Skills on Wheels: Maintaining Quality During Expansion

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Abstract

A team with collaborators from a Midwestern university and the local children's hospital have implemented Skills on Wheels, a wheelchair skills program for the pediatric population. After a successful pilot program, the team identified areas of program improvement for the next session of the program running the following year. The gaps identified were in participant screening, volunteer training, and assessment standardization. This capstone focused on addressing these gaps by providing processes for improving the program. The capstone student worked collaboratively with the Skills on Wheels team to complete a detailed needs assessment and propose solutions for the identified gaps with the goal of program improvement.

Keywords: wheelchair skills, pediatric, program improvement

Skills on Wheels: Maintaining Quality After Expansion

The Wheelchair Skills Program (WSP) is an evidence-based program that includes assessment and training of over 30 specific wheelchair skills. The goal of the program is to increase the of confidence and effectiveness of wheelchair users when navigating their community while increasing occupational performance and participation in desired roles. The WSP was designed for adults and there is currently limited research surrounding the use of this program with children. A team of physicians, occupational therapists (OT), researchers, and OT students ran a pilot Wheelchair Skills Training Program (WSTP) called Skills on Wheels in the spring of 2021. Outcomes were measured using the Wheelchair Skills Test (WST), the Wheelchair Outcome Measure for Young People (WhOM-YP), and semi structured interviews with participants and families.

Children who use wheelchairs as their primary form of mobility may experience limitations in social participation, play, and community mobility due to physical and environmental barriers they encounter throughout their day (Sawatzky et al., 2011). Although the ability to explore and move independently throughout their environment is important for brain development, many children who use wheelchairs rely on their parents to push or carry them in the home or the community (Rodby-Bousquet & Hägglund, 2010). This may be because wheelchair skills training is widely considered an important piece of rehabilitation for adults who have suffered an injury and transition to using a wheelchair for mobility, however children are not always provided with the same instructional opportunities for wheelchair skill development (Sawatzky et al., 2011). Using the WSP with children addresses this gap and increases confidence and occupational participation within this population. Although there is currently

evidence to support the effectiveness of the WSP with the adult population, there is a lack of evidence for the use of this program in the pediatric population (Daoust et al., 2021).

Daoust et al. (2021) conducted a study using the WSP with children in a pediatric rehabilitation center, a specialized elementary school, and a specialized high school. The researchers concluded that the WSP could be beneficial in increasing participation and confidence for pediatric wheelchair users. Their results provide guidance and recommendations for adaptations to the program such as a caregiver component to the evaluation. With continued evidence and research to support the use of this program with pediatrics, this program could be more widely used within pediatric settings (Daoust et al., 2021).

Needs Assessment

To gain a deeper understanding of the Skills on Wheels program, the capstone student initially conducted a brief literature review and conducted a semi-structured interview with a faculty member in the affiliated university's occupational therapy department and the team lead on the Skills on Wheels team.

Site Interview

In an interview with the team lead conducted on March 24, 2021 (Appendix A.), he emphasized that this was the first official adaptation of this program for children (A. Chase, personal communication). Since there is currently little research surrounding adapting this program for children, he hopes to provide evidence-based literature to help other programs around the world run this program for pediatric populations (A. Chase, personal communication, March 24, 2021). Currently the team lead is working on a systematic review on social participation with children who are wheelchair users and hopes to continue that research with the participants in the program (A. Chase, personal communication, March 24, 2021). The team lead

is using the social model of disability to guide his research and therefore hypothesizes if the participants can overcome physical societal barriers, their confidence, occupational performance, and participation will increase (A. Chase, personal communication, March 24, 2021). The team lead expressed a desire to continue to grow the program after this pilot session and presented many different directions the capstone student would be able to take with this project. The capstone student planned to volunteer with the pilot program which was to take place April 24-June 5 and would continue to develop a plan throughout the summer based on the experience.

Pilot Experience

Throughout the pilot program the student conducted informal interviews with other volunteers, physicians, and therapists to explore ideas for the capstone project the following spring. The common themes revealed through these conversations were standardization of the assessment, volunteer training, and participant recruitment. The pilot program had four participants, each of these participants was recommended by a member of the Skills on Wheels leadership team. The therapists and physicians expressed a desire to grow the program significantly the next session, however, noted concerns about recruiting participants that were not known by the Skills on Wheels team. The participants would need to be able to self-propel relatively efficiently, follow directions, and have the cognitive abilities to learn the new skills. If the team were to recruit participants that were unfamiliar to its members, some type of screening process would need to be developed prior to the start of the program. While speaking with a few of the other student volunteers, a gap in the volunteer training process was identified. Although the students shared that they felt confident with the skills and how to teach them, they did not feel as confident with administering the assessment. The training that took place prior to the pilot session was quite informal and did not include the process for administering the assessment or

the cues that were to be used. Additionally, many of the students expressed it was difficult hold back from providing coaching during the assessment. When speaking the therapists on the team they agreed that it was difficult to refrain from coaching, however the goal of the assessment is to identify the skills the participant possesses upon entering the program.

