HANDCRAFTED ADAPTATIONS: Enhancing Performance through Cardboard Devices A Capstone Manuscript

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Capstone (Entry-Level OTD)

Keywords
Assistive Technology, Environmental Modifications, Hands-On Activity

Subject Categories
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HANDCRAFTED ADAPTATIONS:

Enhancing Performance through Cardboard Devices

A Capstone Manuscript

Julia Damon

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Introduction: An Initiative for Training and Provision

Serving clients through adaptive devices and assistive technology (AT) is integral to occupational therapy (OT) practice (AOTA, 2010). The use of physical adaptations is an evidence-based method that therapists regularly employ to support participation and performance in a variety of meaningful occupations. AT has been proven to enhance participation in daily activities that improve health and well-being across a variety of impacted client populations (Casey, 2011; Nordström et al., 2013). These services range from teaching the use of a sock-aide to a patient adhering to hip surgery precautions, to creating a seat insert for a child who cannot sit up from lack of core strength, to providing a learning-disabled student with voice-to-text software to complete written assignments. The Accreditation Council for Occupational Therapy Education (ACOTE®) standards require OT practitioners to know, understand, and deliver AT services (AOTA, 2011). Given the contextual nature of AT, the ability to proficiently evaluate needs, source and implement materials, and monitor functional outcomes requires hands-on training and experience. Many higher education programs, however, are not meeting the AT training needs of future OT practitioners (Bausch and Jones, 2012; Long, et al., 2007). Untrained therapists are at risk of providing diminished quality and minimal outcomes to their clients.

Lack of AT curriculum also deprives OT students of opportunities to engage in hands-on learning activities, which was identified by one group of students to be a leading point of criticism and source of stress in their OT program (Pfeifer, Kranz & Scoggin, 2008).
Assistive Technology is defined in the Individuals with Disabilities Act (1988) as both a device and a service. A device is any item, piece of equipment, or system that is acquired commercially, modified, or customized to increase, maintain, or improve the functional capabilities of individuals with disabilities. Services include evaluating need, acquiring the device, fitting or customizing the device, coordinating the intervention plan, and providing training and technical support to the user and related support personnel. Institutions that integrated structured, hands-on AT curriculum into their programs were found to produce practitioners who were qualified and confident in their AT service delivery (Hammel et al. 1993). Several higher education programs offer AT training, including The University of Madison-Milwaukee (UMW), York St. John, and Colorado State University. Still, AT training options are limited, and have not been sufficient to keep up with the increasing expansion of technology into people’s daily lives’, nor the increasing need by impacted populations to access AT through trained professionals (Bausch & Hasselbring, 2004).

Possible barriers and supports to AT training and provision

Barriers:

• scarcity of physical and social AT resources within the community
• lack of hands-on AT curriculum in professional programs
• minimal opportunities for post-graduation AT training in the community
• low understanding of the increasing demand for AT in impacted populations
• delayed progress of professional programs to evolve with technological trends
• management of physical, temporal and social resources within institutions
Handcrafted Adaptations

- poor understanding of AT within the scope of professional practice
- lack of individual and institutional regard for ACOTE standards
- health literacy and language barriers between clients and AT providers

Supports:

- OT codes of ethics such as occupational justice and evidence-based practice
- AOTA description/ACOTE requirements for AT in OT practice
- demand for hands-on AT training from OT students
- support and promotion of AT from faculty members in professional programs
- IDEA guidelines for delivering AT goods and services
- existing institutions, communities, and individuals who can share AT skills and info.
- appeal for customized and client-centered care across a variety of settings/populations
- value in development of professional skill and clinical reasoning
- availability of sustainable resources, humanitarian efforts and creativity
- research and literature demonstrating benefits of AT training and provision
- use of no-tech, low-tech-, and high-tech AT for meeting initiative objectives
- Rehabilitation Engineering and Assistive Technology Society of North America

Ideal solution

Strategies for increasing AT training and provision opportunities are best described using Bronfenbrenner’s Ecological Systems Model (Appendix A). Entities that
mandate AT provision, such as IDEA and ACOTE, already exist in the macro system. Training and provision solutions would target subsequent layers, nested within the macro system, beginning with the exosystem. Ideally, at this level, professional institutions such as colleges and universities, would offer an AT certificate to all of their professional programs (e.g. OT, speech, teaching, etc.) The curriculum for this would be similar to the one offered by UWM (Appendix B). This solution would have the most influence because it operates on broadly reaching layer of society, where benefits are accessible to a wide array of professional students.

Alternate solution

A feasible alternate would be to implement more opportunities within the micro system, targeting a specific college within a larger institution, such as a school of OT. At this level, an AT elective track of 2-3 specialized courses could be offered to OT students who are seeking hands-on learning opportunities, AT skills, or a cohesive sequence of classes to satisfy their program’s elective requirements. This curriculum would include coursework in AT that meets ACOTE standards and projects that serve authentic clients.

Acceptable solution

An acceptable solution will be to offer, on an individual level, multi-day community workshops in AT. Workshops would be offered to practitioners, caregivers, and laypersons interested in serving themselves or others near them. In curriculum based on the one offered by The Adaptive Design Association in New York City (Appendix C), clients would learn to fit, make and implement adaptive equipment created from
cardboard. This multi-day workshop would be offered for continuing education credits to post-graduate practitioners, and could be sponsored by a professional school of OT affiliated with a larger university.
Appendix A: Impact Levels of Ideal, Alternate and Acceptable Solutions

Based on Bronfenbrenner's Ecological Systems Model
Appendix B: Example of UMW AT Certificate Courses

Images retrieved from: http://uwm.edu/healthsciences/academics/certificate-in-assistive-technology-accessible-design/

The Certificate in Assistive Technology and Accessible Design (ATAD) follows a model of prerequisite disability and technology basic knowledge, survey of the fields, assessment, intervention and leadership. You will work under the direction of a faculty member to complete a capstone project, which, by design, is potentially publishable.

Coursework

With a Certificate in Assistive Technology and Accessible Design (ATAD), you will be better prepared to meet the diverse and adaptive needs of a career in the field of assistive technology and accessible design.

