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Exploring the Value of Interprofessional Collaboration between Occupational Therapy and Design: A Pilot Survey Study

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Abstract

Background: Consistent with the American Occupational Therapy Association's Vision 2025, interprofessional partnerships between occupational therapy and designers is necessary to "maximize health, well-being, and quality of life for all people . . . through effective solutions that facilitate participation in everyday living" (2016, para 1). Occupational therapy's knowledge of the person-environment-occupation fit appears to make us well suited to collaborate with design teams to create environments that facilitate optimal function and promote health and well-being (Ainsworth & de Jonge, 2014).

Method: Two short closed-ended online questionnaires were designed to gain an understanding of designer and occupational therapy practitioner impressions of interprofessional collaborations between occupational therapy practitioners and designers.

Results: Domestically and internationally, 224 occupational therapy practitioners and 127 designers completed the questionnaires. The results indicate current barriers to collaboration among occupational therapy practitioners and designers are due to different professional languages, a lack of opportunity to interface, and designers not fully grasping the scope of occupational therapy as well as its value, which was found to be statistically significant.

Conclusions: Productive daily living is incumbent upon a person supported by his or her environment using products to complete daily tasks that facilitate participation. Evidence-based research is needed to demonstrate the distinct value of occupational therapy on design teams.

Keywords
occupational therapy, design, interprofessional, collaboration

Cover Page Footnote

Credentials Display and Country
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Creating environments and products that meet complex societal needs requires more than a single-discipline design approach. Through our research, we explored the notion of collaboration through Patrick Maxwell's (2012) words, "Breakthroughs . . . occur when people trained in different disciplines come together" (p. 41). With increasing interest in interdisciplinary and interprofessional collaborative design processes, an under-reported yet important collaborative design approach is melding the unique skill set of occupational therapy with design disciplines and professions, such as architecture; interior design; landscape architecture; and clothing, lighting, graphic, and human computer interface design to create environments and products that best meet users' needs. In this paper, we argue that occupational therapy practitioners are well suited to move beyond our typical role of modifying home environments and recommending adaptive equipment to become involved with the design of spaces, products, services, and systems that engender client autonomy and control.

Our capacity for partnering in design projects is significant. Occupational therapy practitioners can use their unique knowledge of person-environment-occupation fit to collaborate with design teams to create environments that facilitate optimal function and promote health and well-being (Ainsworth & de Jonge, 2014; Canadian Association of Occupational Therapists, 2003; Layton & Steel, 2015). From a community population level, health is advocated for when we create and improve physical and social

environments to support people in developing "their fullest potential" (Renalds, Smith, & Hale, 2010, p. 68). Occupational therapists can encourage designs that are both holistic and evidence-based. Neighborhoods with homes with porches and with streets and sidewalks that provide connectivity among neighbors elicit perceptions of safety and promote socialization, physical activity, and well-being (Renalds et al., 2010). Codesigning communities with verdant urban open spaces encourages human activity, provides sensory stimulation, affords safety and security, and promotes healing socialization and well-being (Srinivasan, O'Fallon, & Dearry, 2003). Irregular street layouts (with minimal crossroads, uncomplicated forked or t-junctions, and a hierarchy of main and residential side streets) have the highest legibility factor for people with dementia, thus decreasing their risk of getting lost when going out alone (Mitchell & Burton, 2010).

Our profession's knowledge of cognitive processing is important in health care settings in which clear and intelligible wayfinding can reduce anxiety and confusion for patients and family members (Golembiewski, 2013). In senior living and health care settings, occupational therapy practitioners can be valuable design partners, as they understand how the placement of grab bars, hand-held showers, mirrors, and soap dispensers can hinder or promote function and full participation in daily living. In educational settings, occupational therapy practitioners can share how difficulties in sensory processing that impact learning can be exacerbated or ameliorated by

environmental design choices (Kinnealey et al., 2012). In living and work environments, occupational therapy practitioners can assist in creating environments that promote comfort and well-being by controlling sound levels, lighting, temperature, and the fit of furniture to meet individuals' physical and sensory needs (Christenson, 1990). With knowledge of changes in vision and cognition in later life, occupational therapy practitioners can reduce falls among older adults with their understanding that dark rugs on a light-colored floor can be perceived as holes in the floor, or that sun shining through a beautiful garden trellis creates strong light and dark shadow patterns on walkways that can appear as obstacles to step over.

