The Occupational Designer: New Frontiers in Teaching and Clinical Practice

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ABSTRACT

Collaborative problem-solving events incorporating individuals within the health care, design, and engineering fields that use design thinking (DT) to address current health care issues are becoming more commonplace in educational and professional settings. By recognizing occupational therapy’s creative foundation, bringing it to bear on today’s opportunities, and working across disciplines, the occupational therapy profession can become a key partner in these interprofessional education (IPE) design experiences, effectively working to meet the objectives stated in the American Occupational Therapy Association’s (2017) Vision 2025. This article discusses implications for increasing occupational therapy students’ exposure to and presence within design through implementing IPE design experiences as part of current occupational therapy education. Examples of design experiences within occupational therapy curricula that meet Accreditation Council for Occupational Therapy Education ACOTE® (2012) standards and that can enhance student learning and future practice within this innovative frontier are provided.

LEARNING OBJECTIVES

After reading this article, you should be able to:
1. Identify the benefits of engaging in IPE design experiences using DT
2. Describe IPE design experiences that use DT as a consideration for occupational therapy practice
3. Recognize current academic environments that can support IPE design experiences
4. Identify outcome tools that will objectively measure the efficacy of IPE design experiences

INTRODUCTION: DESIGN THINKING METHODOLOGY

Design thinking (DT) is a methodology popularized by the d.school at Stanford University. It has been applied within design education and design professional platforms in the fields of industrial design, architecture, and user interaction for years. DT is a human-centered, team-based approach to thinking and problem solving that goes beyond considering how things look (i.e., form), and takes into account how things work (i.e., function; Ferreira, Song, Gomes, Garcia, & Ferreira, 2015). Breaking this down further, the process of DT incorporates five primary steps in which a team (1) gains empathy for the user, (2) defines the problem, (3) develops ideas to address the uncovered issues, (4) generates prototypes, and (5) tests these prototypes to gain additional understanding (Hasso Plattner Institute of Design at Stanford, n.d.). Outside of design, the DT process has been used by practitioners across myriad fields, including university and K–12 educators to develop new curriculum and teaching methods; engineers, scientists, and marketing professionals to analyze trends and determine gaps in the market for consumer goods; corporate managers to develop novel business strategies; rural medical professionals to create delivery systems for providing comprehensive eye care in developing countries; and hospital employees to rethink service delivery methods, including patient handoffs (Brown, 2008; Cahn et al., 2016; Nixon, 2013; Zupan, Stritar, & Nabergoj, 2014).

Within health care education, medical schools have been using DT-based interprofessional education (IPE) design collaborations to enhance the skill development of students. These collaborations incorporate the principles of empathy, integrative thinking, optimism, and experimentation, with a goal to improve problem solving (Brown, 2008; Ferreira et al., 2015; Roberts, Fisher, Trowbridge, & Bent, 2016; Van de Grift & Kroeze, 2016).

DT principles can also meld well with our occupational therapy process, as described in the Occupational Therapy Practice Framework, Domain and Process, 3rd Edition (Framework; American Occupational Therapy Association [AOTA], 2014). The DT process has five parts (empathize, define, ideate, prototype, and test), whereas the occupational therapy process has three (evaluation, intervention, and outcomes). Despite the differences in the number of steps and terminology, the two processes are remarkably similar. Within occupational therapy curricula, students learn from the outset that the occupational profile and analysis of occupational performance of clients during the evaluation process is meant to be client centered; this process can be focused on individuals, groups, or populations that are often affected by illness, disease, or disability. In DT, these steps directly correspond to the initial phase of empathizing: “The empathizing mode is the work you do to understand people…. It is your effort to understand the way they do things and why,
their physical and emotional needs, how they think about the world, and what is meaningful to them” (Hasso Plattner Institute of Design at Stanford, n.d., p. 2). Similar to DT’s process of ideate, prototype, and test, occupational therapy intervention requires a “dynamic interrelationship … where evaluation and intervention planning continue throughout the implementation process,” and the occupational therapist’s clinical reasoning is applied to deliver skilled intervention with targeted outcomes (AOTA, 2014, p. S15). The three-step process (for DT: ideate, prototype, test; for OT: evaluation, intervention, outcomes) is repeated, with insights from each “test” or “intervention” being funneled back into the next phase of “ideate” or “evaluate” until a final solution is reached in anticipation of the client’s discharge or the completion of a design project. Both processes are similar in that they allow the designer or the clinician to work in unison, from understanding to action.