You will gain classroom experience in the following content areas, among others:

- Introduction to Assistive and Rehabilitation Technology
- Assistive Technology Service Delivery in the Schools
- Assessment and Intervention in Augmentative and Alternative Communication
- Assessment in AT and Accessible Design
- Design and Disability
- Introduction to Low Vision and Vision Impairment
- Practical Aspects of Visual Impairment and Low Vision Intervention
- Introduction to Biomedical and Rehabilitation Instrumentation
- Technology and Instruction for Children with Disabilities
- Special Populations in Communication Disorders
Appendix C: Examples of Adaptive Design Association Course

images retrieved from: http://www.adaptivedesign.org/#!education/c8j

BASIC AND PROFESSIONAL DEVELOPMENT COURSES

DAY 1: Cardboard Basics in Adaptive Design
Earn 6.0 NYP TA CH or 0.5 AOTA CEU

Learning Objectives: Understand a child's unique equipment needs. Participants use hand tools and single-layer cardboard to create a mock-up of a user-specific seat insert and practice writing a justification for the adaptation.

Ideal for occupational and physical therapy practitioners, teachers, students, and parents

Course time: 10:00 a.m. - 4:00 p.m. with 1 hour lunch break

Fee: $225, includes material costs

Offered primarily on Tuesdays. If you need a different day, please give us a call. Click the register button for a full description, dates, and available discounts.

DETAILS AND REGISTRATION

DAY 2: Making Adaptive Equipment Work
Earn 6.0 NYP TA CH or 0.5 AOTA CEU

Prerequisite: Day 1-Cardboard Basics

In addition to Learning Objectives listed in the Day 1 Course, participants will understand the step-by-step process of creating customized adaptations, from assessment to delivery of final item. Participants learn to make a basic adaptation—a footrest, desk, or monitor stand—while delineating the process of revising the IEP or service plan, in order to list, justify, and ensure the provision of customized adaptive equipment.

Ideal for occupational and physical therapy practitioners, teachers, students, and parents

Course time: 10:00 a.m. - 4:00 p.m. with 1 hour lunch break

Fee: $225, includes material costs

Offered primarily on Wednesdays. If you need a different day, please give us a call. Click the register button for a full description, dates, and available discounts.

DETAILS AND REGISTRATION

DAY 3: Adaptive Devices Made To Fit
Earn 6.0 NYP TA CH or 0.5 AOTA CEU

Prerequisite: Day 2-Making Adaptive Equipment Work

In addition to the Learning Objectives listed in the Day 1 and Day 2 courses, participants create and test devices for specific children, write justifications, and explore adaptations created for individual needs in academics, ADLs, communication, music, and art.

Ideal for occupational and physical therapy practitioners, teachers, students, and parents

Course time: 10:00 a.m. - 4:00 p.m. with 1 hour lunch break

Fee: $150, includes material costs

Offered primarily on Thursdays. If you need a different day, please give us a call. Click the register button for a full description, dates, and available discounts.

DETAILS AND REGISTRATION
References


Chapter II: Acquisition of Hands-On Skills

“Man, through the use of his hands, as they are energized by mind and will, can influence the state of his own health”

Mary Reilly, 1962

Between April 11, 2016 and July 30, 2016, the author of this manuscript participated in a capstone experiential internship at Adaptive Design Association, Inc. in New York, New York. The mission of this internship was to learn to create adaptive devices from cardboard in order to promote health, well-being, participation, and occupational justice through hands-on activities. One cannot memorize a skill using cognition alone; both the body and the mind need to adjust to it. One can’t just claim to have a skill; first, it must be executed and practiced. For these reasons, the projects created during the internship are recorded in spaces 15 through 47 of the 100 Piece Portfolio (Appendix D). Projects 1 through 15 were created before the capstone internship, and indicate the author’s prior level of skill. The empty spaces for projects 48 through 100 show that though the author’s skills have improved, her future still holds a multitude of life enriching, hands-on experiences.

It is true that one uses the whole body rather than its individual parts to promote quality of life, yet even while viewing the gestalt, the hands (as a literal part or figurative term for the sensory-motor system) are easily seen as the ones that lead the body in engaging and transacting with the greater environment. The hands externally take in and act on information that is internally gathered, processed, and catalyzed by the heart and mind (e.g. psychosocial and cognitive domains).
The hands allow us to solidify performance patterns and improve performance skills. They clue us in to what feels natural and what feels odd. They materialize abstract concepts into tangible items that can be used, shared, and returned to. They turn fleeting ideas into explicit records that inform us of who we are, where we come from, and where we should go next. The hands are the link between the inside and the outside. They are the tools that allow us to belong, manipulate, and survive in the complicated magnitude of our ever-changing context. By denying the use of our hands, we risk losing our link to the outside world, and our chances of surviving in its inherent chaos. Yet, embracing the use of the hands promises a prosperous future hallmarked by awareness, cooperation, and the continuous harmony between human beings and the greater environment that they are both simultaneously derived from and enveloped in.

By documenting this work, the author hopes to inspire future OT interns at ADA to produce a 100-piece portfolio. Though similar in format, their individual projects will be original and substantial. Their projects will inspire new ideas and their stories will inspire new makers. Like this portfolio, the portfolios that future OT students produce and document will become a unique contribution to this phenomenal maker’s movement.
### Appendix D: 100 Piece Portfolio

