

## **The Accessibility of a Children's Museum**

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Service learning is an effective means of implementing course curriculum in the real world (Driskoll, 2009). As a Carnegie Foundation classified campus for the Advancement of Teaching, Community Engagement, the University of Texas Brownsville actively promotes service learning and partnerships with community agencies ([www.utb.edu/vpaa/cce/Pages/](http://www.utb.edu/vpaa/cce/Pages/)). While enrolled in a graduate course in assistive technology, graduate participants in special education were challenged with a service learning project for the local children's museum. To help meet the needs of the museum, the graduate students were charged with task of evaluating the accessibility of the museum exhibits for children with disabilities. This project provided service learning experience to graduate participants while fulfilling the needs of the children's museum.

*Keywords:* service learning, collaboration, assistive technology, museum

Service learning is considered an effective method of instruction for students in high schools (Celio, Durlak, and Dymnicki, 2011) as well as universities and colleges (Driskoll, 2009). Service learning in special education courses (Jenkins & Sheehey, 2009; Novak, Murray, Scheuermann, & Curran, 2009) has also been seen as a successful enhancement of both content learning and community collaboration (Jenkins & Sheehey, 2009).

As a Carnegie Foundation for the Advancement of Teaching, Community Engagement Classified Campus, a major goal of the University of Texas Brownsville (UT Brownsville) is to incorporate service learning ([www.utb.edu/vpaa/cce/Pages/](http://www.utb.edu/vpaa/cce/Pages/)) into courses. As is becoming the trend at other institutions (Neeper and Diamond, 2012) , the UT Brownsville faculty in

special education have taken this to heart and have integrated service learning projects into the majority of courses.

### **Method**

*Purpose.* Service learning projects should enhance the core curriculum to be covered in the course. In this assistive technology course, graduate students were asked to apply course information during the accessibility evaluation of exhibits at a children's museum. Projects between universities and children's museums are unusual, but there is a synergy in the collaborative process (Hennessey and Johnson, 2010). This project developed a strong relationship between UT Brownsville's special education program and the local children's museum. The purpose of this course project was threefold:

(a.) to guide graduate participants in a special education program in the process of engaging in service learning within the curriculum of an assistive technology course, (b) to evaluate the accessibility of a local children's museum with the ultimate objective of becoming more available to all children, and (c) to make exhibits more inviting to parents through understanding the importance of play. After a special education faculty member was approached by the director of a children's museum in a small town in south Texas, the faculty member designed a course project for the graduate participants, which would meet all goals.

*Setting.* The children's museum is located in a small city, population 140,000, on the border of Mexico in south Texas. The area is predominantly Hispanic and bilingual in English and Spanish. The area is also identified as one of the poorest in the nation with a higher than normal rate of poverty and unemployment (US Department of Commerce, 2012).

Although parents must stay at the museum while their children play, many choose to sit to the side rather than to engage in activities with their children. More than 40 years of research (cited in Smilansky and Shefatya, 1990), indicates that children from low SES and minority groups do not engage in sociodramatic play as often as other children. Sociodramatic play is beneficial in the transference of emotional development, social skills, and other cognitive abilities in young children entering school. Keeping this in mind, it was important to make exhibits parent friendly. Because some parents still choose to sit on the sideline, exhibits will need to allow the children to be as independent in their play as possible.

To educate parents in understanding the benefits of play in young children (Bergen, 2002), the educational director of

the local children's museum implemented a parent support group for families of children with special needs. A frequent concern voiced by the parents was that the children were limited in which exhibits they could use independently. While a guest speaker for this parent group, the university faculty member was asked to evaluate the different museum exhibits. This connection between the university and the museum led to the unique, collaborative design of the course project.

*Participants.* Participants were graduate students enrolled in a special education assistive technology course as part of a masters program at UT Brownsville. Participants were 3 men (all Hispanic) and 5 women (1 Caucasian and 4 Hispanic). Participants were representative of the enrollment of UT Brownsville, a designated Hispanic Serving Institution (U.S. Department of Education, 2011). Current enrollment includes 92.6% Hispanics with 5.2% White and 2.2% Other (e.g., African American, Asian, etc.) as well as 41.6% male and 58.4% female. Most students are first generation college goers. ([www.utb.edu/vpaa/admin/pages/fastfacts.aspx](http://www.utb.edu/vpaa/admin/pages/fastfacts.aspx)).