In specific terms, as outlined in the Framework, the occupational therapy process consistently uses the previously mentioned DT principles effectively by (1) applying empathy via therapeutic use of self within “client-centered delivery of occupational therapy services” (AOTA, 2014, p. S12); (2) collaborating with the client during evaluation and treatment to “allow clients more control in decision making and problem solving” (AOTA, 2014, p. S12); (3) developing custom plans of care through collaboration with other health professionals, including physical therapists, speech-language pathologists, licensed clinical social workers, registered nurses, and physicians, via direct and indirect service delivery models (AOTA, 2014); and (4) constructing prototypes during intervention via interactive clinical reasoning skills. These prototypes are then (5) tested in real time and result in feedback incorporated into successive iterations as “intervention review” (AOTA, 2014, p. S15).

Because of the naturally occurring alignment in these processes, occupational therapy, as a health care profession, is primed to take advantage of the recent interest in DT occurring across health care (Reeves et al., 2016). In occupational therapy, clients are often observed interacting with tools and objects located in their contexts and environments; the occupational therapist considers client factors, performance skills, and performance patterns, and analyzes where occupational participation appears functional or affected, including how tools and objects are used (De Couvreur et al., 2012; Sanders & Stappers, 2012). Data collection occurs throughout the occupational therapy process; therapists compile data, use insights based on clinical reasoning, and combine it with feedback from their clients to craft evidence-based effective care plans that allow them to create appropriate adaptations and measure efficacy of outcomes while promoting clients’ well-being and participation (DePoy & Gitlin, 2016).

WHY DESIGN?

In the past decade, there has been an increasing awareness within occupational therapy education and practice of the importance of and need for effective design (Sanders & Stappers, 2012). To augment the skills of the occupational therapy student and future clinician, IPE design experiences with design students and/or professionals can be used to introduce new ideas and approaches that may help to address limitations during occupational performance that negatively affect participation for individuals and populations (Campbell, 2012; De Couvreur et al., 2012). Collaborations may include working with graphic designers to promote health literacy and improve user accessibility for mobile apps and wayfinding signage systems, consulting with building and landscape architects to develop accessible home modifications, teaming with fashion designers to develop effective clothing modifications, and partnering with industrial designers to develop tools and objects that can be used within the built environment (McDonagh, Thomas, Khuri, Sears, & Peña-Mora, 2011). Practically speaking, occupational therapists are frequent “end users” of medical innovation products that are ultimately marketed to clients (Silver, Binder, Zubcevik, & Zafonte, 2016). Any lack of occupational therapy involvement in the beginning design stages of those products may unduly lead to ineffective solutions that are produced but rarely used by clients, further limiting occupational engagement and performance (Campbell, 2011; Nasar & Elmer, 2016).

Within the past 2 years, design has explicitly emerged as a potential area of enhanced focus within the various domains of occupational therapy practice. Bhakta et al. (2017) described collaboration between occupational therapy students and fashion design students at Washington University. Elsewhere, De Couvreur et al. (2012) spoke of emerging design collaborations occurring among occupational therapists, caregivers, and individuals with disabilities to co-construct adaptive devices used within community-based health care projects. Silverman, Bartley, Cohn, Kanics, and Walsh (2012) described collaborations to improve inclusion and participation for individuals experiencing a variety of disabilities at museums in Boston, Philadelphia, and Chicago. Other reported design experiences have included engineering and occupational therapy students (Waite, 2014), an occupational therapist developing toys and games (Waite, 2016), and individuals with spinal cord injuries helping design rehabilitation solutions (Campbell, 2012).

