to UDL, UDL could also enhance occupational therapy. The most obvious application of UDL would be to consider our own curricula and find ways to build them around the principles of UDL. This would support

diverse learners within our own profession and could enhance the educational experiences of our own students.

As UDL principles fit so well with occupational therapy's philosophy, adopting these approaches more fully in our education practice could enable us to "practice what we preach." Providing information in a variety of formats, enabling students to express their knowledge in different ways and providing different engagement methods could enable students to value difference intrinsically. Our clients, too, have different learning preferences; therefore, as occupational therapists, we need to adapt our style to include a diverse client group. Supporting our own students in this way would confirm our commitment to client-centred (and student-centred) practice.

Basing curricula on UDL principles, particularly the goal of producing expert learners, fits with the aim to develop critical, resourceful, motivated occupational therapists who can adapt to change and strategically manage their own learning. This is likely to also be relevant to other university programs. Occupational therapists may be in a position to support a range of colleagues to apply UDL principles to designing and developing education programs.

My experiences as a disabled student, occupational therapist working with disabled students and occupational therapy lecturer lead me to conclude, first, that there is a very important place for an inclusive curriculum (based on universal design for learning) and also that we, occupational therapists, are in an excellent position to promote this approach.

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Getting to universal design for the public play space

Kim Sanderson

During my time as a City of Edmonton staff member and advocate for advancements to play space provision, a particular testimonial from an occupational therapist was music to my ears. This individual described the importance of specific city play spaces in support of her work with children with disabilities. She outlined how these sites included both a high degree of access for the children and a diverse range of play settings. As it turned out, these play spaces all met a national minimum accessibility requirement or code specific to play spaces. There are now more than 100 such sites in Edmonton (City of Edmonton, 2013), and that number grows each year. Furthermore, the occupational therapist's top listed sites had been planned by veteran designers using a child-friendly, universal design approach the city had adopted some years earlier.

Getting to universal design for public play spaces requires concerted advocacy efforts, which build from a solid foundation of conceptual frameworks, research and practical rigour. In an age of government contraction, support for this level of quality in facility provision can be hard to come by, and even harder to maintain. That said, children of all abilities and their caregivers are counting on these efforts to be made.

This paper will provide a brief overview of recent gains, with a focus on the establishment of accessibility codes in Canada and the United States and work carried out in Edmonton to achieve a universal design approach to play space provision. It is hoped that entry points for similar efforts can be discerned through this review for application to other jurisdictions. Lastly, recommendations for participation by occupational therapists in this broader advocacy process are put forward.

Code for the public play space

In recent years, we have witnessed increased efforts to extend access for those with disabilities to recreational amenities such as public parks and, specific to this paper, play areas. In the United States, under the Americans with Disabilities Act (ADA), the updated *ADA Standards for Accessible Design* (United States Department of Justice, 2010), signed into law in March 2012, includes a Play Areas standard (Section 1008). Prior to this, the Play Area standard was available as a guideline, beginning in 2000.

In 2007, the Canadian Standards Association (CSA) released an updated version of its *Children's Playspaces and Equipment Standard* (CSA, 2007). This document contained

an annex entitled *Children's playspaces and equipment that are accessible to persons with disabilities* (Annex H). While considered an informative addition to the standard, Annex H was written in mandatory language to facilitate adoption as policy. Moreover, Annex H was prepared in such a way as to be compatible with its American counterpart, thereby providing consistency within a North American context.

Collectively, these new accessibility codes for play areas represent a significant achievement for the benefit of children with disabilities and their caregivers. However, if you read blogs or articles related to play space accessibility, you may come upon a litany of reasons for noncompliance with the code. Excuses include the inability to accommodate additional costs compliance is purported to incur as well as arguments that the standards in general ruin children's play. A National Public Radio piece looking into the effects of the new U.S.-based Play Area law (Benincasa, 2013) points out that too often it is up to parents and local advocates to ensure that new and renovated play areas are accessible.

