

HEALTHCARE + DESIGN

IMPROVING MULTI-DISCIPLINARY COLLABORATIONS

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Figure 1. One multi-disciplinary team: three OT students (L), one person living with a disability (Center), and two ID students (R)

1. ABSTRACT

Collaborating in teams with people with disabilities is a potent way to immerse undergraduate Industrial Design (ID) students in the complexities of human centered design. Students personally witness the exclusion our poorly designed products and environments present to their partners with disabilities. Including experts from healthcare fields is a natural way to bring necessary medical competence to these teams. As a healthcare profession Occupational Therapy (OT) is a good fit for ID as the view, focus and skills are quite complementary. This paper details an on-going multi-disciplinary collaboration between two universities that joins OT graduate students, ID undergraduate students, and various people living with disabilities into participatory design teams. Despite the compatibility of these two fields there were professional differences that led to conflict on nearly every team. These differences were carefully unpacked to reveal the underlying causes. These insights will improve future collaborations.

2. RELEVANCE

The US is facing an unprecedented demographic shift toward an older population. By 2030 20% of our population will be 65 or older [CDC, 2011] and it is projected that at that point ten U.S. states will have more Medicare-eligible seniors than school-aged children [AARP, 2013]. This formidable shift in

population means a tremendous shift in human needs and consequently a demand for designers who can work effectively in the healthcare arena. These designers will need strong collaboration, empathy and research skills. Working with the disabled and elderly will demand new “cultural sensitivities” and new skills. Currently 50% of those 75 and older report living with a disability [Erikson, 2012]. Familiarity in collaborating on teams with healthcare experts will prove to be a strong advantage for designers.

3. CONNECTING WITH THE HEALTHCARE PROFESSIONS

With regards to the education in medical school there is ongoing discussion of including empathy training – a skill which is currently taught at most design schools. In 2004 Dr. Mohammadreza Hojat, a research professor of psychiatry and human behavior, published his paper “An Empirical Study of the Decline in Empathy in Medical School” which has triggered much focus on this topic [Hojat, 2004]. Dr. Hojat and team had published the Jefferson Scale of Empathy, which has become a standard measure of empathy for researchers [Hojat, 2001]. This concern for empathy skills is indicative of the shifts occurring in the medical professions and underscores the opportunity for inter-professional alliances with ID.

For the ID students, partnering with healthcare professionals adds expertise that is invaluable particularly when working with people with disabilities. Designers are taught human factors but are not trained in the details of body mechanics, nor how to analyze a client’s performance skills and patterns, which health professionals are readily able to complete. Occupational Therapy (OT) is a client-centered health profession and is a natural fit for ID. OTs follow a similar process to ID although with different methods and a slightly different view regarding client interactions and obligations. Understanding the cultural differences between ID and OT is necessary to minimize the conflicts that can arise in collaboration. This paper will detail how teasing apart the moments of team conflict led to a greater understanding of each profession. Given the pervasiveness of cross-disciplinary teamwork these lessons may have implications for other professional collaborations (ID and engineering, etc). The remainder of this paper will delineate the differences in perspectives, approach, working relationships, language, methods and how to make improvements for better future collaborative studios.

4. LESSONS LEARNED FROM YEAR 1

The first year allowed faculty to study the conflicts that arose and create a list of improvements for Year 2:

- Offer brief seminar “What is OT” and “What is ID” explaining each profession
- Run an Interviewing workshop
- Define deliverables to each Client from day 1 (set expectations)
- Show best work / sample work from prior year
- Prep clients earlier (reminders are helpful especially if there are any cognitive challenges)
- Allow more project time
- Create a budget for prototyping materials for each team

The most successful project from Year 1 featured an arm actuated table top mounted variable speed controller for a sewing machine. The user had paraplegia and was resigned to never sewing again. Through “deep listening” students discerned the need and designed and built a working prototype.



Figure 2. Year 1 project receives local press.

5. YEAR 2

In the second year the process was tightened by incorporating these improvements. Including an extra week up front allowed each team to get to know each other before the client was introduced in week 2. A lecture was offered during week 1 to familiarize students with the ID and the OT creative processes. It was not until the 2nd week that the partners living with disabilities were introduced to each team.



Figure 3. OT students take the lead in the in-home interviews using the COPM.

The OTs took the lead on the interviewing component of the research phase. This is a critical part of their practice and is much more standardized than the ID research practices. It was here that the OTs demonstrated to the IDs how to develop data from an interview. The COPM, a structured interview, is

used by the OTs to help the client identify their desires for improvement in self-care, productivity and leisure [Law, 2005]. This assessment is conducted before and after an intervention to measure changes in the client's performance and satisfaction.

The image below shows one team's COPM results. An activity of high importance in which there was very low satisfaction identified their project direction.