INCORPORATING DESIGN INTO CLINICAL EDUCATION

According to AOTA’s Vision 2025, occupational therapists need to be effective, collaborative, accessible leaders, specifically by being “influential in changing policies, environments, and complex systems” (AOTA, 2017, p.
To this end, incorporating creativity into clinical education and encouraging practitioners to use it regularly can have a positive effect in that the “more light we shed on creativity, the more therapists will use it, the more success they will have with it, and the more they will enjoy it” (Schmid, 2004, p. 87). Pragmatically, creativity is required to help future health care professionals shape a “well-defined and recognizable practice framework for the broad-scaled integration of more creative, interdisciplinary, and human-centered approaches to health care management, innovation, and practice” (Roberts et al., 2016, p. 11). As creativity is applied, a positive feedback loop is created, as innovation skills are gained by health care professionals and implemented in practice (Steen, 2013). By recognizing occupational therapy’s creative foundation, bringing it to bear on the opportunities of today, and working across interprofessional disciplines, the profession stands to actively shape the future of health care (McDonagh & Thomas, 2013).

One of the best places to initiate this change is within the educational system that trains the next generation of practitioners. Many medical and health care programs are already engaging in DT-based IPE design experiences to help their future clinicians prepare to navigate the changing health care landscape awaiting them (Cahn et al., 2016; Reeves et al., 2016; Roberts et al., 2016; Van de Griff & Kroeze, 2016). Future occupational therapists would greatly benefit from consistent participation in design-centric IPE experiences to fully enhance the profession’s marketability and diversity in today’s rapidly evolving health care environment (Steen, 2013) and contribute to achieving Vision 2025. Occupational therapy practitioners are well positioned to be key players within DT-based IPE design experiences, as the profession inherently possesses distinct skills directed toward enhancing occupational performance, particularly around client factors; performance skills and patterns; and habits, routines, and roles in various contexts and environments as noted by the language in our Framework (AOTA, 2014).

USING DT WITH EMERGING AREAS OF OT PRACTICE
Clients living with illness or disability often are required to navigate complex, disjointed, dynamic systems to address their everyday needs, while simultaneously being presented with limited access to functional objects and tools within their physical environment to complete desired tasks, negatively affecting their ability to engage in meaningful occupations (Dahler, Rasmussen, & Anderson, 2016; Lee, Han, Kim, & Bang, 2015). Client-centered theoretical models, such as Person-Environment-Occupation, Person-Environment-Occupation-Performance, and the Ecology of Human Performance, coupled with activity and occupational analysis and skilled observation (hallmarks of the profession), are taught to and used by occupational therapy practitioners to frame complex situations and to aid in developing interventions (Schell, Gillen, & Scaffa, 2014). Even with this broadly applicable foundation and approach, much of occupational therapy’s work remains geared toward rehabilitation services under traditional service models (Hildenbrand & Lamb, 2013). Originally advocated for as part of the Centennial Vision a decade ago, several “emerging areas of occupational practice” were outlined (Baum & Christiansen, 2006) and continue to maintain relevance today, including extending our reach into ergonomic design and accessibility consultation for home modification; helping develop safe, effective assisted-living communities; and using assistive-device design to support individuals and populations to promote participation, health, and wellness.