<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Client(s) Context</th>
<th>Function</th>
<th>Material</th>
<th>Build Site</th>
<th>Time Est.</th>
<th>Date Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sea Turtle Anatomy Puzzle</td>
<td>Created by high school marine biology student for classmates</td>
<td>3-D model for learning about sea turtle skeletal structures and how they are spatially oriented</td>
<td>paper, manila folder, markers, packing tape, foam core board</td>
<td>Hilo, HI</td>
<td>7 hrs.</td>
<td>May 2001</td>
</tr>
<tr>
<td>2</td>
<td>Light Up Tracing Easel</td>
<td>Created by undergrad art student for use in class</td>
<td>Allows artist to trace design onto watercolor paper before painting</td>
<td>Plexiglas scrap, house light, second-hand easel</td>
<td>Eugene, OR</td>
<td>10 min</td>
<td>April 2007</td>
</tr>
<tr>
<td>3</td>
<td>Balance Master Drawing Game</td>
<td>Created by student teacher for middle school art students to learn design principle of balance</td>
<td>Helps students practice radial, asymmetrical &amp; symmetrical line drawings with peers</td>
<td>paper, cardboard shoe box, laminate, dry erase markers, kitchen timer</td>
<td>Eugene, OR</td>
<td>20 hrs.</td>
<td>March 2008</td>
</tr>
<tr>
<td>4</td>
<td>View Finder Window</td>
<td>Created by student teacher for high school art class</td>
<td>Helps students frame real life views and spatial relationships that are transferred to paper for still-life drawing</td>
<td>mat board, duct tape, overhead transparenc y, permanent marker</td>
<td>JC High School</td>
<td>30 min</td>
<td>Sept. 2008</td>
</tr>
<tr>
<td>5</td>
<td>Display Easel For Handout</td>
<td>Created by OT student for client at SNF to display COPD home exercise program</td>
<td>Puts handout in clear view and creates an environmental press for client to perform breathing exercises.</td>
<td>Manila folder, scotch tape, binder clip</td>
<td>Level IA fieldwork site (SNF)</td>
<td>12 min</td>
<td>Jan 2013</td>
</tr>
<tr>
<td>#</td>
<td>Description</td>
<td>Created by</td>
<td>Allows clients with motor challenges to turn electronic devices on and off more easily</td>
<td>recycled CD’s, copper tape, electric wire</td>
<td>OT pediatrics class</td>
<td>Time</td>
<td>Date</td>
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<tr>
<td>6</td>
<td>Battery Interrupt Switch</td>
<td>OT student for use with clients with motor challenges</td>
<td></td>
<td></td>
<td>Hillsboro, OR</td>
<td>30 min</td>
<td>Oct 2013</td>
</tr>
<tr>
<td>7</td>
<td>Tactile Discrimination Activity</td>
<td>OT student for use with clients with fine motor and SI challenges</td>
<td>Allows student to experience a variety of textures, use various amounts of UE pressure and practice pincer grasp</td>
<td>Freezer bag, paint roller, key, coin, lace, shell, chain, play dough</td>
<td>Hillsboro, OR</td>
<td>1 hrs.</td>
<td>Dec 2013</td>
</tr>
<tr>
<td>8</td>
<td>Heart Stencil</td>
<td>OT FW student for typically developing preschool group</td>
<td>Builds skills in tool use and grades down activity as it allows a shape to be traced before it is cut with scissors</td>
<td>Constructio n paper</td>
<td>Hillsboro, OR</td>
<td>1 min</td>
<td>Feb 2014</td>
</tr>
<tr>
<td>9</td>
<td>Honey Comb Magnets</td>
<td>OT FW student for typically developing preschool group</td>
<td>Helps students learn pincer grasp, object orientation, bilateral coordination, and cooperation</td>
<td>Constructio n paper, magnets, manila folder, printed images, yarn, glitter, yarn needle</td>
<td>Hillsboro, OR</td>
<td>3 hrs.</td>
<td>April 2014</td>
</tr>
<tr>
<td>10</td>
<td>Go Fish Kit</td>
<td>OT FW student for typically developing preschool group</td>
<td>Grades card game down to pre-k level with use of visual cues to encourage social participation and EF</td>
<td>Printed images, index card, glue, used deck of cards</td>
<td>Hillsboro, OR</td>
<td>1 hr.</td>
<td>May 2014</td>
</tr>
<tr>
<td>11</td>
<td>Mandal a Coloring Book</td>
<td>OT FW student for 5th grade student with ADHD</td>
<td>Helps student focus during class lectures by allowing proprioceptive input and organized FM movement.</td>
<td>Printed images, constructio n paper, staples</td>
<td>Vancouver, WA</td>
<td>30 min</td>
<td>Sept 2015</td>
</tr>
<tr>
<td></td>
<td>Handcrafted Adaptations</td>
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<tr>
<td>12</td>
<td><strong>Pumpkin Lacing Activity</strong>&lt;br&gt;Created by OT FW student for preschooler OHP&lt;br&gt;Helps students learn pincer grasp, object orientation, bilateral coordination, sequencing&lt;br&gt;paper plate, paint, yarn, construction paper, paper clip&lt;br&gt;Level IIB FW (school-setting)&lt;br&gt;Vancouver, WA&lt;br&gt;10 min&lt;br&gt;Oct 2015</td>
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<tr>
<td>13</td>
<td><strong>Tactile Butterfly</strong>&lt;br&gt;Created by OT FW student for preschooler w/ONH&lt;br&gt;Helps student cross midline and practice symmetrical UE gross motor movements with tactile cues&lt;br&gt;laminated poster board, large sequins, hot glue&lt;br&gt;Level IIB FW (school-setting)&lt;br&gt;Vancouver, WA&lt;br&gt;2 hrs.&lt;br&gt;Nov 2015</td>
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<tr>
<td>14</td>
<td><strong>Large Numbered Dice</strong>&lt;br&gt;Created by OT FW student for middle school student w/CP&lt;br&gt;Allows student to grasp and release dice for further inclusion and autonomy in math program&lt;br&gt;manila folder, marker, scotch tape&lt;br&gt;Level IIB FW (school-setting)&lt;br&gt;Vancouver, WA&lt;br&gt;1 hr.&lt;br&gt;Dec 2015</td>
<td></td>
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<tr>
<td>15</td>
<td><strong>Tri-wall Box</strong>&lt;br&gt;Created by OT Intern to for multiple purposes (e.g. footrest, computer stand)&lt;br&gt;Allows client to sit in ergonomic position for reduced strain, and increased focus, access and well-being&lt;br&gt;tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane&lt;br&gt;Capstone Experiential site (ADA)&lt;br&gt;New York, NY&lt;br&gt;8 hrs.&lt;br&gt;April 2016</td>
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<tr>
<td>16</td>
<td><strong>Side Lying Wedge</strong>&lt;br&gt;Created by OT Intern per PT request for adolescent client w/CP&lt;br&gt;Allows client to be supported in side lying for improved lung function&lt;br&gt;tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, thread, yoga mat, Velcro&lt;br&gt;Capstone Experiential site (ADA)&lt;br&gt;New York, NY&lt;br&gt;10 hrs.&lt;br&gt;April 2016</td>
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<tr>
<td>17</td>