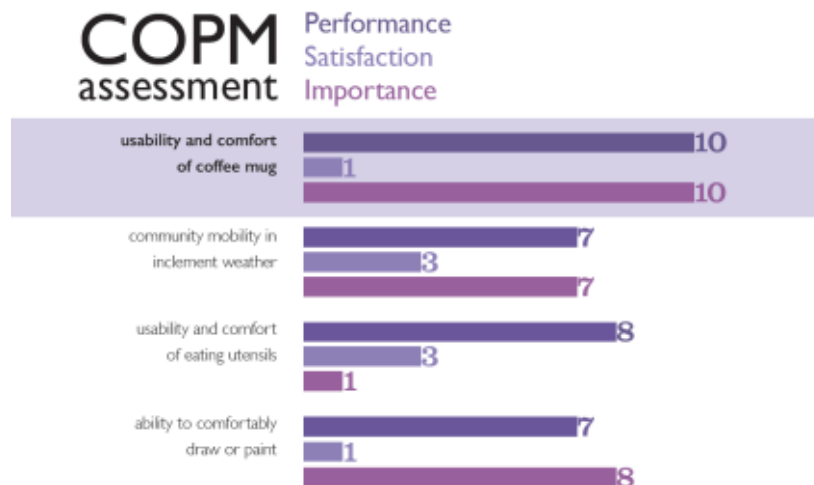


Figure 4. One team's COPM assessment highlighting an area of high importance to the client that is in much need of improvement.

However, not all teams found the COPM quite so useful. For clients with cognitive issues this method proved to be quite confusing. At this point the ID students had to think on their feet and resort to alternate methods. The IDs informal interviewing techniques in which they encouraged the client to tell stories became quite helpful.

6. SKETCHES AND CHUNKY MONKEYS

All students sketched their concepts, argued over their ideas, and eventually built quick sketch models to give their ideas form. While the IDs had much stronger skills in making their concepts visual, the OTs were encouraged to participate as well. The atmosphere was one of experimentation without judgment.



Figure 5. OTs constructing quick prototypes using paper plates, corrugated cardboard and tape.

This step was called “prototyping for conversation” to lessen expectations for high quality prototypes. The notion was to sketch in 3 dimensions in order to get the client to react with specifics. Students were required to successively iterate their prototypes through 3 generations, involving their client at each stage. Clients provided direct and honest feedback which was even a bit blunt at times but always quite useful.



Figure 6. Student engaging a client/partner with a “prototype for conversation”.



Figure 7. Clients showed no hesitation to offer genuine feedback to prototypes they disliked!

7. THE CLASH OF CULTURES

Agreeing to a clear project direction based on research was a source of much conflict. Every team struggled in this task and most required faculty intervention. Three surveys were conducted throughout the project to offer students a way to privately identify their concerns to the faculty. These surveys were very useful in revealing team dynamics and the extent and nature of conflict. Triggered by student concerns the faculty engaged in an examination to uncover the more subtle values that created these conflicts. The following chart was created to help students in each major understand the differences in

work methods and expectations. This chart can be utilized in future years for the introductory lecture occurring on Day 1 of the course.