In the face of resistance from a range of stakeholders, more



Accessible pathway to accessible swings. Photo by Kim Sanderson.

work is needed to see the code enshrined in local policy and applied to all new and altered sites in a jurisdiction. Success at this level is critical. Owners and operators, such as municipal governments and school boards, may oversee upwards of 1000 playground sites. Each play space constructed without compliance is lost to accessibility for its entire lifespan, a loss that leads to major access deterrents for children with disabilities.

It is important to note that the code spells out a minimum accessibility requirement. In order to optimize the experience and associated developmental outcomes for all children using play sites, we must go beyond minimum requirements and, ideally, employ a universal design approach. A brief narrative about Edmonton's experience will help to illustrate how this was achieved for one jurisdiction.

Universal design and the public play space

The City of Edmonton has been at the forefront of quality play space provision for decades. In the 1970s, custom play space designers supported the "adventure" in children's play with highly creative play areas throughout the city. In the 1980s, when the city experienced significant growth, community partnerships were formed to leverage resources and keep up with provision of quality spaces. After safety concerns were raised by the medical community, the city became an early adopter of play space safety standards.

In the 1990s, play advocates began to decry the proliferation of "cookie cutter" fixed playground equipment. Subsequently, the city renewed its interest in play space design. Workshops were held with internationally recognized experts, and soon more sophisticated and playful designs began to emerge. These incorporated a broader range of play settings, including hills and berms, natural vegetation areas and playful pathways. Despite design progress, city staff faced a nagging gap between improvements in playground quality and little or no discernable access for children with disabilities.

This continued lack of accessibility resulted in design mentors being called back to Edmonton. Rather than focus on accessibility specifics, mentors introduced staff to the concept of universal design as applied to the play area. Subsequently, universal design for play spaces was formally adopted by the city as a guiding design principle, with *Play for All Guidelines: Planning, Design and Management of Outdoor Play Settings for All Children* (Moore, Goltsman, & Iacofano, 1992) as the supportive resource.

It didn't end there. Workshop facilitators had left behind a copy of the final draft of the ADA Play Area guideline, mentioned earlier, which spelled out a minimum accessibility requirement. An extensive review of this document was undertaken by staff, and revisions made to ensure the code would fit national, provincial and local contexts. The city

adopted the revised code as policy in 2005. In turn, the code formed the basis of, and was superseded by, CSA's Annex H in 2007.

You can now see how that occupational therapist's testimonial affirmed the work undertaken. Edmonton was now taking a universal design approach to new play facilities while meeting a recognized accessibility standard. The accessibility gap had essentially been bridged, and children's right to quality play supported.

Role in the play areas for the occupational therapist

Unfortunately, the City of Edmonton remains an anomaly in its commitment to securing children's right to universally designed play areas which conform to recognized access standards. As vulnerable citizens, children, especially those with disabilities, need advocates to ensure gains on a larger scale in Canada. Occupational therapists are well-positioned to provide this advocacy, and may consider the three following suggestions. Firstly, when new play sites are being proposed, question whether owners and operators have necessary policies in place to meet the Annex H requirement, and lobby to have designers versed in universal design approaches lead the planning process. Secondly, participate on the many committees that oversee specific play projects, review standards and determine public policy. Lastly, follow the example of the occupational therapist introduced earlier, who has gone on to develop a social media strategy for informing others of universally designed sites, including a plan for filming and posting testimonials of site users and designers. Collective efforts such as these can help to ensure all children are supported to lead healthy, active and playful lifestyles.

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Universal design: A consumer's perspective