*Procedure.* In order to evaluate the accessibility of the exhibits at the children's museum, the participants visited the museum. Each participant was asked to explore the exhibits and to observe children exploring the exhibits. After debriefing as a group on the different exhibits, participants were asked to simulate various handicapping conditions. With the simulated handicapping conditions, each participant went back into the museum to explore the exhibits again. Handicapping conditions included: (a) confinement to wheelchairs, (b) legs tied to crutches for limited mobility and balance, (c) elbows tied behind the back for limited reach, (d) blindfolds, and (e) earplugs. Although not simulated,

considerations for cognitive disabilities and autism were also included in the evaluation of each exhibit.

The museum's exhibits included a fishing pier (including boat, dock, lighthouse), a farm (including farm house, tractor, pickup truck, horse, a goat, mini rocking chairs, chicken coop with eggs, a stuffed pig with piglets and a crop stand with rows of corn), an infant zone (including books, toys, bars for standing and mats to climb on), a construction zone (including pegboards, framing, work bench, and hand tools), a weather station (including TV station and on camera screen), a game zone (including floor chess, tables with puzzles, and game manipulatives), a restaurant (including kitchen, guest tables, cashier, utensils, dishes, artificial food and play money), a puppet theater (including a portable theater stand, puppets, and stools for an audience), and a medical zone (including examining tables and dental chairs, dolls, weight scale, first aid manipulatives, reading lights with x-rays, dress up lab coats, crutches, toothbrushes, two 3-dimensional heads to practice brushing teeth, and two 2-dimensional bodies to locate internal organs).

After completing their second exploration, the participants were asked to

describe the difference between the two experiences. The frustration to participate due to their simulated disabilities was most evident from participants suffering with orthopedic impairments. Several exhibits including the fishing pier, farm truck, and horse were completely inaccessible to individuals with wheelchairs and crutches. Other health impairments were not specifically simulated for this project, but participants reported that children with low vitality, weak balance and poor fine motor control would struggle to access game tables and the construction area.

Upon completion of the comparison of the two experiences, participants were divided into groups to determine what assistive technology, if any, was available to improve the accessibility of each exhibit. The task was to research types, prices, and sources of high and low tech options.

Each group was asked to discuss exhibits for mobility issues, sensory impairments, cognitive impairments and sensory sensitivities (Autism Spectrum Disorders), health and vitality issues and any other concerns that were considered. The faculty member filled out the following table during the discussion. The following table shows the results, (+ indicates no problem, — indicates concern).

TABLE 1

Handicapping Conditions→ Exhibits↓	Limited Mobility and Reach	Sensory Impairments	Cognitive Impairments	Health and Vitality Issues	Autism Spectrum Disorders	Total Needs by Zone
Fishing Pier	—	—	+	+	+	<b>40%</b>
Farm	—	+	+	—	—	<b>60%</b>
Infant Zone	+	—	+	+	+	<b>10%</b>
Construction Zone	—	+	—	—	+	<b>60%</b>
Weather Station	—	—	—	+	+	<b>60%</b>
Game Zone	—	—	—	—	—	<b>100%</b>
Restaurant	+	—	+	—	—	<b>60%</b>
Puppet	—	—	+	—	+	<b>60%</b>

Theater						
Medical Zone	—	—	—	—	—	<b>100%</b>
General Atmosphere in Museum	+	—	—	—	—	<b>80%</b>
Total Needs by handicapping conditions	<b>70%</b>	<b>80%</b>	<b>50%</b>	<b>70%</b>	<b>50%</b>	

The director of the children’s museum made one final request, which was that all suggestions had to be within a reasonable budget. Therefore any suggestions needed to either be easily and locally available or to have a multi-tiered pricing. Multi-tiered pricing would provide the board of directors some flexibility in prioritizing purchases within their limited budget.

*Results.* As seen in TABLE 1, most thematic zones fell short of basic accessibility. The infant zone fared the best with limitations in sensory impairments only. Infants and younger toddlers are at the beginning of their gross motor skills development, so limitations in these skills did not pose a significant hurdle in the infant zone. Ninety percent of the books, toys, furniture and manipulatives in the infant zone were deemed appropriate and accessible.