Our training enables us to contribute to many types of design projects. We can consult on a website design so that individuals with blindness or low vision can successfully navigate the site. Occupational therapy practitioners are well versed in disabling conditions and human development, and thus can actively participate in designing clothing for individuals with physical challenges. Furthermore, occupational therapy recognizes the dynamic nature of the disability continuum. Whether through normal development or due to disease or disability, an environment that once provided good person-environment-occupation fit may need redesign to adapt to changes in functional abilities (Strong et al., 1999). The emotional response generated by such situations can be difficult. The family home, for example, represents much more than simply a functional space that

houses a person with a disability. Redesign of an individual's home can trigger a sense of loss of control and force confrontation with the nature of the disability. Families undergoing such projects value and benefit from validation and inclusion in the design process. Morgan, Boniface, and Reagon (2016) suggest that professionals working in this area should attend to the complex nature of disability and ensure a holistic view of the person served, both at the time of the design project and in the future. When collaborating on interprofessional design teams, occupational therapy practitioners are well positioned to integrate this complex information and share it with architects, landscape architects, and web and graphic designers, who may or may not, by virtue of their training, be as well informed.

When individuals are supported in participating fully in life, health and well-being is promoted (World Federation of Occupational Therapists, 2012). Involving occupational therapy practitioners in the design of environments and products from the outset can positively influence the process for good design approaches that optimize user function and health. Employing an interprofessional design process has the capacity to positively contribute to user satisfaction and, subsequently, increased participation in daily life.

Collaboration

Interprofessional collaboration is often challenging, and despite many points of connection, some of which we have shared, the languages and frameworks of design and health care professions, including occupational therapy, remain separate. A

conscious decision to bridge that gap is necessary. At the inaugural meeting of the American Institute of Architecture Design & Health Research Consortium, interprofessional teams consisting of architects, city planners, and public health professionals were encouraged to meld together their "adjacent but distinct professional vocabularies" (Pulse on Progress, p. 15). To do so, members were advised by organizers to try to suspend assumptions about other disciplines, and instead truly engage with each other to create a new, shared language (Pulse on Progress, 2015).

Of interest is that early on in one's professional training there appear to be barriers to collaboration. A recent survey study by Larkin, Hitch, Watchorn, Ang, and Stagnitti (2013) examined first-year architecture and third-year occupational therapy students' impressions of a semester long series of interprofessional activities. The researchers used the *Readiness for Interprofessional Learning Scale* (RIPLS) as a pre and posttest measure at weeks 1 and 12 of the semester. Pretest results indicated that the architecture students were significantly more negative about the process than the occupational therapy students. At posttest, the architecture students remained more negative, but in some of the questions it was noted that there were declines in the scores of the occupational therapy students. In an ideal continuum, interprofessional practice is a natural extension of interprofessional education. Introducing students to traditional and nontraditional interprofessional experiences during their academic programs can be an important step

forward in creating future generations of practitioners who collaborate in their general scope of practice (e.g., health care or design) or beyond traditional collaborations, such as health care and design. While we may attribute being established in one's practice as a limiting factor in interprofessionalism, clearly early on there appear to be other pre-professional biases that challenge interprofessionalism between design and occupational therapy. Further exploration of these apparent biases is warranted if a culture of collaboration is a future goal for emerging practitioners to achieve.

Based in part on training and professional culture, several types of collaboration are typically employed in design and occupational therapy. They include silo, multidisciplinary, interdisciplinary, and interprofessional models of practice (Falk-Kessler, 2014). The level of interaction between team members, shared decision-making, collaboration, and communication depends on the model of practice. Selecting a model of collaboration for any type of design project entails "the ability to recognize and respect the expertise of others and work with them in the patient's [or end user's] best interest" (Cruess & Cruess, 2016, p. 13).