Peter Faid

Blending professional and personal

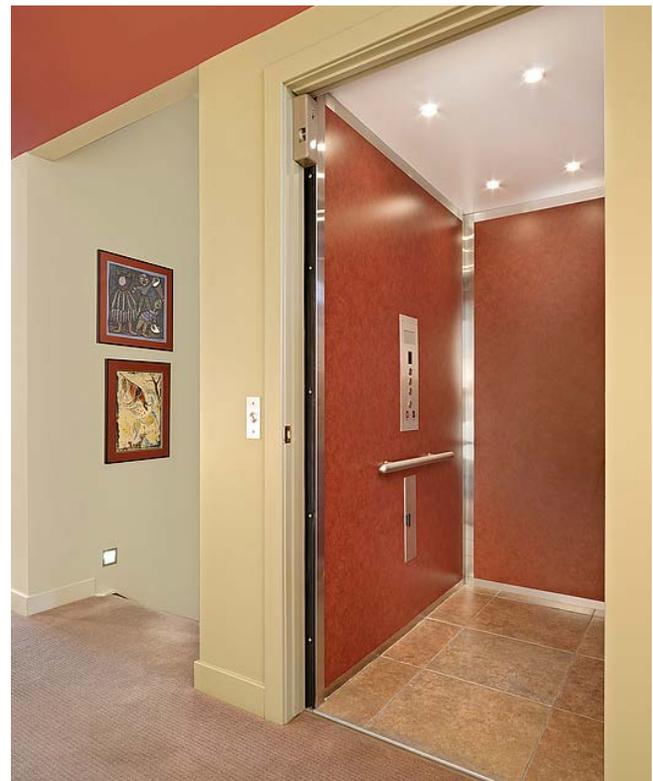
My appreciation of the importance of universal design emerged from a moment of pure synchronicity. As a consultant, I had been contracted by the City of Edmonton to undertake a study on *Aging in Place* (Community Services Consulting Ltd., 2007), exploring what the city might do within its mandate to encourage the development of livable communities where older citizens would have a suitable level of independence as well as opportunities to participate fully in the life of their neighbourhoods. At the very same time, my wife and I were starting to consider that as “empty nesters” we should begin the process of downsizing to a bungalow. While the large number of stairs in our present house did not yet bother us, we knew that the time would come when they would become a burden. As well, we were embarrassed by the number of people who couldn't visit us because of the stairs. One thing of which we were both sure was that we wanted to continue to live in Edmonton, preferably in the same neighbourhood where we had already lived for 25 years. When a small lot came on the market just three doors from our home, we made an offer to purchase. The sale was finalized just a few hours before I entered the hospital for open heart surgery. Coming home after such a major operation, I quickly came to appreciate how limiting a house with many stairs could be!

Older adults prefer to remain in their homes

My research into aging in place showed that the majority of older adults would prefer to remain in their present home for as long as possible, primarily because they love their current location, they like the design and layout of their home and they have good friends in the community (Canada Housing and Mortgage Corporation, 2008). From the many focus groups my company conducted with older adults, my colleagues and I learned that there is a real need for physical adaptations to homes, both to reduce the risk of falls and to allow residents to remain there comfortably. We heard that there was a need for help with home maintenance and repairs, along with assistance with snow shoveling and gardening, as well as occasional aid with personal care, housekeeping and meal preparation. A lack of transportation was a limiting factor for many older adults, and there was a need for timely access to a range of health services, especially home care, if many of them were going to be able to remain in their homes.

Why does the public remain so unaware?

I quickly came to realize that many of the features that were necessary to allow older adults to continue to live in their own homes described my own desires for my future life in Edmonton. My wife and I were, in fact, strategizing about how we could build a new home that would allow us to continue to live in our own home and our own neighbourhood as we aged. As we researched, we discovered just how little public understanding there is about the impact of the aging population at a community level and how important it is that, as a society, we come to appreciate the necessary influence of this issue on critical decision-making and service delivery in the coming decades. We were surprised by the lack of political will to implement measures that would make communities in our city more livable, and the scarcity of planning that would encourage community design that facilitates walking. We came to appreciate the failure of the market to provide a



Elevator installed in the author's home.

diversity of housing options, with affordable and accessible units for people with different income levels and abilities. But perhaps above all else, we learned that there was a scarcity of home design features that were intended to serve families across the life span. In essence, the principles of universal design, which support “making things more accessible, safer and convenient for everyone” (Center for Inclusive Design and Environmental Access, 2009, para. 1), were not common knowledge.

How about an elevator?