<td><strong>Circle time bench</strong>&lt;br&gt;Created by OT Intern per Principle request for elementary student w/VI&lt;br&gt;Allows client to sit in ergonomic position for reduced strain, and increased focus, access and well-being&lt;br&gt;tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane&lt;br&gt;Capstone Experiential site (ADA)&lt;br&gt;New York, NY&lt;br&gt;5 hrs.&lt;br&gt;April 2016</td>
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<td>No.</td>
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<td>Materials</td>
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<td>Date</td>
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<tr>
<td>18</td>
<td>Therapy Room Bench</td>
<td>Created by OT Intern per Motor Team request for school-based OT/ PT room</td>
<td>Provides a place for students to perform therapeutic activities and exercises (e.g. don/doff shoes)</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>8 hrs.</td>
<td>April 2016</td>
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<tr>
<td>19</td>
<td>Anti-tip Bag Weights</td>
<td>Created by OT Intern to be used with anti-tipping drawer device for child’s chair</td>
<td>Provides removable (portable) weight to increase base of support and prevent backwards falls when child hyper extends in chair</td>
<td>Cotton fabric, thread, small stones</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>2 hrs.</td>
<td>May 2016</td>
</tr>
<tr>
<td>20</td>
<td>Anti-tip Bag Weight w/buckle</td>
<td>Created by OT Intern to attach chair to front, bottom or chair used by child with high tone</td>
<td>Provides removable (portable) weight to counter balance weight in back of chair and prevent backwards falls</td>
<td>Cotton fabric, thread, small stones, 2’ polyester strap, plastic buckles</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>3 hrs.</td>
<td>May 2016</td>
</tr>
<tr>
<td>21</td>
<td>Back Support w/Removable Head Piece</td>
<td>Created by OT Intern per OT request for adult, home health, client with Parkinson’s-like symptoms</td>
<td>Allows client to sit in supported position in living room chair to reduce tremors, unilateral lean, falls, and improve quality-or life</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, , strap, staples</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>15 hrs</td>
<td>May 2016</td>
</tr>
<tr>
<td>22</td>
<td>Head Piece w/Memory Foam Pillow</td>
<td>Created by OT Intern to complement Back Support device</td>
<td>Allows clients head to be supported in midline to reduce tremors, unilateral lean, and improve quality-or life</td>
<td>Thermoplastic, strap, buckle, memory foam, thread, velveteen spandex, Velcro</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>10 hrs.</td>
<td>May 2016</td>
</tr>
<tr>
<td>Handcrafted Adaptations</td>
<td>Prototype of Chair w/ Footplates</td>
<td>Created by OT Intern to train volunteer in adaptive design</td>
<td>Models design of support chair w/removable foot plates, a device that can be adjusted as client grows in height</td>
<td>single wall cardboard, tooth picks, white glue, hot glue</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>2 hrs.</td>
<td>May 2016</td>
</tr>
<tr>
<td>24</td>
<td>Smartphone Stand</td>
<td>Created by OT Intern for 6 year old client with Phelan-McDermid syndrome</td>
<td>Allows hands-free video viewing during family gatherings where extended seating is required</td>
<td>single wall cardboard, hot glue</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>5 min</td>
<td>May 2016</td>
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<tr>
<td>25</td>
<td>Smartphone Template</td>
<td>Created by OT Intern per request of volunteer and outreach coordinator to teach easel construction at STEM fair.</td>
<td>Grades down time and skill level of activity while also ensuring success through backwards chaining</td>
<td>manila folder, pen, marker</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>2 hrs.</td>
<td>May 2016</td>
</tr>
<tr>
<td>26</td>
<td>Finishing Fish (Set of 3)</td>
<td>Created by OT Intern per request of ADA director to show stages of finishing</td>
<td>Shows learners sequenced cutting, sanding, edging, priming painting and sealing samples on each side</td>
<td>tri-wall cardboard, white glue, paper bags, paint, polyurethane, metal ring</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>3 hrs.</td>
<td>June 2016</td>
</tr>
<tr>
<td>27</td>
<td>Finishing Fish (Set of 5)</td>
<td>Created by OT Intern per request of ADA director to show finishing stages separately</td>
<td>Shows learners sequenced cutting, edging, priming painting and sealing samples on each fish</td>
<td>tri-wall cardboard, white glue, paper bags, paint, polyurethane, metal ring</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>4 hrs.</td>
<td>June 2016</td>
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<td>Purpose</td>
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<tr>
<td>28</td>
<td>Bathroom Steps</td>
<td>OT Intern per request of elementary school for 3rd grade student w/ dwarfism</td>
<td>Allows student to step up to urinal in school bathroom independently</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, particle board</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>8 hrs.</td>
<td>June 2016</td>
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<tr>
<td>29</td>
<td>Steps w/Wood Rails</td>
<td>OT Intern per request of elementary school for 3rd grade student w/ dwarfism</td>
<td>Allows student to step up to classroom chalkboard and stable non-dominant arm while writing.</td>
<td>tri-wall cardboard, hot glue, white glue, metal screws, 1' &amp; ½' wood dowels &amp; 2x4s, paper bags, paint, polyurethane, wood filler</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>20 hrs.</td>
<td>June 2016</td>
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<tr>
<td>30</td>
<td>Classroom Desk</td>
<td>OT Intern per request of elementary school for 1st grade student w/ VI</td>
<td>Allows student a portable way to sit on bench and participate in classroom activities while using Visual Magnifier</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>10 hrs.</td>
<td>June 2016</td>
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<tr>
<td>31</td>
<td>Circle Time Desk</td>
<td>OT Intern per request of elementary school for 1st grade student w/ VI</td>
<td>Allows student a portable way to sit on floor and participate in circle time activates while using Visual Magnifier</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>10 hrs.</td>
<td>June 2016</td>
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<tr>
<td>32</td>
<td>Visual Magnifier Case/Stand</td>
<td>OT Intern per request of elementary school for 1st grade student w/ VI</td>