Well-honed collaborations succeed for several reasons. Designs become richer with different perspectives directed toward a common goal. Knowledge and expertise can be shared as all members of a design team come to a project with different professional skill sets and worldviews. Successful outcomes, and a space well used to its fullest capacity and in ways the design team may

not even have considered, depend on the design processes and the design itself. But in all reality, a team of experts does not necessarily make for an expert team (Salas, Cannon-Bowers, & Johnston, 1997). What, then, constitutes an expert team?

Interprofessional Model of Practice

For the purposes of this paper, we explored only interprofessional collaboration. An interprofessional design team is comprised of multiple professions. Interprofessionalism is the development of a cohesive practice between professionals from different disciplines. Its purpose is to meld professional practice through a process by which professionals reflect on and develop ways of practicing that provide an integrated and cohesive answer to the needs of the client, family, and/or population (D'Amour & Onadasan, 2005). The "environment of practice and the determinants and processes that support a cohesive practice" shape an interprofessional design process (p. 10).

All interprofessional team members are active learners. There is no staking of professional territorialism. Team members support one another and work collaboratively through purposeful interaction to produce quality long-term outcomes from the start to finish of a project. Interprofessional design practice is about blurring the lines and reaching across the aisle. Interprofessional design approaches are risky, smart, and good practice. It takes vision, courage, humility, humor, patience, and time for interprofessional practice to gel. Looking at design through an interprofessional lens enables design and occupational therapy and other allied health care professionals to collaborate successfully to create environments and products that support health and wellbeing and active engagement in life (Wagenfeld & Winterbottom, 2015).

According to McMurty (2013), interprofessionalism requires from its team members "diverse perspectives, constructing common ground, negotiating conflicts, and synthesis [of perspectives]" (p. 76) to "produce something that is 'greater than the sum of the parts'" (p. 82). In terms of diverse perspectives, occupational therapy focuses on the person-environment-occupational performance fit. Design focuses on creating environments, products, and services for people. Through mutual respect and active listening, and a user-centered focus, conflicts and differing professional values can be shifted to productive design outcomes. Synthesizing shared knowledge of the important relationship between a person and his or her interaction in the environment can lead to impactful outcomes for end users.

Why Collaborate

The prevailing assumption may be that the only projects in which occupational therapy and design can collaborate are those that involve people with disabling or chronic conditions, such as health care design, adapted playgrounds, aging in place, adaptive equipment and clothing, or modified website projects. In support of current research, we argue that there is another way to look through the lens of interprofessional collaboration. If every designed product or environment is intended to be useful for the widest range of people possible, all design can and should be approached through an

interprofessional process. Layering occupational therapy practitioners' awareness of the relationship between the person, environment, and performance with that of the designers' awareness of the person-environment relationship is, arguably, the most effective and compassionate way to ensure that the outcomes of projects promote people who are fully engaged in using a product, service, or environment to its optimal capacity. As a result of this collaborative potential in design, this study sought to understand how occupational therapists and designers understand each other and perceive the value of interprofessional collaboration.

Method

Design and Instruments

A survey method was used for this pilot study. Two short questionnaires were co-designed by the authors, one for occupational therapy practitioners and one for designers (including architects; landscape architects; and industrial, lighting, web, graphic, clothing, and furniture designers). The questionnaires were designed to gain an understanding of the respondents' impressions of interprofessional collaborations between occupational therapy practitioners and designers and were pilot tested by two occupational therapists and a designer. The occupational therapy practitioner questionnaire contained 18 questions and the designer questionnaire had 14 questions. The questions for both questionnaires were close-ended with either multiple choice or Likert scale formatted, forced choice responses. Demographic questions asked for information about a specific level of occupational therapy practice (OT/OTA),