In starting the design process for our new proposed bungalow, we realized that the size of the lot and the existing bylaw requirements dictated that we would be limited to a 930 square foot “footprint.” Given the economics of an inner city lot, we decided that it made little sense to continue with a bungalow design—we just had to go up an extra level! We visited a number of companies to explore the option of installing an elevator, only to be told by several that they “didn’t do residential elevators.” Times have changed quickly since — in just a few years, there has been an increasing demand for small residential elevators. Various contractors visited us as we installed the elevator to see how it was done, as they had been receiving a growing number of requests from retiring baby boomers interested in including an elevator in their homes.

Universal design begins with accessibility

The first focus related to universal design in the planning of our new home was on accessibility. We learned that in keeping with the principles of “visitability” (Canadian Centre on Disability Studies, 2014), we needed to have no stairs at the entrance and minimal thresholds at all other exterior doors, including the entry from the garage into the house. We specified in the plans that all doors should be 36 inches wide, with lever handles for opening, and all hallways should be a minimum of 42 inches wide. Our commitment to accessibility ensured that there would be at least five feet of maneuvering space in all entranceways and in front of the elevator door so that wheelchairs (or strollers!) could be easily accommodated. Again in accordance with visitability, we made sure that there would be a wheelchair accessible bathroom on the main floor, with a three feet by four feet available space in front of the raised, low-flush toilet.

FlexHousing™ and adaptability

Canada Mortgage and Housing Corporation (2000) uses the term “FlexHousing™” to describe the type of home we were attempting to build. Adaptability is one of the principles of FlexHousing™, and this became an important concept for us as we worked on the design of our new home. Our research and our own experience encouraged us to include a small walkout apartment in the basement. This would have its own bathroom and small kitchen as well as bedroom and living room, which would serve as our television room and guest room but could be adapted as living space for returning family members and their children, for guests and, perhaps eventually



The author’s universally designed home.

for a live-in caregiver. We learned about the importance of incorporating maximal natural light and specific task lighting for aging eyes; we came to appreciate the value of including low-pile carpet, flush transitions between floor surfaces and glare-free floor surfaces and trim. We insisted upon including anti-scald devices on all taps and showers, easy-to-use handles and drawer pulls, crank-operated casement windows and large plates for light switches. We asked that reinforcement be added to all of the walls around showers and toilets to allow for the installation of grab bars, either immediately or later, when the need would be greater. We saw the benefit of having most of the windows come to within 18 inches of the floor so that it is easy to appreciate the outside view from a wheelchair, without having to stretch to be able to see. We have subsequently noticed that young children love being able to stand at the windows and see out with no difficulty at all.

With respect to the outside of the home, we were determined to minimize all outside maintenance by installing metal-clad low maintenance windows. All decking was made of composite material that does not require maintenance or painting. The garden has raised flower beds, which are much easier for older adults and their grandchildren to plant together, and the entire yard was simply designed, with no grass to cut or fertilize.

Energy efficiency and solar power

Energy efficiency was always important to us in trying to both save energy costs and preserve the health of the planet. Our home requires a heat recovery ventilator to recirculate fresh air into the home while holding the accumulated heat for further recirculation. We also incorporated a “passive solar wall” that gathers heat from the sun during the winter and directs it through a thermostatically controlled fan to the air return on the furnace. Two years ago, we decided to add 26 solar panels to the flat roof of the home and, through the use of reverse metering, for which excess solar-generated electricity is sold to the local electricity company, we are now able to produce almost 60% of our own electricity. The home has a tankless water heater, which, much to our surprise, has meant that our house insurance has recently been reduced by \$165 a year. Cork, a renewable resource, has been used on

floors in the walkout basement and the kitchen. We have come to appreciate its resilience and its softness, and have even remarked that it would offer a gentler landing if an older adult, or a child, was to trip and fall. We also asked that all of the subtrades use low-emission products and materials as often as possible when constructing and painting our new home.

Occupational therapy and spreading the word about universal design

Throughout the experience of designing our home, I have come to appreciate that, almost without exception, features or adaptations added to a home to accommodate the needs of those with a temporary or permanent reduction in abilities have proven to be beneficial to those of all ages. Yet, I remain troubled that the general public has little appreciation of the benefits of universal design, much beyond curb cuts, closed captioning on television and perhaps vegetable peelers! What options are there for increasing the public's awareness as to how beneficial universal design can be to the building of new homes?