<td>Provide stand for book scanning, storage doors and a durable case for a high price e device</td>
<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, staples, straps, buckles, stones</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>35 hrs.</td>
<td>June 2016</td>
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<td>No.</td>
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<td>33</td>
<td>Tray Insert for Power WC</td>
<td>Created by OT Intern per OT request for 13 year old girl w/CP Narrows gap between trunk and tray to prevent elbow from getting stuck tri-wall cardboard</td>
<td>Capstone Experiential site (ADA) New York, NY 20 min June 2016</td>
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<tr>
<td>34</td>
<td>Rocking Chair Tray</td>
<td>Created by OT Intern per OT request for 18 month year old girl w/ motor delays Allows child to participate in table top activities when rocker is locked in stop position tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY 4 hrs. July 2016</td>
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<tr>
<td>35</td>
<td>Rocker Stopping System</td>
<td>Created by OT Intern per PT request for 18 month year old girl w/ motor delays Allows child’s rocker to be stabilized for stationary activities tri-wall cardboard, hot glue, white glue, metal screws, 1' &amp; ½' wood dowels &amp; 2x4s, paper bags, paint, polyurethane, wood filler</td>
<td>Capstone Experiential site (ADA) New York, NY 12 hrs. July 2016</td>
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<tr>
<td>36</td>
<td>Activity Stander</td>
<td>Created by OT Intern per PT request for 18 month year old girl w/ fine motor delays Isolates child’s lower body and allows her to focus on table top activities in standing tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, Veltex, thread, yoga mat</td>
<td>Capstone Experiential site (ADA) New York, NY 20 hrs. July 2016</td>
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<tr>
<td>37</td>
<td>Back Support for Stander</td>
<td>Created by OT Intern per OT request for 18 month year old girl w/ motor delays Provides support and proprioceptive input on child’s back to increase stability and activate parasympathetic NS tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY 8 hrs. July 2016</td>
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<td>38</td>
<td>PVC Activity Bar</td>
<td>Created by OT Intern per OT request for 18 month year old girl w/ motor delays Used as a stand or mount for interchangeable fine motor activities that can be rested on or hung from bar PVC, hot glue, spray paint</td>
<td>Capstone Experiential site (ADA) New York, NY 2 hrs. July 2016</td>
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<td>39</td>
<td>Veltex Activity Board</td>
<td>Created by OT Intern per OT request for 18 month old girl w/ motor delays Veltex surface allows items to be stuck together with Velcro for grasp and release practice tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, Velcro, Veltex, staples, straps</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>3 hrs.</td>
<td>July 2016</td>
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<tr>
<td>40</td>
<td>Rounded Cardboard Rails</td>
<td>Created by OT Intern per Motor Team request for practice steps in school-based OT/PT room Carved out channels and rounded edges of rails allow child’s hand to properly grasp rail for safety and comfort while practicing stair mobility tri-wall cardboard, hot glue, white glue, wooden dowels, putty, paper bags, paint, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>7 hrs.</td>
<td>July 2016</td>
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<td>41</td>
<td>Adaptive Design Association (ADA) T-Shirt</td>
<td>Created by OT Intern for ADA Organization Allows staff member to promote organization and advocate for the people who ADA serves T-shirt, acrylic paint</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>30 min</td>
<td>July 2016</td>
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<td>42</td>
<td>Adaptive Design Association (ADA) Tri-Wall Sign</td>
<td>Created by OT Intern for ADA Organization Allows staff members to promote organization and advocate for the people who ADA serves 4’x8’ piece of cardboard, white glue, paper bags, polyurethane</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
<td>20 hrs.</td>
<td>July 2016</td>
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<td>43</td>
<td>Adaptive Design Association (ADA) Parade Banner</td>
<td>Created by OT Intern for ADA Organization Allows staff, interns and volunteers, to promote organization and advocate for the people who ADA serves at large public events (e.g. parades) 3’x7’ piece of canvas, primer, paints, thread, PVC</td>
<td>Capstone Experiential site (ADA) New York, NY</td>
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<td>44</td>
<td>OT Intern-led collaboration w/group of 5 SUNY Downstate OT students for 7 year old girl w/ Microcephaly</td>
<td>Isolates child’s lower body and provides balance support to allow table top activities in standing</td>
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<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, duct tape, contact paper, stickers</td>
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<td>45</td>
<td>OT Intern led collaboration w/group of 5 SUNY Downstate OT students for 7 year old girl w/Microcephaly</td>
<td>Tablet easel, art easel, and Velcro board with moveable shapes, provides multiple options for fine motor practice, exploratory learning and screen play</td>
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<td>tri-wall cardboard, hot glue, white glue, wooden dowels, paper bags, paint, polyurethane, duct tape, contact paper, stickers</td>
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<td>46</td>
<td>Created by OT Student to use with smart device for ADA archiving project</td>
<td>Allows smart device to be stably mounted, at consistent height; and moved to various locations, while user is scanning documents</td>
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<td>47</td>
<td>Created by OT Intern per request of ADA director to honor cardboard carpentry history and allow learners greater access to original books</td>
<td>Allows learners to quickly reference organized information from ADA print library in the workshop without damaging books or risking infringement</td>
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<td>3 ring binders, printed materials, staples, section dividers with tabs</td>
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</table>
Reference