specific design discipline, years in practice, location of practice, and gender. The other questions were developed to examine the respondent's level of understanding, interpretation, and perceived value of interprofessional collaboration between occupational therapy and design, as well as the frequency of collaborative endeavors and the likelihood of continued collaboration or the initiation of such. Eight questions were the same for both questionnaires. The surveys were customized to reflect practice questions that both overlap and are unique to occupational therapy practitioners and designers. We were particularly interested in what designers know and think about occupational therapy's role in design. These findings have been submitted for publication in a design journal. Questions focused on the designers' familiarity with occupational therapy with a follow up about their feeling as to whether it is part of our scope of practice to engage in design projects, whether they are aware of collaboration and its rate of frequency, and what occupational therapy can bring to the table in terms of design. A checklist was provided for the designers to indicate which (if any) health care professionals they viewed as potential design partners. The questionnaires were posted as separate links on Secure Survey©.

The first author holds specialty certification in environmental modifications through the American Occupational Therapy Association, has expertise in collaborative therapeutic garden design, and is a researcher. The second author is an occupational therapist and gerontologist with a focus on therapeutic environments for older adults,

and is a researcher. Both hold academic positions. The third author is an occupational therapist as well as an industrial designer and is an enabling design advocate. The questionnaires were designed to be short to encourage a higher participation rate. The study was approved by the Western Michigan University Human Subjects Institutional Review Board.

Population

A nonprobability convenience sampling technique was employed to generate the respondents for this study. Two hundred and twenty-four occupational therapy practitioners completed the questionnaire and 127 designers completed their respective questionnaire. Ninety-two percent of the occupational therapy practitioner responses came from the United States, 6% from Europe, and 2% from Africa. Seventy percent of the designer responses came from the United States, 23% from Europe, and the remaining 7% from South America, Asia, the Middle East, and Australia/New Zealand. See Table 1 for detailed information about the completed questionnaire response rates.

Table 1
Response Rates

Group	Total number of questionnaires initiated	Total number of questionnaires completed	Rate of return
Occupational Therapy Practitioners	776	224	29%
• Occupational Therapist		211	
• Occupational Therapy Assistant*		13	
Designers	543	127	23%
• Architect		45	
• Landscape Architect		22	
• Interior Designer		22	
• Product: Furniture, fashion, graphic, website		27	
• Industrial Designer		10	
• Lighting Designer		1	
Combined Occupational Therapy Practitioners and Designers	1309	351	27%

Note. *Due to the low rate of occupational therapy assistant responses as compared to occupational therapist, data is reported as occupational therapy practitioner.

Procedures

Invitations were submitted electronically May 2016 through July 2016, and the links to the questionnaires remained open until August 30, 2016. An invitation containing a short description of the study, as well as a link to the Secure Survey© site, was submitted to 13 occupational therapy and 32 design domestic and international (English

speaking) social media sites identified by the research team. An invitation to participate in the study was also sent to the Western Michigan University occupational therapy alumna email group. The notification asked potential respondents to invite other colleagues to participate in the study, thus creating a snowballing data collection method. Data was analyzed using SPSS Version 24. Descriptive statistics and two-sample t-tests with significance at .05 were used to interpret the data for the questions in both surveys.