There is certainly an important role here for occupational therapy professionals to spread the word that universal design has much to offer. Two years ago, we were approached by the Alberta Ballet to have our home included in their annual fundraising house tour. As one of the eight houses selected within Edmonton, we had almost 1000 people visit our home

over the selected weekend. To help us spread the word about universal design, we asked a group of occupational therapy students and graduates to serve as guides throughout the house. In addition, they offered advice and information on possible alterations to homes that might enable individuals to successfully age in place. Comments we received told us that the occupational therapists and students were a great addition to the home show — a small but successful first step in building greater public awareness of the advantages of universal design!

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Universal housing design and home modification practice in Australia

Liz Ainsworth and Desleigh de Jonge

There are a range of organizations providing universally designed features within homes for older adults and people with a disability in Australia. Occupational therapists work within or in partnership with a number of services to address the environmental barriers that limit participation in the home. This article aims to give the reader an understanding of universal housing design and home modification practice in Australia, and highlights the leadership and innovative practice demonstrated by Australian occupational therapists in various settings.

With a population of 22 million people, one in five with a disability and a significant proportion of whom are aging (Australian Bureau of Statistics, 2012), there is an overwhelming need to ensure homes are universally designed. The majority of existing housing does not cater to the changing needs of the population, despite efforts by the federal government to fund home modifications in both the social housing and private housing sectors. In recognition of this, Livable Housing Australia (LHA; <http://livablehousingaustralia.org.au/>) was formed by building and disability sector representatives to address the future housing needs of the diverse population. This non-government organization has created and promotes the Livable Housing design guidelines (LHA, 2012). The focus of the Livable Housing design approach has been on providing visitable housing, which must include basic features that provide access to and within specific areas of the home.

Occupational therapists have long recognized the need for well-designed housing, and have taken opportunities over the years to show leadership, develop innovative resources and practice, and provide input into strategic planning, policy and practice relating to new construction design and home modifications. It was, therefore, a natural fit for occupational therapists to become involved with LHA. Some of the roles and activities undertaken by occupational therapists related to this organization have included:

- Appointment as Livable Housing Advisors to review plans and buildings under construction or to review those buildings that have been modified for recommendation for certification to bear the Livable Housing logo.
- Membership on the Technical Advisory Panel to provide advice about the products being documented by the initiative and the design documentation itself.
- Membership with the Australian Network of Universal Housing Design to promote the features of a universally designed home and to support the change in legislation to

make it mandatory for all new homes to be built according to the Livable Housing design guidelines.

- Promotion of Livable Housing design features to be incorporated into the design of public rental housing and government-funded social housing; participating in review committees for these design documents.
- Review of specific designs relating to housing and public buildings and providing signatures to indicate approval of plan designs.
- Incorporation of Livable Housing design features into medico-legal reports for clients who have sustained catastrophic or complex injuries, and reviewing and signing off on plans after settlement to ensure the designs best meet client needs.

Despite these developments, occupational therapy service delivery in this field continues to be inconsistent, as a result of the large geographical spread of services around the nation and the lack of a national policy and practice framework for the consistent delivery of home modifications across Australia. Further, the current practice environment continues to undergo significant changes, including the devolution of government services to the private sector in some areas and the emergence of new models of service delivery as a result of some new and reformed federal programs.

While these changes present numerous challenges, they also afford many opportunities for occupational therapists to influence models of service delivery and affect current and future policy and practice relating to housing design and modifications. Such change provides the profession with the chance to demonstrate leadership and innovative practice.

Occupational therapists have worked in a number of positions to assist administrative staff, designers, policy-makers, management and technical staff to understand the intent of legislation and standards related to the provision of housing for older adults and people with a disability. They have provided input on designs and products to design review and post-construction review committees and promoted the need to incorporate client feedback into any evaluation process. Occupational therapists have also undertaken specific research into the effectiveness of home modifications and service provision intended to enhance health, safety, independence and quality of life in the home. This research has provided valuable feedback on the value and effectiveness of home modifications for clients, and brought to light concerns clients have about the process of service delivery. It

has also stimulated the review of current assessment practices and the development of better practice tools.