“Similar to the philosophy of occupational therapy practice,” experiential learning activities promote “learning by doing,” in which students apply knowledge gained in the classroom to the needs of communities and individuals (Knecht-Sabres, 2013, p. 25). Simply defined, experiential learning “is a process through which a learner constructs knowledge, develops skills, and gains value from one’s experience” (Knecht-Sabres, 2013, p. 25). DT emphasizes collaboration; creativity; discovery; and iterative exploration, including prototyping, testing, feedback, and refinement. Like experiential learning, DT is a hands-on, experiential process that generates ideas through action (Sanders & Stappers, 2012; Steen 2013). As Knecht-Sabres (2013) illustrated in her research on experiential learning within an occupational therapy program, this method of education enhances a student’s understanding and application of content, increases professional skills and attributes, and works to increase clinical reasoning. Students in her study noted a desire for more experiential learning throughout their programs and a belief that experiential learning provided an opportunity to “bridge the gap’ between academia and clinical practice” (Knecht-Sabres, 2013, p. 32). Following from the similarities in approach, benefits of incorporation, and stated student desires, using a DT-focused, experience-based educational process within an occupational therapy curriculum via devices such as the Design Thinking for Educators Toolkit may provide instructors with a new tool that can be used to provide effective, first-hand learning experiences. With such experiences, students gain the skills and attributes to transition from educational experiences to occupational therapy and designer positions within traditional and emerging practice settings (IDEO, 2013).

DESIGN LEARNING EXPERIENCES IN THE EDUCATIONAL PROCESS
According to Silver et al. (2016), hackathons are an example of a multidisciplinary design process that traditionally “bring together stakeholders in the early design phase … to identify the most urgent or important clinical needs and create
new products, systems, services, datasets, and tools that will improve health care delivery.” In recent years, medical schools have increasingly applied hackathon formats using DT within their programs to help students learn to think more creatively and empathically (Thomas & McDonagh, 2013). Through using the DT methodology within an interdisciplinary setting, these events are creative opportunities for occupational therapy students to engage in experiential learning. Unlike occupational therapists, designers are traditionally taught human factors and anthropometrics but are not well-versed in musculoskeletal performance occurring within disability or illness (Donati & Vignoli, 2015; Saurus & Rebola, 2012). Many other health care professionals are also not trained in how to comprehensively analyze a client’s performance skills and patterns within various environments and contexts; however, current occupational therapy education addresses several of these domains through Accreditation Council for Occupational Therapy Education (ACOTE®; 2012) B standards, making occupational therapy an asset in teams. Using DT and engagement in IPE design experiences and hackathons can expand occupational therapy student and faculty thinking beyond current occupational therapy models (Reeves et al., 2016). IPE design experiences involving occupational therapy and design professionals can help create a deeper understanding of specific human needs and may yield innovative, client-centered solutions with universal application. People with diverse skill sets working together in teams improve end products and increase function and participation for individuals living with disability (Campbell, 2012; Silver et al., 2016). Inherent in both the DT and occupational therapy processes is an iterative cycle that encourages the designer or therapist to create and test new ideas and create successive solutions, with each attempt coming closer to the desired outcome (Brown, 2008). The main difference between the processes is that for DT, the need for these iterations is made explicit from the outset, with failure seen as a natural and inevitable part of the process. As the founder of the design firm IDEO and one of the creators of DT, David Kelley, often says, “Fail faster, succeed sooner” (Manzo, 2008). Teaching occupational therapy students to apply DT within the occupational therapy process can help them learn the value of experiencing these early failures for building the resilience and grit, understanding, and complex clinical reasoning skills necessary for effective problem solving (Brown, 2008; Cahn et al., 2016). Using IPE design experiences that use DT in occupational therapy education can encourage students to engage in teamwork and explore new solutions, stretching their thinking beyond the traditional educational experiences occurring within their present curricula.