Results

Two hundred and twenty-four occupational therapy practitioners responded, with 33% (n = 75) reporting having participated in an interprofessional design project. Of the 127 designer responses, 31% (n = 40) reported having worked with occupational therapy practitioners on design projects. That said, 88% (n = 197) of occupational therapy practitioners strongly believe there is not enough collaboration between occupational therapy and design, 8% (n = 18) feel it is not in the scope of practice, and only 4% (n = 9) are satisfied that there is enough interprofessional collaboration between occupational therapy and design (see Figure 1).
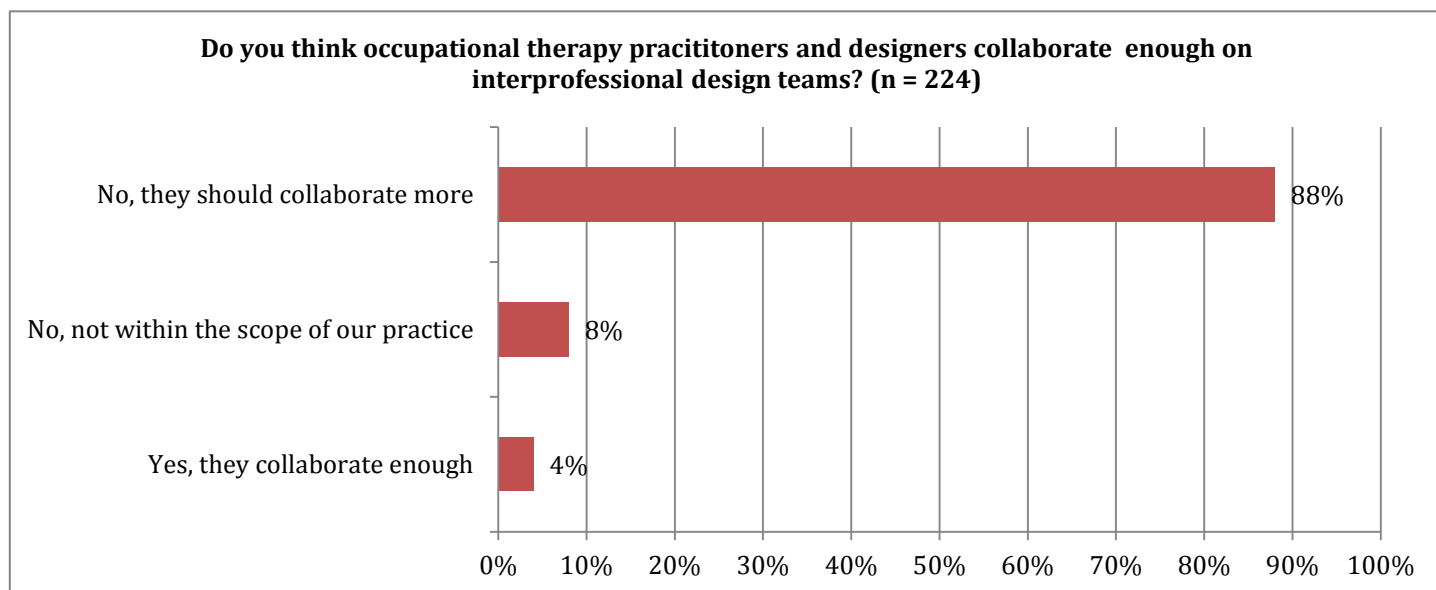

Figure 1. Do occupational therapy practitioners collaborate enough on design teams?

A successful interprofessional design process hinges on team members' clear understanding of the capacity and scope of all partners who are working together. Results of this study showed that there is lack of clarity between

occupational therapy practitioners and designers regarding each other's contributions to the design process. Seventy-one percent (n = 90) of the designers feel that they have the skills and training to design spaces, products, or services that meet the