Chapter III: Teaching and Advocating

Even the smallest adaptation can be “life changing”. These were the exact words of the parent of the client who received Project 24, the iPhone stand (Appendix D). The author created the device, and it was given to a six-year-old client with Phelan-McDermid syndrome. The client successfully used it to sit still during an initial evaluation at ADA for a seat insert. The device was made using Project 25, the iPhone template (Appendix D). The author and another volunteer developed the template in order to teach construction of the iPhone stand at an up-coming STEM fair. The template grades down the time and skill level needed to complete the activity, while also ensuring the builders’ feelings of success through backward chaining.

When the parent of the child with Phelan-McDermid syndrome returned for the first fitting, she said that using the stand to watch movies on the iPhone had been the only thing that kept her son from getting up and wandering around at restaurants. She said that before they had the stand, they were using condiment bottles and salt and peppershakers to keep the phone propped up, often unsuccessfully. Now, with the stand, the phone stayed up and her son was able to voluntarily sit still and participate in family meals. The original template was turned into a digital version by a staff member at ADA.

The paper template was used to teach the parent how to make the stand. The family created 300 stands from the templates and brought them down to this year’s Phelan-McDermid syndrome conference in Florida, so that other parents of children with this rare condition could benefit from the use of the simple yet “life changing stand.” This family’s story was featured in the July issue of the ADA newsletter. The template is
provided in Appendix E of this manuscript, and a lesson plan for teaching new learners about cardboard adaptations, and how to build these devices, is located in Appendix F.
Appendix E: iPhone Stand Template (scaled down from 11” x 17” format)

Appendix F: iPhone Stand Lesson Plan
Handcrafted Adaptations

Time: 90 minutes
Title: Introduction to Making Cardboard Devices
Course Level: Graduate/ Post-Professional
Instructor: Julia Damon

I. Goals
• To gain knowledge about the history of cardboard carpentry
• To understand the nature of the material
• To demonstrate basic skills, tool use, and safety awareness
• To consider implications for use in practice setting

II. Objectives
• After watching a brief presentation, students will take a short quiz about cardboard carpentry and pass with a score of 80% or higher.
• After seeing a demonstration on building an iPhone stand, students will return demonstrate skills and safety awareness while building stands during work period.
• After demonstration and work period, students will complete a functional iPhone stand.
• After group discussion, students will have stated at least one implication for the use of cardboard carpentry in their current practice.

III. Concepts
• Environmental adaptations can improve inclusion, independence, task performance, and overall well-being in the daily life of a person whose current environment(s) does not naturally allow these things.
• Engaging in a hands-on practice improves the quality of life and well-being in the maker.
• Cardboard carpentry can be used to make anything from easels and puzzles to furniture and play spaces.
• Cardboard adaptations can serve and be made by multiple populations, with various skill sets in a variety of settings.
• Cardboard is a strong, malleable, inexpensive, light, and eco-friendly material that can be used to make a wide range of portable, affordable, and customized adaptations.
• Even the smallest cardboard adaptations can be life changing.
• The history of cardboard carpentry is over 100 years old.
• Cardboard is the common name for any type of fiberboard made from compressed paper pulp.
• Corrugated refers to the wave of flutes located between the flat sheets.
• Corrugated single wall cardboard was invented in New York in the 1870s.
• Tri-Wall cardboard was invented in New York in the 1960s as a packing material for heavy items (e.g. watermelons).
• Tri-Wall cardboard can withstand about 100 lbs. per square inch when weight is bared perpendicular to the flutes.
• Tri-Wall compression strength is tested via Edge Crush Tests (ECT).
• Water and crush damage can compromise cardboard's integrity.
• Using cardboard carpentry to build classroom adaptations was popularized in the 1970s by the Center for Learning Things (now closed) in Massachusetts.
• In the Early ’80s, Alex Truesdell helped pioneer the Adaptive Design Center at Perkins school for the blind.
• 10 years later Truesdell moved to NYC and started a small company that developed into a nationally recognized non-profit organization called Adaptive Design Association Inc. which specializes in making adaptive cardboard furniture for children with disabilities.
• Tri-wall cardboard can be made from reused single wall or purchased from a corrugation plant in 4’ x 8’ sheets.
• Other materials such as white glue, hot glue, wooden dowels and sandpaper can be purchased at hardware or arts and craft stores.
• Basic safety equipment includes ear plugs and safety glasses and first aid kit.
• Basic hand tools include: pencil, ruler, carpenter square, box cutter, steak knife, awl, flat-head screwdriver, pencil sharpener, hammer, spoon, and plastic card (e.g. expired credit card).
• Basic Power tools include: jigsaw, glue gun, hand drill.
• Always wear earphones and safety glasses when using jigsaw and hand drill.
• Always make sure that cutting and drilling path is clear.
• Be aware that hot glue can cause severe burns and sharp edges can cause severe cuts.
• Carpentry skills include measuring, cutting, scoring, sanding, gluing, edging, priming, painting and sealing.
• Cardboard carpentry can be done in a small work area, such as a kitchen table, or a larger scale area like a professional sized woodshop.
• Delivering adaptations to those in need requires a triage of roles: maker, user, and requester. These roles can be fulfilled by clients, teachers, caregivers, therapists, family members, and peers.
• Occupational therapists are particularly useful team members because they are clinically trained; specialize in holistic, client-centered care, and are unique in their use of hands-on activities to promote health and well-being.

IV. Visuals
• Power Point Presentation
• iPhone Stand Template

V. Space demands
• 5x5 foot space for supplies, equipment, and waste
• 3x3 foot standing or sitting room (per participant)
• 3x3 foot solid, flat work surface with adequate lighting (per participant)

VI. Supplies and equipment
• computer, screen and/or projector
• utility tables or desks (3x3 foot surface area per person)
• iPhone stand templates (one for 1-2 participants)
• pre-cut single wall card board (1-2 per participant)
• hot glue gun (one for 1-4 participants)
• hot glue sticks (2 per participant)
• pencil (one per participant)
• 12” ruler (one per 1-2 participants)
• metal spoons (one per participant)
• box cutter (one per participant)
• single wall cardboard sheets (5” x 17” area per participant)
• cutting mat (one per participant)

VII. Teaching procedure

<table>
<thead>
<tr>
<th>Time allotment</th>
<th>Activity Description</th>
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<tr>
<td>5 minutes</td>
<td>A. Introduction: participants receive overview of class and are told that they will be making two devices, one to keep and one to give away</td>
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<td>30 minutes</td>
<td>B. Presentation: participants view PowerPoint slideshow, are given a paper quiz, and review answers as a group.</td>
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<td>5 minutes</td>
<td>C. Simulation: participants attempt to read from smart device. (or screen sized index card) w/out moving hands head or trunk</td>
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<td>10 minutes</td>
<td>D. Demonstration: instructor shows students how to measure, score, fold, and glue first device from template, and how to measure and cut cardboard for second device.</td>
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<td>30 minutes</td>
<td>E. Work Period: participants work on projects while instructor circles room, assisting and answering questions.</td>
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<td>10 minutes</td>
<td>D. Closure: participants share devices with group, state who they will be giving one of their devices to, explain how these skills might be used in current practice setting and express whether or not they would be interested in taking another, higher level course</td>
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</table>
Chapter IV: Workshop Workbook Project