EDUCATIONAL COLLABORATIONS BETWEEN OT AND DESIGN

Using innovative methods to implement IPE design experiences that use DT within curricula and implementing client-centered design programs benefit all learners, including those within the design and occupational therapy professions. For example, ACOTE standard B5.9 requires occupational therapy students to “evaluate and adapt processes or environments by applying ergonomic principles and principles of environmental modification” (ACOTE, 2012, p. 24), and B5.10 notes the need for students to “articulate principles of and be able to design, fabricate, apply, fit, and train in assistive technologies and devices used to enhance occupational performance and foster participation and well-being” (ACOTE, 2012, p. 24). To address these standards, many occupational therapy curricula use interactive labs that facilitate students’ application of universal design principles to adapt objects, tools, and toys within the personalized environmental spaces in which clients function. Solutions developed in these labs are functional and usable, but they can be limited in innovation, aesthetics, and refinement. Specifically, occupational therapists learn how to fabricate (“hack”) objects and tools for individual client use; however, these final products are not intended to be professionally manufactured or marketed for larger populations that may ultimately benefit from use. Merging occupational therapy students’ training in evaluation and intervention principles with design students’ creative processes and understanding of materials can build a deeper understanding of specific human needs and yield state-of-the-art, client-centered tool and object solutions with potentially universal application that may be useful beyond the individual experience (Sanders & Stappers, 2012; Thomas & McDonagh, 2013). Using appropriate and measurable outcomes during IPE design experiences can allow educators to capture collaborative IPE effectiveness at the student, client, and interprofessional levels.

INTEGRATING DT INTO OT CURRICULUMS: ASSIGNMENT SAMPLES

Since 2013, Thomas Jefferson University’s Occupational Therapy Department has engaged in interprofessional, DT-based, small-scale design hackathons, incorporating 2- to 3-week toy and game and playground design problems based on fictional case stories. A larger, semester-long independent study elective is provided for team partnerships for clients with disabilities. Additional design-focused health care work has been undertaken in a partnership among Philadelphia University, the Sidney Kimmel Medical College of Thomas Jefferson University, and Thomas Jefferson University’s Occupational Therapy Department. This coursework, which is partly sponsored by Comcast, aims to produce physical prototypes that address the needs of clients and health care providers.
Example 1: Toy and Game Design Hackathon
In this brief, 3-week design program, 82 students total were assigned to 12 teams, each of which was composed of a ratio of up to seven occupational therapy students (second-year bachelor’s-to-master’s and first-year master’s) to one industrial design student (undergraduate or graduate level). Teams were provided with a case study during week 1. They used large sheets of brown craft paper, permanent markers, and sticky notes for sketching purposes to come up with a concept. During week 2, “chunky monkey” (a type of rough prototype design) production occurred at the industrial design studio at a local university, and in week 3, teams presented their prototypes with accompanying PowerPoint presentations to their peers and instructors. Occupational therapy students were required to complete a separate worksheet justifying their toy and game design in relation to developmental level, age appropriateness in relation to play expectations, environments in which the toy and game could be used, and an explanation of the child’s needs and the rationale as to how the adaptation provided met those needs. Specific ACOTE B standards addressed by the experience included B1.1, B1.2, B4.8, B5.1, B5.8, B5.9, and B5.10 (ACOTE, 2012).

Example 2: Playground Design Assignment
The playground design activity occurred over a 2-week period and engaged 80 occupational therapy students. During the first week, two graduate-level industrial design students laid the foundation for the charrette (a meeting by design team members to agree on and finalize a design) by presenting a critical review of current playground systems, a survey of contemporary playground principles, and the effect of these factors on the development of play skills and social behavior. Occupational therapy students then toured four local playgrounds and public spaces with varied spatial configurations, completing photographic documentation and detailed observation logs. During week 2, the occupational therapy students, in 20 groups with three to four members each, created hand-drawn schematic plans for a new playground to be situated within an adjacent urban square. Through this work, students were exposed to and needed to consider the effect of large spatial and contextual factors and the realities of working within an urban environment while creating an inclusive and engaging play environment for children of varying abilities. Specific ACOTE B standards addressed by the playground experience included B1.1, B1.2, B4.8, B5.1, B5.8, B5.9, and B5.10 (ACOTE, 2012).