intended user's needs as compared to 39% (n = 88) of occupational therapists who feel designers have these skills. Further, while 54% (n = 69) of the designers reported knowing how to integrate nature and other sources of inspiration into the environment to enhance wellness and quality of life, only 34% (n = 77) of the occupational therapists feel that designers' skills encompass this component of design. Both areas are common to the core of the person-environment-occupation fit, a central tenet of occupational therapy. There was general agreement between the groups (57% [n = 72] of the designers and 53% [n = 118] of the occupational therapy practitioners) that designers know how to use material properties to create sensory experiences and to move a design from concept to completion for user interaction (see Figure 2).
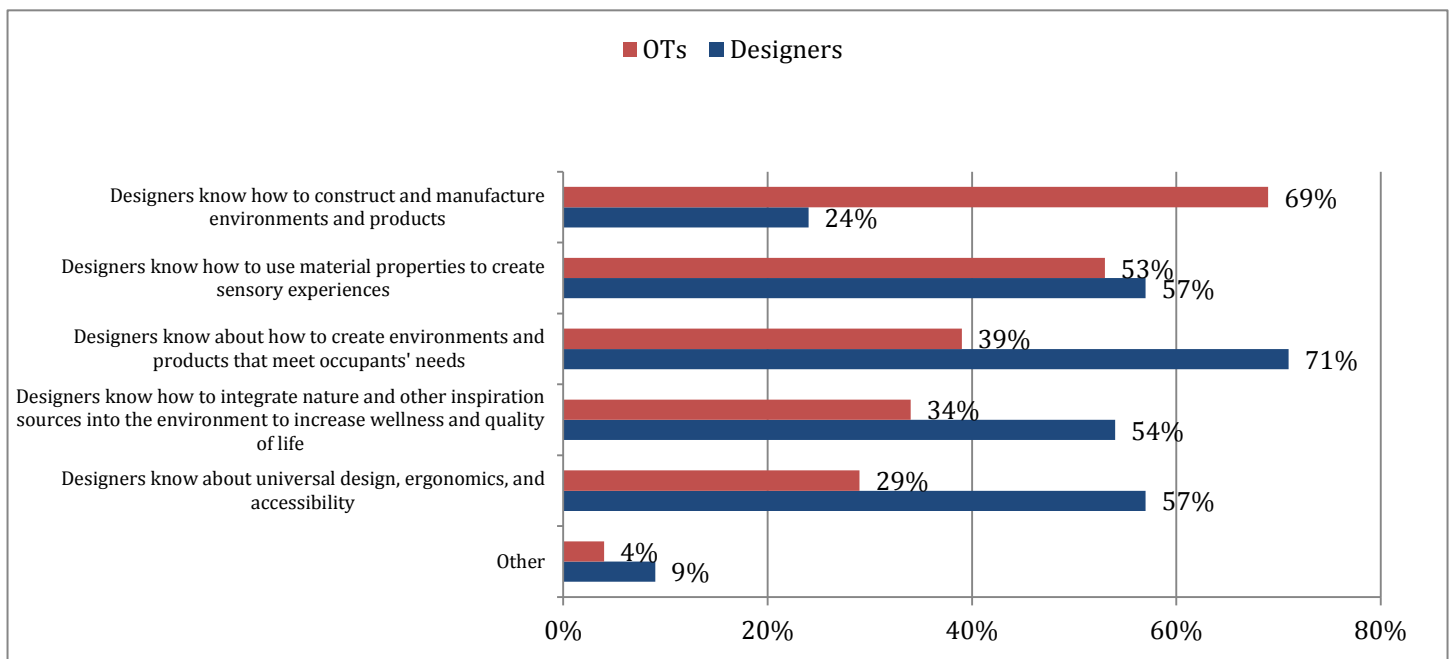

Figure 2. Areas in which designers can contribute to interprofessional design projects.

There were discrepancies between what the occupational therapy practitioners and the designers felt the other can contribute to an interprofessional design process, but there was similar agreement on foundational barriers to engaging in the interprofessional design processes. There was essentially even agreement (84% [n = 189] of the occupational therapy practitioners and 83% [n = 105] of the designers that) that lack of opportunity to meet is the greatest barrier to collaboration. Seventy-five percent (n = 169) of the occupational therapy practitioners and 66% (n = 84) of the designers responded that designers are not fully aware of the scope and capacity of occupational therapy. When broken down by design disciplines, 80% (n = 10) of industrial designers, 77% (n = 22) of landscape architects, 69% (n = 45) of architects, 67% (n = 27) of product designers, 59% (n = 22) of interior designers, and 0% of lighting designers (n = 1) responded that they do feel it is in the scope of occupational therapy to be part of collaborative design projects. The designers generally agreed

(43%, n = 55) with occupational therapists (41%, n = 91) that occupational therapy practitioners are not familiar with how designers work. Finally, a lack of common language (32% [n = 71] of the occupational therapists and 24% [n = 31] of the designers) among the professions presents another layer of challenge to interprofessional collaboration (Wagenfeld, Amiri, & Reynolds, 2016, submitted for publication).