The Workshop Workbook Project began as a request from Alex Truesdell, executive director of Adaptive Design Association Inc. and a recipient of the 2015 MacArthur fellowship. Along with founding her current organization, Truesdell has pioneered the development of countless devices, programs, and workshops that changed thousands of people's lives, over the past 30 years. Though she has become a key asset in the adaptive design movement, it should be known that she is not responsible for inventing or perpetuating this movement on her own. The history of cardboard carpentry spans well over 100 years (Trybom, 1907), and it is not one individual, but rather the collaborative efforts of many, that has brought cardboard adaptation making to the national spotlight. Much of these efforts, skills, designs, and histories have been recorded in a collection of bound literature, collected at ADA. Though the content of these materials is extremely valuable, accessing them has become challenging.

For example, a book titled *The Further Adventures in Card Board Carpentry, Son of Cardboard Carpentry* (Cope & Morrison, 1972), is out of print. Furthermore, its publisher, The Center for Learning Things, has been closed for over 30 years. Truesdell purchased this book just as the company was closing, and attributes most of her cardboard carpentry skills and knowledge to the book. Because of this, the book was able to facilitate the sites methods and purpose long after The Center for Learning Things disappeared. Though this information was passed on to Truesdell via this particular book, the book could not feasibly be made available to the
learners at the ADA workshop as its rarity and frail condition put it at risk of loss or destruction. This challenge was also inherent to many other books in the ADA library. Additionally, the content of these books was not all organized into functional categories, such as ‘philosophy’, ‘devices’ or ‘tools & skills’. This presented an additional challenge to sourcing information as sifting through each page and bookmarking each page of relevant information became tedious and time consuming to new and returning readers. This, in turn, impeded the efforts of builders, program planners, authors and educators who wished to use these materials to inform their client-centered projects.

From an occupational therapy perspective, the greatest obstacle to accessing this literature was the lack of functional use that physical form and logical organization of the original printed materials allowed. Another obstacle to function were the infringement risks that ADA faced if the materials were not legally re-appropriated. In an attempt honor, preserve, and share this valuable history; while making its skills and ideas comprehensively and legitimately accessible to future learners, the print resources collected at Adaptive Design Association were reproduced into a series of functional Workshop Workbook Binders using the following archiving methods.

Methods

All published materials are subject to intellectual property rights and typically cannot be reproduced without written permission from the publisher. The US places a high value on education and allows copyrighted materials to be copied and shared for classroom learning without publisher permission. Because the
workbooks were created as learning tools to be used within a non-profit organization, they were protected under the US copyright law. 'Classroom Use Exemption' (17 U.S.C. §110(1)).' This exemption allows instructors and learners to display and perform copyrighted materials in face-to-face classroom settings cost-free and without written consent from the copyrighter. Once this law had been thoroughly reviewed, the processes for digitizing the books began.

In many ways, the following methods are a testament to how environmental adaptations, both high and low tech, can be synthesized to expedite a process, reduce waste, lower costs and improve overall performance. The high tech device used was an iPhone 6S smart phone. On the phone, the open-source document scanning App, 'Cam Scanner', was downloaded. The low-tech device used was a scanner stand made of cardboard. Two versions of a scanner stand were used. One was a solid box made from triple wall corrugated cardboard, and the second was a collapsible stand made of single wall, corrugated cardboard. Due to the portability of the devices, scanning could take over multiple spaces at various times. When digital archiving is done using a desktop computer and large stationary scanner, the weight, and size of the cables, as well as the length of connecting cables and demands for a nearby power source, limit the act of scanning documents to a relatively small area. These limitations no longer become an issue with the use of the app, smart device and scanner stand, as all are small, light, portable, and require only the battery power of the smart device. The cardboard stand further enhances the performance of the smart device and app by providing a consistent height, adequate light, and a secure hold for blur reduction of the images. When an image
of a document is captured from above, rather than being placed on a scanning bed, the capture speed is reduced from 5-10 seconds per scan to less than one second per scan.

The Cam Scanner App allowed the pages to be scanned individually or in batches. The books were scanned in batches that included a complete book, from cover to cover. After the books were scanned, each page could be cropped, straightened using the app. This allowed the user to clean up each page directly on the iPhone. Pages could then be formatted over a variety of contexts and in combination with other occupations, including transportation, while riding on the subway train. Freeing up time and space demands while editing not only decreased processing time, it also made the work feel as enjoyable and habitual as using a smart device to play games of puzzles during downtime.

After books were scanned and saved in batches, and the individual pages were cropped and adjusted. The files were converted to PDF formats and sent via email to a Mac Book Pro, Laptop Computer. The PDF versions of the book were down loaded and opened in Adobe Acrobat Pro where a watermark and footer was added to each page. The watermark was created in size 48 font, and read, “For educational uses only’. It was adjusted to 25% opacity, aligned to the center of page and rotated 45% to the right. The footer was created in 10 point font and included the book’s title, author, publication date, and original copyright information. It also cited the US copyright ‘classroom use exemption’. This information not only legitimized the copies, but it also provided readers with a way to source each page to its original book. After the documents were altered, they were placed into a folder titled “ADA books w/watermarks” and the original copies were discarded.
From the appropriated color copies, Adobe Acrobat Pro was again used to remove color from the files and reduce their size. A reduced black and white version of each book was then created to make the documents easier and less costly to share and print. Copies that were black and white and reduced in size were placed in a separate folder titled “ADA print”.