Example 3: Industrial Design Independent Study Elective
Second-year master’s students registered to participate in a semester-long immersion in industrial design product design. Teams comprised two industrial design students, two occupational therapy students, and one client experiencing a physical and/or cognitive disability. Teams used an empathic design framework. Occupational therapy students used structured interviews pre- and post-design with the Canadian Occupational Performance Measure (COPM; Law et al., 2014) and iterative discussion coupled with environmental observational research within each client’s work or home environment to locate areas of occupation where participation was compromised. Occupational therapy students were additionally required to locate one pre-existing self-report assessment tool that demonstrates good reliability and validity and that could be used pre- and post-design to capture client outcomes. With ongoing feedback from their client, occupational therapy and industrial design students identified a specific design problem causing occupational dysfunction. Teams conducted research, sketched, brainstormed ideas, created prototypes, and rendered multiple potential solutions for feedback and input from their client. Occupational therapy students located applicable peer-reviewed literature to further validate their team’s intervention design. Several physical prototypes created by each team were tested by their client during the semester. At the end of 10 weeks, each team had developed a new product that was usable or potentially usable by their client to enhance participation. Specific ACOTE B standards addressed by this elective included B1.1, B1.2, B4.1, B4.8, B5.1, B5.8, B5.9, B5.10, B6.2, B6.3, and B9.3 (ACOTE, 2012).

Example 4: Design and Health Care Course
In this full-semester class, 10 industrial design students, 20 medical students, and 3 bachelor’s-to-master’s occupational therapy students learned about and created solutions for client- and/or clinician-focused needs within a hospital setting. Because of the mixed backgrounds of the student cohort, at the start of the semester students received didactic content covering a wide range of topics, including the current health care landscape, materials and processes used to physically create hospital-grade equipment, and common conditions and medical equipment present in the hospital. Following this initial phase, 11 mixed student groups were assigned to clinical mentors located throughout the medical system (including, but not limited to, the emergency, surgical, oncology, and rehabilitation departments). Through several onsite observations, in-person interviews with clinicians and clients, and successive rounds of prototyping and testing, each group developed an original solution to an uncovered opportunity for improvement. Solutions involved both developing physical objects as well as procedural changes to existing workflows. Specific ACOTE B standards addressed by this elective included B1.1, B1.2, B4.1, B4.8, B5.1, B5.8, B5.9, B5.10, B6.2, B6.3, and B9.3 (ACOTE, 2012).
PRACTICAL CONSIDERATIONS
Implementing DT-based IPE design experiences can be a time-consuming but worthwhile proposition for occupational therapy educational programs. The IPE partnerships described in this article occurred among a health professions college associated with a hospital, a private art university geographically located within five city blocks, and the medical school at Thomas Jefferson University. Initial collaborations continue to occur informally between the medical school and the occupational therapy department to develop future IPE courses. In addition, an occupational therapy doctorate residency is being planned.

The Toy and Game Design hackathon was trialed and implemented 2 years before implementing the Industrial Design Independent Study Elective Course. Feedback from previous years’ toy and game hackathon experiences necessitated tailoring the fictional pediatric case stories to conditions that would easily allow for usable physical design solutions (e.g., for clients with cerebral palsy or amputation as opposed to attention deficit hyperactivity disorder) and that contained enough specifics to allow teams to develop a final prototype within the brief, 3-week hackathon timeframe. For the Independent Study Elective, securing clients who were willing and able to share their full medical history, provide ample access within home and/or work environments, and tolerate frequent visits from a team of students was essential. Providing teams with a budget for supplies ($100), an open and undisturbed work space with access to power tools (available in the industrial design department’s facilities), and consistent times within the students’ schedules in which both programs could regularly collaborate as teams were also beneficial.

Locating local universities that offer design programs and that can foster partnerships may not be feasible for all occupational therapy curricula. In lieu of this, occupational therapy educational programs may consider reaching out to local design firms (if available) to determine collaboration possibilities. Professional organizations, such as the Industrial Designers Society of America, the American Institute of Architects, provide directories of members located throughout the United States.

CONCLUSION
To date, combining disciplines has provided occupational therapy students with exposure to DT, prototyping, and concepts of mass production. Learning opportunities for students extended in many directions, including increasing their understanding of what is required to live successfully with a disability in today’s society. Given the pervasiveness of interdisciplinary teamwork, the lessons gleaned from these types of collaborations can have positive implications for occupational therapy education and enhance the profession’s position as it moves toward Vision 2025.