Statistical significance was noted between the occupational therapy practitioners' and designers' application of evidence-based practices into their work (p < .001). The occupational therapy practitioners (n = 224, mean 2.37, standard error of the mean .041) reported using evidence-based practice more than the designers (n = 127, mean 1.91, standard error of the mean .088) (see Figure 3). There was also a statistically significant difference between the occupational therapy practitioners' and the designers' belief that occupational therapy should be represented on interprofessional design teams (p < .001). Ninety-eight percent of the occupational therapy practitioners believe there is a role for occupational therapy on a design team, as compared to 69% of the designers who feel occupational therapy belongs on the team.
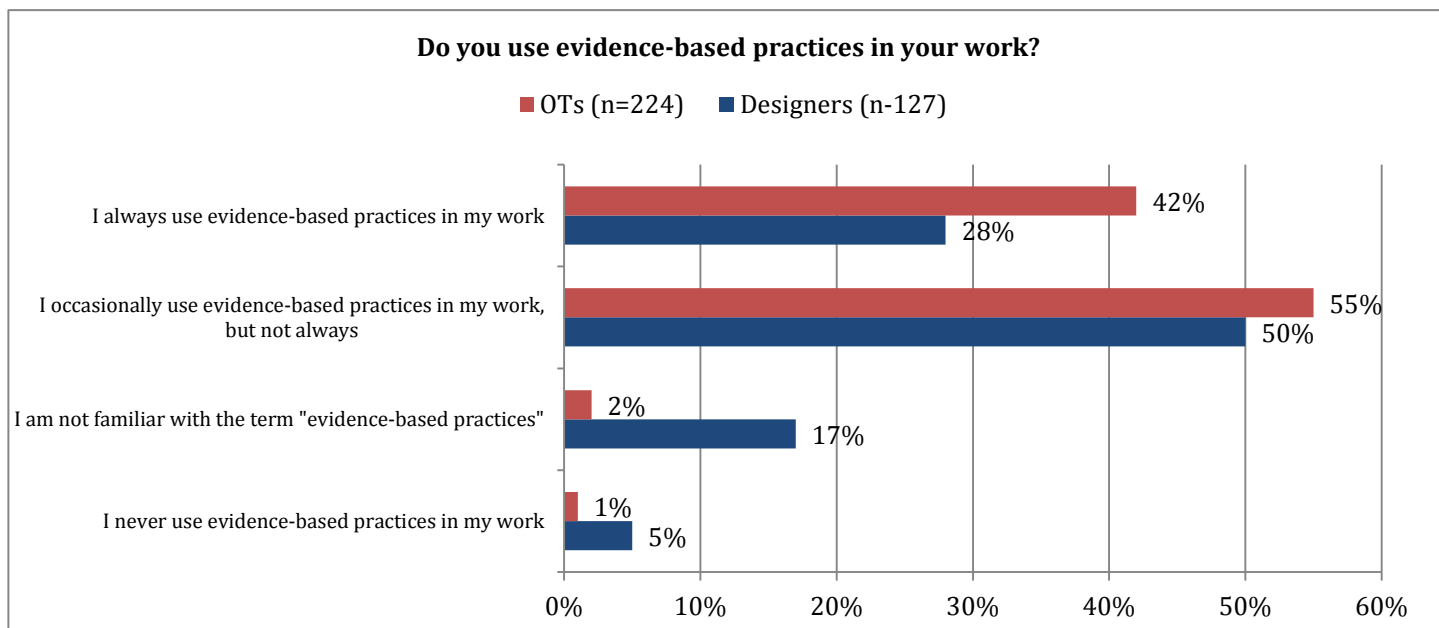
Do you use evidence-based practices in your work?

■ OTs (n=224) ■ Designers (n-127)

I always use evidence-based practices in my work	42% / 28%
I occasionally use evidence-based practices in my work, but not always	55% / 50%
I am not familiar with the term "evidence-based practices"	2% / 17%
I never use evidence-based practices in my work	1% / 5%

Figure 3. Use of evidence-based practice and group statistics.