From the “ADA print” copies, individual pages were extracted and reorganized and color-coded into functional themes and book titles within a master folder ‘ADA Workshop Workbooks’. The color coded themes were named “All About Cardboard”, “Therapy”, “Devices”, “Tools/Techniques”, and “History”. Once all books had been sorted the files were uploaded onto a jump drive and delivered to a print shop, where a total of 1,647 extracted pages were printed, stapled, and punched with a three ring hole punch.

After the documents were sorted by binder themes, printed, and processed, a further level of organization was enacted. Sorting one binder at a time, the pages were divided into piles of related functions. When viewed in their printed form, it became very apparent that the ‘Device’ group of documents was by far the largest, and would need to be divided between two binders, which became the “utility, mobility, and furniture” device binder, and the “puzzles, games, and toys” binder. In contrast to the amount of ‘device’ pages, the amount of pages in the other categories was much less. Hence, these categories could be grouped into single binders. ‘History’, for example, was grouped with ‘Therapy’, and ‘Tolls/Skills’ was bound with ‘All about Cardboard’.
Results

The results of this sort produced four workshop binders, one that was three inches wide, and three that were one inch wide. Pages within each binder were separated, tabbed, and labeled by functional category. The largest binder was titled “Adaptive Devices: Mobility, Utility, and Play Spaces”. Its sections included ‘mobility’, ‘utility’, ‘electronics’, ‘furniture’, and 'play spaces'. The ‘utility’ section included the subsections ‘easels’ and ‘household’, and the ‘furniture’ section included the subsections ‘beds’, ‘tables and trays’, ‘seating’, and ‘shelves’.

The three smaller binders were named “Adaptive Devices: Toys, Games, Puzzles”, and "Adaptive Practice: Past, Present, Future”, and “Skills & Tools: Planning, Building, Finishing”. Within the second “Adaptive Devices” binder were the sections: ‘toys’, ‘games’, ‘table top projects’, ‘fine motor’, ‘education’, ‘puzzles’, ‘dolls’, and ‘doll houses’. Within the ‘toys’ section were the subsections ‘pull toys’ and ‘cause and effect toys’; within the ‘education’ section were the ‘math’, ‘language’ and ‘vision’ subsections; and the ‘puzzles’ section included the subsections ‘stacking’ and ‘jigsaw’.

copyright info below. Also included was a reiteration of the copyright law, to protect the materials and the organization.

When finished, the binders were presented at a staff meeting and delivered to the ADA workshop for immediate use. The learning tools were well received by everyone. Many informal comments were made about the usefulness of the binders. Many members stated that they had never had a chance to review the books and were happy to receive access to them. Through archiving these rare and frail materials, using high and low tech devices, a new set of adaptive devices was created for cardboard carpentry and adaptive design learners in the form of functional, durable, and easy to reference workshop workbooks. These adaptations were made to honor this movement’s rich existence and to allow its future learners efficient access to its functional value. The hope for these binders is that they will facilitate the production of many devices and learning materials that improve quality of life and promote inclusion and autonomy in all people. The hopes for this process is that it will be used to digitally archive other print libraries whose information is similarly at risk of being protected on a shelf or accidentally discarded and lost forever.
Appendix G: Copyright Information Document

COPYRIGHT LAW: EDUCATIONAL USES
Prepared for ADA Inc.
By Julia Damon OTS
7/18/2016

Footer and Water Mark:
THIS COPY OF 'DESIGNING FOR REHABILITATION' BY ROSE FLAMMANG WAS CREATED IN 2016
BY ADAPTIVE DESIGN ASSOCIATION INC. FOR EDUCATIONAL USES ONLY
UNDER THE US COPYRIGHT LAW "CLASSROOM USE EXEMPTION" (17 U.S.C. §110(1))
THIS COPY IS NOT TO BE REPRODUCED WITHOUT WRITTEN PERMISSION FROM PUBLICIST:
Copyright © 2013 ROSE FLAMMANG

Example

Classroom Use and Fair Use

(17 U.S.C. §110(1)), allows students and/or instructors of a nonprofit educational institution to perform or display works without seeking permission, or giving anyone payment. The Classroom Use Exemption does not apply outside the nonprofit classroom, environment you must be in a classroom, engaged in face-to-face teaching activities.

Fair Use

Fair use (17 U.S.C. §107) Fair use allows the reproduction of learning materials for educational uses, even when permission is explicitly denied. Reproduced works must be marked with a statement indicating that the copy is for educational uses only and must also display the works original copyright information (e.g. date and publisher).

Appendix H: Archiving Process

1) Scanning

1.0 Scanning at desk using single wall corrugated cardboard stand

1.1 CamScanner® app

1.3 Apple iPhone 67® smart

1.4 Books in print format

1.5 Scanner stand made from triple wall

2) Editing

2.0 Scanned pages in 'back'

2.1 Crop & adjust pages in app

2.2 Rename as book titles

2.3 Email PDF to Laptop
Handcrafted Adaptations

3) Formatting

3.1 Water mark created in Adobe Acrobat Pro®

3.2 Footer with copyright information added

3.3 Folders of different file types

3.4 Pages extracted from print versions of PDF book files

3.5 Pages organized into theme group folders

4) Sorting

4.0 Theme groups printed, stapled & hole punched

4.1 Theme groups sorted into functional categories

4.2 Categories separated by tabs in binders

4.3 Workshop Workbook Binders finalized with covers
Appendix I: Workbook Front & Back Cover

**Adaptive Design Association, Inc.**

**Workshop Workbook**

**DEVICES**

**TOYS, GAMES & PUZZLES**

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**CREATIVE CONSTRUCTIONS**
Campbell, M., & Truesdell, A. ©2000 Alex Truesdell & Molly Campbell

**EASY TO MAKE TOYS FOR YOUR HANDICAPPED CHILD**
Caston, D. ©1983 Souvenir Press

**CARDBOARD CARPENTRY**
D’Amato, J., & A. ©1966 KDI-Lion Press

**THE GREAT BOOK OF CARDBOARD FURNITURE**
Carton, K. ©2012 Schiffer.

**ADVENTURES OF CARDBOARD CARPENTRY**
Cope, G., & Morrison, P ©1973 Workshop for Learning Things

**CARDBOARD CARPENTRY**
DeBruin, J. © 1979 Good Apple

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References