REFERENCES

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Final Exam

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The Occupational Designer: New Frontiers in Teaching and Clinical Practice • October 30, 2017

To receive CE credit, exam must be completed by October 31, 2019

Learning Level: Intermediate

Target Audience: Occupational therapists and occupational therapy assistants

Content Focus: Education, Academic program, design thinking, clinical reasoning

1. The main principles of design thinking (DT) include:
   A. Empathy, integrative thinking, optimism, and experimentation
   B. Therapeutic use of self, integrative thinking, and collaboration
   C. Client-centered care, collaboration, and rapid prototyping
   D. Flexibility of use, tolerance for error, low physical effort, and equity of use

2. The following statements are key learning features of a DT-based interprofessional education (IPE) design experience except:
   A. Working alongside a mix of health care and design professionals
   B. Developing a highly resolved solution based on a predetermined goal
   C. Taking risks and developing new ideas within a supportive environment
   D. Hands-on testing and multiple iterations
3. Of the following, which *Occupational Therapy Practice Framework: Domain and Process, 3rd Edition* process component is not readily used within DT methodology?
   A. Therapeutic use of self  
   B. Collaborating with other disciplines  
   C. Analyzing occupational performance  
   D. Applying clinical reasoning skills

4. Occupational therapy students learn from the outset that the occupational profile and analysis of occupational performance of clients during evaluation is meant to be client-centered. In DT, these steps most closely correspond to the initial phase of:
   A. Prototyping  
   B. Integrating  
   C. Empathizing  
   D. Experimenting

5. An occupational therapy theoretical model that can expand a team’s understanding of a client’s needs during a DT-based IPE design experience is:
   A. Model of Human Occupation  
   B. Biomechanical Model  
   C. Transtheoretical Model  
   D. Ecology of Human Performance Model

6. A “hackathon” occurring within a DT-based IPE design experience is:
   A. An interprofessional collaboration currently occurring within occupational therapy curricula  
   B. An interdisciplinary team event to improve health care solutions in the early design phase  
   C. A clinical event that provides experience for occupational therapy students to obtain design skills  
   D. A DT team event limited to health care professionals to create new products, systems, or services

7. The following are benefits of incorporating DT-based IPE design experiences into occupational therapy education except:
   A. Exposing other health professionals and designers to the distinct value of occupational therapy  
   B. Providing students with new tools and techniques for use in clinical practice  
   C. Evaluating students on their use of standardized assessments in a clinical setting  
   D. Increasing the opportunities for experiential learning within curricula

8. When implementing DT-based IPE design partnerships, which of the following is least likely to be a barrier to collaboration?
   A. Delineating available collaboration time  
   B. Meeting ACOTE B standards  
   C. Locating potential design partners  
   D. Procuring power tools

9. In designing and creating solutions, what component does DT philosophy account for via the need for multiple iterations?
   A. Failure  
   B. Learning  
   C. Human factor analysis  
   D. Collaboration

10. Which of the following is least necessary to run a successful DT-based IPE design experience?
    A. Access to a range of disciplines  
    B. Eager and engaged faculty  
    C. Space for students to work on physical models  
    D. Commercial grade tools and machinery

11. Which is likely to be the most readily accessible option for occupational therapy educators who want to support DT-based IPE design experiences but whose college or university does not offer design as a major?
    A. Design an online course  
    B. Join the Industrial Designers Society of America  
    C. Search for a local design firm to teach  
    D. Locate design websites, blogs, and online publications

12. Educators can most efficiently measure and track student outcomes pre- and post-DT-based IPE design experience by:
    A. Holding focus groups for occupational therapy students and designers  
    B. Having students administer the Canadian Occupational Performance Measure tool to the client before and after  
    C. Deploying targeted electronic course evaluations  
    D. Conducting individualized student interviews