

Research Proposal

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Regis

Introduction

There are a variety of interpretations of what it means to be disabled. This study will adopt Nagi's definition of disability which is, the presence of a health condition that impinges on activities that are socially expected of them. This barrier to activity is related to the environment in which individuals live (Nagi, 1969). According to the 2016 American Community Survey (ACS) The overall percentage of individuals living with a disability in the US was 12.8 percent. The highest of the six identified disabilities was "Ambulatory Disability," at 7.1 percent (Erikson, 2017). The U.S. Census Bureau classifies "Ambulatory Disability," as a person who has serious difficulty walking or climbing stairs (Erikson, 2017). Previous research has identified clothing as environmental barrier, to occupational performance, for those living with an "ambulatory disability," (Wang, 2014).

When designing clothing that eliminates those environmental barriers it is just as important to consider the aesthetic as it is to consider the function. Clothing holds a functional value, and a spiritual value to individuals. Solomon and Douglas (1985) have noted that clothes serve not only as external cues observed by others, but also as internal cues that affect a wearer's self-confidence. Applying universal design guidelines when developing clothing for individuals with disabilities would help to incorporate both values into the final product.

Universal design (UD) theory came about in the 1980's to address the environmental barriers faced by those with disabilities. UD works to optimize person-environment interactions by creating environments and products that cater to populations with varying physical disabilities. The profession of occupational therapy is fundamentally oriented with universal design in that they both seek to reduce barriers to occupational performance. This shared philosophy can be of benefit when developing products intended for consumers with disabilities.

Occupational therapists apply their knowledge of disability when reducing barriers to occupational performance. Aside from disability, occupational therapists have a rich knowledge base in a variety of areas including, body structures, body functions, and health conditions. When developing inclusive clothing to be manufactured for market, it has fit into a 12-month lead time. Incorporating occupational therapists into the development stage will create a more efficient framework. The wealth of information that an occupational therapist can contribute to the design team will help to make the garment appropriate for the greatest demographic. The purpose of this study is to show that when a designer collaborates with an occupational therapist to design an inclusive apparel garment the product will include the most universal design elements.

Research

Inquiry into whether the Vision 2025's "collaboration" guidepost will improve universal/inclusive apparel design, generated three questions. Can clothing create a barrier to functional independence? Is there a documented process for inclusive apparel development that contains a client satisfaction measure? What are the current research findings for collaboration between occupational therapists and designers? Articles that were relevant to these questions offered the following information pertaining to this study. Clothing is an important aspect of attaining a desired quality of life and level of social engagement for people living with disabilities, particularly mobility-based challenges (Kabel, 2016). At present there is a deficit in suitable clothing options for people living with a disability. It is not enough that the clothing does not act as a barrier to occupational functioning. The aesthetic of the clothing contributes to the person's overall well-being if individuals are unable to present themselves according to personal standards (Kabel, 2016). Research conducted by Carroll (2007) documented a

framework to produce inclusive apparel to be introduced to mass market. The research also contained a wear test measure that includes universal design criteria. The results from that tool showed that an apparel item can be developed to suit a number of users who represent a variety of physical limitations. A modified version of this tool will be implemented in this study. Finally, the previous research into the collaboration between occupational therapy and design recommended evidence-based research be conducted in the area. That recommendation is what guides this proposed study.

Implications for Practice and Future Research

The results of this case study will provide data about AOTA's "collaborative," Vision 2025 guidepost, in practice. It will also introduce opportunities for future research into emerging practice areas and professional roles. The findings of this case could identify a broader professional territory for occupational therapy in the field of universal product design. Occupational therapies role in this sector could be that of an access consultant. Currently, there is little research available about access consultant as an emerging practice area (Grant & Flores, 2010). This study could also extend into frameworks that are at the core of occupational therapy practice. For example, the cognitive-behavioral frame of reference focuses on psychological barriers to activity engagement (Cole, Tufano, 2008). This study could also provide further insight as to how clothing contributes to an individual's emotion and behavior.

Key Terms

- **Client:** An individual with a disability that is participating in the OSL workshop.
- **Collaborative:** Occupational therapy excels in working with clients and within systems to produce effective outcomes [AOTA Vision 2025]
- **Disability:** The presence of a health condition that impinges on activities that are socially expected of them. This barrier to activity is related to the environment in which individuals live.
- **Inclusive/Adaptive:** Clothing or apparel items made for people with disabilities (Kabel, 2016).
- **Quality:** The score that a garment design receives on the wear test questionnaire.
[9 questions x 2 score per question] 18 ≥ 9 [9 questions x 1 score per question]
Good quality ----- 7 Poor quality
- **Stigma:** A cross between a tangible attribute and a cultural stereotype (Goffman, 1963).
- **Universal Design:** Environments and products that are more usable, safer, and appealing to people with a wide range of abilities (Center for Inclusive Design and Environmental Access, 2003).