Discussion

While the findings indicate that the designers do, to some extent, recognize that the scope of occupational therapy validates participation in design projects, the results of the survey reveal barriers to collaboration. One notable barrier is that a high percentage of the designers (71%) feel they possess the required skills to design spaces, products, and services that meet user's needs, and therefore may not reach out to other professionals who have a unique knowledge of the user and the environmental influence on function.

Other barriers to collaboration include limited opportunities to meet, a lack of a common language needed for interprofessional relationships, and reduced awareness among professions, with 66% of the designers not fully aware of the scope of occupational therapy practice and 41% of the occupational therapy practitioners not fully aware of the contributions designers can make. As noted by Larkin et al. (2013), this lack of understanding between the professions may begin during professional training of the respective disciplines. On entering the field, designers may not fully recognize the scope and capacity for occupational therapy's contribution to design, thus limiting opportunities for interprofessional collaboration. As there are unique contributions that designers and occupational therapists bring to collaboration that enhance outcomes for the end user (McMurtry, 2013), we must suspend assumptions about other disciplines and decide to engage in order to understand and value the unique skills of each profession (Pulse on Progress, 2015).

Designers or teams who are approaching projects from silo practice models are overlooking important opportunities to use evidence from both the design and health care professions to create spaces, products, services, and systems that at minimum meet the needs of its end users and at best exceed those needs. As professionals we must truly engage with each other to create a shared language and build alliances that can lead to innovative solutions to complex issues (Pulse on Progress, 2015; Sutton & Kemp, 2006). In alignment with the American Occupational Therapy Association's

Vision 2025, that "occupational therapy maximizes health, well-being, and quality of life for all people, populations, and communities through effective solutions that facilitate participation in everyday living" (2016, para 1), developing interprofessional partnerships between occupational therapy practitioners and designers is necessary and needed. Because productive daily living is incumbent on environments and products that facilitate participation, who better to be an integral change agent to ensure user-centered outcomes in a partnership with designers than occupational therapy practitioners? Designers and occupational therapy practitioners can blend their respective skills and embrace a mutually respectful user-centered design mentality that exemplifies innovation and excellence. The inherent value of doing so may be a greater capacity for compassionate user-focused design outcomes. Combining intensive knowledge of client conditions and occupational performance with design principles through interprofessional collaboration can lead to outcomes that from the outset enable the intended end users to use a space, product, or service fully without encumbrance or the need for revision or further adaptation, but most importantly with equity and dignity.

Limitations

The greatest limitation of the study was the design itself. While descriptive survey studies can provide findings that support the necessity for additional correlational or experimental research on the same topic, they are limiting in terms of the information they yield. While this pilot study did in

fact provide us with preliminary findings suggesting that designers and occupational therapists do, to a limited extent, engage in interprofessional projects, there are notable barriers that prevent it from becoming mainstream practice, namely that designers are not as convinced as occupational therapists that there is value to having occupational therapy as an integral part of a design process. Thus, without a more robust examination of the value of interprofessional design processes between designers and occupational therapy practitioners, we remain in a position of stasis regarding being able to advocate adequately for the distinct value of occupational therapy in interprofessional design. This is a call to action for occupational therapy practitioners to take on the challenge of engaging in evidence-based research that measures the effectiveness of interprofessional design projects that bring occupational therapy and design together as equal partners with the mutual goal of improving the lives of those for whom the design is intended.

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Lori Reynolds, PhD, OTR/L is Assistant Professor in the Department of Occupational Therapy at Northern Arizona University. Her publications and presentations are on the value of nature for older adults, how individuals' relationship with nature influences their use of gardens in senior living, and the role of occupational therapy in design of environments and being a part interprofessional design teams. She consults with senior living organizations and landscape architects on

the creation of therapeutic garden spaces, and indoor nature spaces that promote health and wellness, and can reduce dementia-related behaviors.

Tamar Amiri, MSc, OTR/L is an occupational therapist with a background in industrial design. Her clinical work is in the fields of blindness and visual impairments, developmental disabilities and dementia. Tamar participates in research and advocacy activities relating to enabling design and inclusion.

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