The next best zone was the fishing pier, which showed needs in both the areas of mobility and sensory impairments. This is the only zone with both vehicles and stairs, creating issues in mobility. The variety of settings from entering the lighthouse to climbing up to the top of the dock to scaling the deck of the fishing boat required some type of audio guide to assist in understanding the entire exhibit. (For example audio clues might include: “Climb stairs to fishing pier.”; “Enter the boat

here.”; “Discover the treasure chest under the pier.”)

The remaining zones all showed three or more deficit areas of accessibility. Children with cognitive or intellectual impairments and Autism Spectrum Disorders were likely to get the most out of the exhibits. This is because many of the activities offered could be used at a variety of levels. For example, a child in the kitchen may pretend to cook and eat by himself while others may choose to run a restaurant. The flexible design of the museum exhibits lends itself to the various ability levels of these children.

Children with sensory impairments, especially those who were visually impaired, were least likely to be successful in independent play. There were no raised guides or auditory indicators to help children move from one exhibit to another or to understand the different purposes of the exhibits. Additionally, the primary accessibility concern for children with other health impairments was the lack of seatbelts and chair backs. These concerns crossed all exhibits with the exception of the infant zone.

This service learning project also provided an opportunity to help educate parents of young children understand the importance of play. Play can be categorized into four categories (Smilansky and Shefatya, 1990): Dramatic play which is symbolic, constructive play, games with

rules, and sociodramatic play which helps develop age appropriate emotional skills in social settings. Each of the museum exhibits falls into one of these categories. Recommendations were made to help children and parents engage in exhibits by expanding the accessibility of the exhibits through the use of assistive technology. Each exhibit area was scrutinized and evaluated. Considerations included utilizing grippers to expand reaching, replacing stools with chairs with seat belts for balance, and providing icons and auditory announcers for identifying locations of exhibits. Recommendations (Seen in TABLE 2) were made for every exhibit and for the general conditions of the museum.

A limitation reported by participants was there was no exhibit specific for children with the Autism Spectrum Disorder. This need could be addressed with a sensory station or an area that can convert into one if the need becomes more prevalent. Another limitation was that the

exhibits fall into multiple play categories and it appears that there are more exhibits for the symbolic dramatic play and only one for games and rules. The exhibits should meet the needs of all play categories or have exhibits that are flexible enough to meet different play needs. Many of the exhibits needed larger pieces of equipment, such as a ramp to get a wheelchair into the back of the farm truck. Considering the space limitations in the existing museum, the implementation for accessibility is seen as a temporary condition. For example, the ramp is put out only when needed. Some parents do not like having to ask for equipment, since it is stored when not in use. The museum is closed to the public on Mondays but open to children with special needs in the evening. The background music is turned down or off, the lighting is subdued, and the assistive technology is made available. During this time the museum is completely accessible.

TABLE 2

Types of play	Age appropriateness	Exhibit	Recommendations
<b>Dramatic play (symbolic play)</b> focuses on social roles and interaction	Early childhood	Light House	Railings that begin on the door way edge and go all the way around.
		Kitchen	Sound mechanisms (motion/touch screen pad) to say where the child is.
		Farm	Aprons need Velcro closures The chairs should have backs on them. Sensory mechanism to state where the child is. Kitchen toys that have lights, switches and make cooking sounds: Tractor needs seatbelt and bar grips. Horse needs bar grips and saddle with stirrups.
		Fishing Boat	Clothes need Velcro closures Grippers can be used for long reaches