Method

This study will partner with MIT's Open Style Lab. The OSL is a 10-week research program that teams designers, engineers, and occupational therapists to create functional yet stylish wearable solutions with and for people with disabilities (OSL, 2017). For the purpose of this study two occupational therapy research fellows, and six of the fashion design students will begin the program a week early. Prior to day 1 each participant will have completed an initial questionnaire (Figure 1) to gather demographic information. At the start of day 1 the participants

will be divided into four groups. Two groups will consist of one OT and one designer, while the other two groups will be pairs of design students. If possible, group members will be matched according to level of curriculum completed. Each group will be given the same profile (Figure 2) of a client participating in the program. The profile will consist of the client's relevant medical history, their measurements, and a diagram that indicates the client's areas of difficulty in dressing,

Each group must construct a shirt that meets the needs of the client. In this study the shirt must be office workplace appropriate. Groups will have six hours of lab time daily (beginning Monday and concluding on Friday) to work on the project. Group members have access to all the resources available in the lab (including wifi) and a \$50 budget for additional materials. At the end of the week they will turn in their products. On the official start date of the program the client will perform a wear test for all the shirts. As part of the wear test the client will fill out a survey (Figure 3) that was developed by Carroll (2007) to measure if a garment possessed both the functional and symbolic value inherent in universal design. The OT's and designers will also complete a follow up survey (Figure 4) that will measure the effectiveness of collaboration on inclusive apparel design. Data concerning cost and time is relevant to potential stakeholders who are considering developing inclusive apparel.

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Figure 1: Team Member Questionnaire 1

<p>1. Gender</p> <p style="margin-left: 20px;">a. Male</p> <p style="margin-left: 20px;">b. Female</p> <p style="margin-left: 20px;">c. other</p> <p>2. Age</p> <p style="margin-left: 20px;">a. Under 18</p> <p style="margin-left: 20px;">b. 18-40</p> <p style="margin-left: 20px;">c. 41-65</p> <p>3. Last semester completed</p> <p style="margin-left: 20px;">a. First</p> <p style="margin-left: 20px;">b. Second</p> <p style="margin-left: 20px;">c. Third</p>	<p>4. Areas experienced in fieldwork (OT only)</p> <p style="margin-left: 20px;">a. Physical disability setting</p> <p style="margin-left: 20px;">b. Psychiatric setting</p> <p>Additional comments:</p>
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Demographic data collected from Figure 1

O: occupational therapist

D: designer

		A- O	A-D	B-O	B-D	C-D1	C-D2	D-D1	D-D2	Total
Gender:	Male									
	Female									
	Other									
Age:	Under 18									
	18-40									
	41-65									
Last semester completed:	1st									
	2nd									
	3rd									
Area(s) experience in fieldwork (OT only)	Phys dys									
	Psych									

Figure 2: Client profile

Client Profile
 Gender:
 Age:
 Relevant medical history:
 Self-reported physical limitations:

Measurements
 Bust
 Shoulder
 Armhole
 Sleeves length (full)
 Sleeves length (half)
 Waist
 Front neck depth
 Back neck depth



Limitations of head movement.
Incoordination
Limitations of stamina
Difficulty in lifting, reaching or carrying
Inability to use upper extremities
Limitations in upper body strength
Limitations of sensation
Difficulty in handling or fingering
Difficulty with range of motion upper body

Project: Create a shirt for the client that is appropriate for an office setting.

Modified from Carroll, 2007.

Data collected could indicate if collaboration developed a more desirable product.

Figure 3: Wear-Testing Results of Apparel

		Design Team				
Universal Design Criteria		Apparel Dimension	A	B	C	D
Low physical effort	Functional element	Uses style that is easy to don and doff				
Perceptible information	Functional element	Uses easy-to-manage fastenings				
Simple and intuitive use	Functional element	Adds features that allow for movement				
Equitable use	Visual element	Uses fabric with situational appropriateness				
Flexibility in use	Functional element	Ensures coverage in needed areas				
Size and space for approach and use	Visual element	Provides styling that is comfortable and appropriately sized				
Tolerance for error	Visual element	Ensures quality, durable construction				
Flexibility in use	Functional element	Adapts features specified by user				
Equitable use	Visual element	Apparel is designed with visual appeal				

		Grading scale: 1-worse than I envisioned 2-just as I envisioned 3- Better then I envisioned
Adapted from Carroll, 2007.		

<i>This questionnaire could provide data on whether collaboration was more efficient and cost effective.</i>
Figure 4: Team Member Questionnaire 2
Was the project completed? Date and time project was completed: Total dollar cost of project (please include any funds that exceeded the \$50 budget): Most challenging part of this assignment:

Wear Test Data

	Uses style that is easy to don and doff	Uses easy-to-manage fastenings	Adds features that allow for movement	Uses fabric with situational appropriateness	Ensures coverage in needed areas	Provides styling that is comfortable and appropriately sized	Ensures quality, durable construction	Adapts features specified by user	Apparel is designed with visual appeal
Group A									
Group B									
Group C									
Group D									

Data Calculations

This study will be single-blinded. Neither the client nor the person handing the shirts to the client should know which group designed each shirt. This will avoid bias if the client and/or handler favors a particular group.

Since rating is categorical data, a chi-square test will be conducted for homogeneity. There are four different groups each constructing a shirt for a specific client. The test will indicate if the distribution of ratings is or is not statistically different between the four groups. If the distribution is different, examine the contributions to the chi-square test statistic to see which

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cells contributed the most to the statistic (biggest difference between the observed and expected values). The contributions will also indicate which groups were the most successful at meeting the client's needs.

The hypotheses:

H_0 : The distribution of rankings is the same for all four groups.

H_A : The distribution of rankings is not the same for all four groups.

If there is not a similar across the observed and

$$\frac{(\text{row total})(\text{column total})}{\text{table total}}$$

statistical difference the rankings should be very table. For each cell the difference between the expected values should again be similar.

Expected value =

If the null than the 5% need to be

$$\frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

hypothesis is rejected because the test's p -value is greater level of significance, then the components (contributions) calculated.

component =

The components with the highest differences will indicate which group(s) were the least successful in meeting the client's needs.

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