Other innovative and emerging practices being undertaken by occupational therapists in Australia to ensure efficient and effective delivery of services for clients needing well-designed or modified homes include:

- Mobilization of teams consisting of an occupational therapist and a builder to assess need, select interventions, discuss options with the client, install minor or major home modifications, train the client and evaluate effectiveness, all within one day.
- Mentorship through an experienced occupational therapist accompanying a less-experienced occupational therapist on home visits to assist with her or his learning of home modification practice.
- Peer-review of occupational therapy reports by a panel of expert therapists to determine if the recommendations can be endorsed for installation.
- Development of resources to enable clients to self-assess the suitability of their home for the long term, and to assist with future planning (e.g., *A Way to Stay* [Scope Access, 2013]).
- Creation of regular newsletters, discussion groups, networking meetings, a Facebook page (HomeMods4OT) and home modification listservs to enable nationwide networking among occupational therapists, consumers and design and construction professionals. Discussions address policy and practice issues relating to universal housing design, as well as access to public and private buildings.
- Use of technology, such as smart phones and tablets, on home visits to record and transmit information, including drawings and photos of the client's environment and equipment, as well as footage of the client's ability to manage in the home environment.
- Use of mobile technologies to link occupational therapists in the field with builders and advisors for live collaboration and supervision without incurring the cost of travel.

Various nationwide resources have also been developed with assistance from occupational therapists, including the Home Modification Information Clearing House (<http://www.homemods.info>), which provides up-to-date information and resources related to home modification practice, and the New South Wales Home Modification and Maintenance Council (<http://www.nswhmms.org.au>), which provides resources and

training for occupational therapists and design and construction professionals.

Challenges

Current challenges for occupational therapists include meeting the lifestyle requirements of an increasing number of clients who are aging or have a health condition. Waitlists for occupational therapy services are continuing to grow as people become more aware of the benefits of home modifications and the valuable role of occupational therapists in this area. Service delivery is occurring in an environment in which significant technological and organizational changes are occurring, impacting the availability of occupational therapists to provide direct client service. A further challenge for occupational therapists is to lead change within human services to enable older people and people with a disability to live safely and independently in their preferred communities.

Conclusion

Occupational therapists possess unique skills and a perspective that recognizes the value of incorporating universal housing design into home modifications and new construction solutions. Given the wealth of experience that occupational therapists have in understanding impairment and disability, and the impact of these on performance in various areas of the home, they can provide valuable input into the review and development of a range of government policies and practices related to building design, construction and modifications, as well as social planning. These invaluable contributions, as demonstrated in Australian practice, ensure that housing designs, products and service delivery are responsive to the diversity of client requirements. Moving from direct service delivery into leadership roles ensures that the profession's capacity to provide innovative services can be clearly recognized and valued.

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Liz and Desleigh co-authored a book: Ainsworth, E. & de Jonge, D. (2011). *An occupational therapist's guide to home modification practice*. Thorofare, NJ: SLACK, Inc.

Editor's note: The authors' book is available at www.caot.ca/store or by contacting publications@caot.ca

Update from the Canadian Occupational Therapy Foundation

COTF 2014 scholarship competition

The deadline for the 2014 scholarship competition is October 1, 2014. COTF will be offering the following awards:

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3. COTF Master's Scholarship
4. COTF/Invacare Master's Scholarship
5. Goldwin Howland Scholarship
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For more information or to apply online, please visit: www.cotfcanada.org Technical questions can be directed to: amcdonald@cotfcanada.org All other questions can be directed to: skamble@cotfcanada.org

The success of COTF's sessions at the CAOT Conference: Testimonial by Ivonne Montgomery

At the past two CAOT Conferences (2013 and 2014), I had the pleasure of attending the COTF Session. These were centered on building a mentorship program by moving research into practice. Both sessions were very dynamic and focused on finding a match for occupational therapy clinicians with varying interests and abilities who would like to be involved in research with academic researcher support. Open, forthright dialogue was a hallmark of these sessions, with both clinicians and academic researchers speaking freely regarding their interests, needs and abilities to move this agenda into reality.