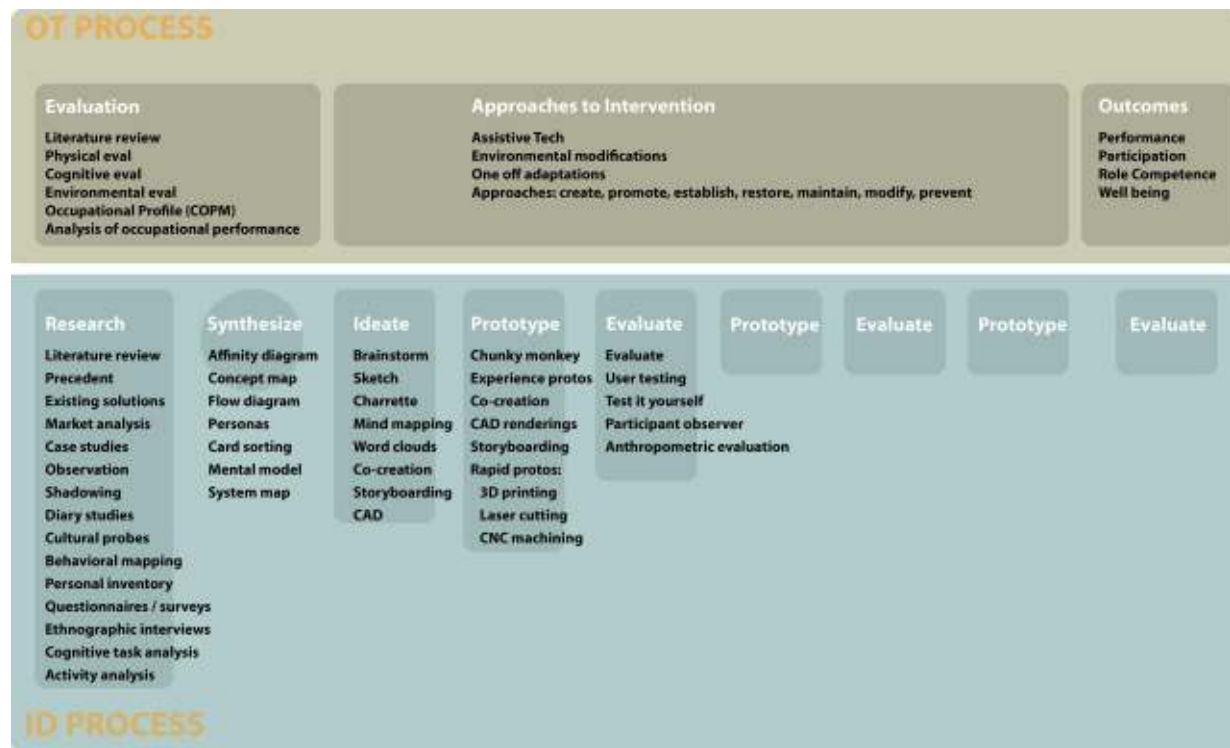


Figure 8. Chart comparing process stages and work methods for both OT and ID.

Laying one process in detail next to the other provided us with a Rosetta Stone that helped make sense of each others approach and language. Creating this chart immediately demonstrated one major differences between ID and OT. ID is VERY process oriented and this shows in the detailed articulation of the ID process. In contrast the OT process is much more straight-forward. The OT contribution is to bring deep knowledge of the needs and complexities of human bodies to bear on the desires and problems faced by their client. Innovation is not a requirement for OTs as appropriate solutions may be to retrain the body or to buy an existing product to solve the problem. ID does not bring this kind of specific expertise to the table but instead brings a broad expertise in creative process in general.

To further their understanding of each other’s field the faculty then charted the wider characteristics and language of their practice as might be experienced at a student level. This allowed similarities and contrasts to be clearly seen and furthered the understanding of each profession.

OT Student Tenants	ID Student Tenants
Client centered	User centered
Client factors	User needs
Applying knowledge	Applying process
Healthcare expertise	Making expertise (2D&3D)
One-off adaptations & modifications	One-offs or new products
Solutions for individuals	Universal solutions
Apply assistive technologies	Apply human factors
Conduct client evaluations	Apply anthropometrics and ergonomics
Client interview is entry point	Listen closely, but watch what they do
Driven by client participation	Driven by usability, aesthetics, manu ...
Maintain professional boundaries	Immerse in culture
Structured interviews (COPM)	Semi-formal - storytelling encouraged
Rational decisionmaking	Intuitive leaps encouraged
Measured outcomes	Success established by agreement

Figure 9. Similarities and differences between OT and ID.

8. RESULTS

Each team completed fully documented research on their client which defined a clear project direction. Each team then produced iterative prototypes until the client was satisfied. Results included both adaptations and new product concepts. Sample solutions shown below:



Figure 10. Project results (L to R) include an improved coffee cup holder for someone with arthritis, an adjustable art table, and a knitting needle holder for someone with arthritis.

- The coffee cup sleeve utilizes a low durometer thermoplastic elastomer for increased grip and comfort. After studying grip options and completing user evaluations of quick mockups, students CNC milled their own mold and cast final resin prototypes. Sleeve encourages grip positions of non-deformity that reduce the stress and pain of rheumatoid arthritis.
- The adjustable art table allows artists to work in standing, seated, and wheelchair supported positions. Many anthropometric studies and user evaluations were conducted on prototypes.

- The knitting needle holder was actually designed to reduce pain and fatigue for artists with arthritis while using sketch pencils and paint brushes. After many prototypes the final version was modeled in CAD and 3D printed to fit the client. On a follow-up in-home visit the students discovered the client using the holder for her crochet needle instead, further validating the utility of this solution.

Beyond the particular product results it is crucial to mention the deep impact that these projects had on the students. Through private surveys many students mentioned that this project increased their daily awareness of products and environments that limit participation of people with disabilities. Many students found their personal boundaries and assumptions dissolving as the distinctions between us vs them and abled and disabled dissolved as their empathy and relationship with the client grew. This is life long learning that will hopefully impact their awareness and design work for the remainder of their lives.

9. DISCUSSION

While it would seem that the client centered approach of the OTs and the user centered approach of the IDs would be very compatible, in fact, it presented conflict. Shared or similar language does not always mean shared values and methods. For the OTs the client knows what is best for them. To them the clients understand their experience and their world best and their input is to be taken as fact [AOTA, 2014]. For the IDs - users are to be listened to empathetically, but their suggestions are not necessarily to be taken literally. Insights and intuitive leaps are encouraged in synthesizing a project direction. And designers often seek to leverage their work to impact more than one person, so individual solutions are challenged by consideration of the broader population (Universal Design).

This paper demonstrates the clear value in Industrial Design education of engaging people living with disabilities in collaborative projects. The learning opportunities extend in many directions including very personal life lessons contributing toward the development of responsible designer citizens. Collaborative work in multi-disciplinary teams, and in particular with health professionals such as OTs, greatly deepens client understanding and informs project results. Collaborations with students of Occupational Therapy provide a good fit where skills from each field can complement the other and methods can be shared. Clearly articulating the differences in process, values and language can serve to reduce conflicts so that teams can remain productively focused.

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