		<p>Dock</p> <p>Farm House</p> <p>Doctors Area</p>	<p>Chairs with backs for support</p> <p>Icons to tell where you are and what you are doing.</p> <p>Sound Mechanism</p> <p>Extended hands to reach out of reach items</p> <p>Handrails</p> <p>Modification: Ramp</p> <p>Items are hard to reach high and low.</p> <p>Rocking chairs very small.</p> <p>Need to add multiple size rockers</p> <p>Toys should have switches and lights</p> <p>Motion detectors and jelly buttons to turn on display</p> <p>Railing along the examining table</p> <p>Velcro on Lab coats</p> <p>Voice output and Braille for organ man</p>
<p><b>Constructive play</b></p> <p>focuses around sensory—motor activity with a preconceived plan. During this time frame the child becomes a creator and creates something that will last</p> <p><b>Games with rules</b></p> <p>—table games and physical games both types require rules and the ability to accept the rules and adjust to them.</p>	<p>early childhood to adulthood</p> <p>early childhood to adulthood</p>	<p>Construction Zone</p> <p>Manipulative Area</p> <p>Puppet Theater</p> <p>Chess area</p>	<p>Clothing needs Velcro to make one size fits all and to help grip peg boards and tools.</p> <p>Sensory Mechanism for audio</p> <p>Economy fast food trays to transport tools and parts</p> <p>Aprons to carry tools and parts</p> <p>Magnetic tip drivers</p> <p>Seats with backs</p> <p>Trays for loose pieces</p> <p>Dowel rods to open and close curtains and puppet holders</p> <p>Velcro to hold table skit in place to hide puppets</p> <p>Lightweight Foam chess pieces.</p> <p>Possible choice for pieces near edges for easy use by wheelchair bound</p>

			children Grippers to extend reach
<b>Dramatic play (sociodramatic play)</b> expresses the child’s growing awareness of his social surroundings. Gestures are imitated and human relationships are explored. This type of play is person—orientated and not material or object orientated.	early childhood  early childhood to adult hood	Infant Zone  Farm Truck	Books too high to reach Toys with vibrations and lights Fiber optic lighting Toys that are multi—sensory Ramp needed for wheelchair accessibility  Motion Sensory/Automated voice box/pad

**Discussion**

The participants were divided into smaller groups and were assigned a different thematic zone within the museum (e.g., medical and dental exhibit, fishing pier and boat, etc.). Each group, then, worked collaboratively to research prices and materials that could help improve the accessibility of the exhibits at the children’s museum. The participants also collaboratively created a class Power Point demonstrating how to implement the suggested equipment needed to make the children’s museum more accessible to a child that has special needs in areas of mobility, auditory, visual, cognitive impairments and Autism Spectrum Disorder.

Participants were invited to present their outcomes to the children’s museum board of directors. Following the presentation, the board of directors convened to discuss the results of the study. The director of the museum was tasked with writing a grant to purchase the equipment to help improve/enhance the exhibits and ultimately to better serve the children with special needs in the community.

Modifications recommended by the participants for increasing accessibility were made within a year. Velcro was added to costumes, grippers and wheelchair ramps were purchased, and chairs with backs and seatbelts were added to the exhibits. Updates describing these changes and purchases were described on the museum’s website. Parent instructions explaining the new equipment were also uploaded to the museum’s website and printed on the information sheets available at the desk. Additional discussions of interacting with children during dramatic and sociodramatic play were scheduled for parent group meetings.

The service learning project was a great opportunity for graduate students to go into the community and apply what they were learning. The participants returned to the classroom with comments, such as “It doesn’t take much to make a change in other people’s lives.” Participants reported on their end of semester course evaluations that the overall experience is one that was truly appreciated and will not be forgotten.

*Conclusions.* The service learning project can also open other doors for graduate participants. For example, this particular project was accepted to be presented at the Council for Exceptional Children National Conference 2011 in National Harbor, Maryland. A poster session was submitted by the faculty on behalf of the students. The conference presenters included the Children's Museum director, the faculty guiding the service learning project and a graduate student representative. The presentation showed the background of how the service learning project came about and the before and after pictures of the exhibits. The director of the Children's Museum attended to discuss the collaboration between the community and the service learning project.

*Limitations:* Limitations of this study include the time constraints of the university course. Graduate courses are scheduled for evenings to accommodate participants' work schedules, but the children's museum closes at 5 pm. To enhance the participants' understanding of the specific needs of children with disabilities, a visit during Monday hours when the museum is open to special populations would have provided the opportunity to observe specific handicapping conditions. Data from such observations could validate the participants' findings from their own simulations.

*Future Implications:* The next group of graduate students in this assistive technology course will be asked to evaluate the exhibits with the assistive technology in use in order to assess the effectiveness of the chosen equipment. They will also assess the newer exhibits, e.g., a grocery store with checkout counter for accessibility. Additionally, they will be asked to observe children with special needs in the museum exhibits and to survey the parent group to

understand the parental perspective of the changes made to the museum's exhibits.

Note: Web sites of materials are available by writing to the authors.

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