The facilitators of the sessions were open to all ideas and suggestions. Despite the range of interests and capacities of both occupational therapists and academic researchers who were present, as well as the wide range of potential avenues to pursue, the facilitators of these sessions were able to move concepts and possibilities forward. This was evident when witnessing the ideas discussed at last year's session being brought forward currently as "next steps." Additionally, it was impressive to see that there has been much work going on behind the scenes with ideas made into reality. For example,

the new COTF Clinical Research Award is now available. This award supports research by a clinical occupational therapist paired with an occupational therapist with demonstrated research experience. Facilitating these forms of partnership can lead to effective outcomes and long-lasting collaboration, moving evidence-based practice forward in occupational therapy.

As a clinician and University of British Columbia Master of Rehabilitation Science student, I am very excited to see this initiative continue to develop and commend COTF for all of their work and efforts to support clinical occupational therapists.

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Make a donation now! www.cotfcanada.org

COTF is the only organization that provides funding solely to occupational therapists who are CAOT members!

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 <p>25 ADVANCED STRATEGIES TO PROMOTE POSITIVE EMOTIONAL HABITS</p> <p><i>A Workshop for a Broad Range of Professionals in Clinical and Non-Clinical Settings</i></p>  <p>JOHN PRESTON, PSY.D.</p> <table border="0"> <tr><td>Halifax, NS.....</td><td>Oct 20, 2014</td></tr> <tr><td>Ottawa, ON.....</td><td>Oct 22, 2014</td></tr> <tr><td>Toronto, ON.....</td><td>Oct 24, 2014</td></tr> <tr><td>Saskatoon, SK.....</td><td>Nov 21, 2014</td></tr> <tr><td>Vancouver, BC.....</td><td>Dec 3, 2014</td></tr> <tr><td>Victoria, BC.....</td><td>Dec 4, 2014</td></tr> </table>	Halifax, NS.....	Oct 20, 2014	Ottawa, ON.....	Oct 22, 2014	Toronto, ON.....	Oct 24, 2014	Saskatoon, SK.....	Nov 21, 2014	Vancouver, BC.....	Dec 3, 2014	Victoria, BC.....	Dec 4, 2014	<p><i>Canada's 5th Annual</i> PREMIER PSYCHOTHERAPY CONFERENCE</p>  <p>HEALING & TREATING TRAUMA, ADDICTIONS & RELATED DISORDERS</p> <p>3-Day Conference in Calgary, Alberta November 19, 20 & 21, 2014</p>
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Call for Papers

CAOT Conference • 2015 • Congrès de l'ACE
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Artist: Ildiko Nova

Occupational Justice: Rising to the challenge

For hundreds of years people have gathered at the junction of the Red and Assiniboine rivers where Winnipeg now stands to meet, trade goods, share ideas and build communities. Today, the Canadian Museum of Human Rights rises majestically above the prairie horizon as a reminder of our collective commitment to furthering human rights and occupational justice for all people. Occupational therapists have developed an understanding of the importance of addressing injustices to enable people's full participation in occupations that are meaningful and enriching. Please join us in Winnipeg to share your knowledge and strategies for rising to the challenge of enhancing occupational justice in our communities.

Call for Papers deadline: October 1, 2014

Submit your proposal online at www.caot.ca
 Information: (800) 434-2268, ext. 232 • E-mail: conference@caot.ca
 Conference Program available February 1, 2015 at www.caot.ca
 Early Bird Registration: February 1 - April 13, 2015

The logo was created by Winnipeg artist Ildiko Nova from Artbeat Studio/Studio Central. The logo depicts the changing skyline of Winnipeg, highlighting the new Canadian Museum for Human Rights and the moving waters of the Red and Assiniboine Rivers. Artbeat Studio is a mental health consumer initiated, peer directed and recovery oriented program with a vision to enable consumers of mental health services to engage in artistic expression that promotes recovery, empowerment and community.



CAOT - ACE

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