Literature Review

The researcher conducted a literature review to analyze current research regarding the WSP, WST, and the pediatric wheelchair user population. The following articles were determined to be beneficial in the planning and implementation of this project. The databases that were searched were CINAHL and PubMed. The search terms that were used were wheelchair, wheelchair skills program, wheelchair skills test, and pediatrics. To ensure the most recent information and research, the search was limited to articles published in the last 10 years. The articles were then screened by the researcher and were included based on relevance to the project and plan.

Pediatric Wheelchair Users

The capstone student aimed to gain knowledge about pediatric wheelchair users and deepen the capstone student's understanding of some of the barriers faced by this population. Additionally, the capstone student explored any types of wheelchair skills training programs implemented with children. As the capstone student expected, research in this area is quite limited.

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development, many children who use wheelchairs rely on their parents to push or carry them in the home or the community (Rodby-Bousquet & Hägglund, 2010). This may be because although wheelchair skills training is widely considered an important piece of rehabilitation for adults who have suffered an injury and transition to using a wheelchair for mobility, children are not always provided with the same instructional opportunities for wheelchair skill development (Sawatzky et al., 2011). Using the WSP with children could be a way to address these concerns and increase confidence and occupational participation within this population. Although there is currently substantial evidence to support the effectiveness of the WSP with the adult population, there is a lack of evidence for the use of this program in the pediatric population (Daoust et al., 2021).

Wheelchair Skills Test Psychometrics

The Skills on Wheels program used the Wheelchair Skills Test to identify areas in which the participants needed to improve and to evaluate the impact of the program. The capstone student explored the psychometrics of the test to confirm its use within this program.

A pilot study of the WST by Kirby et al. in 2002 examined the test-retest reliability, intrarater reliability, interrator reliability, content validity, concurrent validity, and construct validity of the WST. These psychometric properties were examined using 21-24 participants. Spearman's rank correlation coefficients for the total scores were calculated all with a confidence of P = .001. The test-retest reliability had a correlation of r=.65, intrarater reliability r=.96, and interrater reliability r=.95.

A study evaluating the Wheelchair Skills Test by Kirby et al. 2004 examined the psychometric properties of the WST 2.4. The test-retest, intrarater, and interrater reliability were r= .904, r=.959, and r=.968 respectively. Overall, it was concluded that the WST 2.4 is

"practical and safe, and its measurement properties are very good to excellent" (Kirby et al., 2004).

A review of the reliability of the WST 4.1 was completed by Lindquist et al. in 2010 which evaluated the interrater, intrarater, and test-retest reliability of the test. In conclusion, the WST 4.1 was found to be excellent in terms of reliability with interrater reliability r=.855, intrarater reliability r=.950, and test-retest reliability at r=.901.

The WST test has been shown to have excellent psychometrics throughout the development of the different versions of the tests, however the test was designed for adults and the research has only been conducted with adults.

Table 1

	Test-Retest	**Intrarater**	**Interrator**
Kirby et al. 2022	**r = .65**	**r = .96**	**r = .95**
Kirby et al. 2004	**r = .904**	**r = .959**	**r = .968**
Linquist et al. 2010	**r = .855**	**r = .95**	**r = .901**

Adapting the Wheelchair Skills Test for Pediatrics

The capstone student inferred the research involving Wheelchair Skills Program (WSP) and pediatrics would be limited based on prior research and interviews with the site. The effectiveness of wheelchair skills training using the WSP has been demonstrated in 16 RCTs, with only one of the studies using pediatric subjects (Daoust et al., 2021).

Daoust et al. (2021) conducted a study using the WSP with children in a pediatric rehabilitation center, a specialized elementary school, and a specialized high school. The researchers concluded that the WSP could be beneficial in increasing participation and confidence for pediatric wheelchair users. Their results provide guidance and recommendations

for adaptations to the program such as a caregiver component to the evaluation. With continued evidence and research to support the use of this program with pediatrics, this program could be more widely used within pediatric settings (Daoust et al., 2021).

Gap Analysis

What is Known

The WSP includes free online evidence-based resources for the assessment and training of wheelchair users. Wheelchair users includes those using manual wheelchairs, powered wheelchairs, and motorized mobility scooters. The Wheelchair Skill Program Manual and WST are available for free download and use on the program website (www.wheelchairskillsprogram.ca). The Dalhousie University faculty involved in the creation of this program offer a 6 week training and practical workshops to obtain a Wheelchair Skills Program certification.

Best Practices

Wheelchair users are not always provided the extensive training needed to navigate the community using their chair. The WSP aims to increase the effectiveness of a wheelchair user to navigate their community and increase performance and participation in their desired roles safely and confidently. A meta-analysis conducted by Keeler et al. examined scores of the WST throughout thirteen articles with 581 participants who completed the WSTP (2018). According to the results of this meta-analysis, the total capacity scores of the WST, “increased by 14% when compared to no treatment, standard care, or educational controls, a relative increase over baseline of 21.2%” after completing the WSTP (Keeler et al., 2018).

Guiding Theory and Model

Social Model of Disability

Although about 2.7 million people in United States are wheelchair users (Koontz et al., 2015), our society is designed for able bodied individuals who use walking as their primary form of mobility. Unfortunately, the environmental obstacles that wheelchair users encounter may limit their opportunities and prevent them from participating within their communities. In order to effectively navigate a community not designed to accommodate their needs, wheelchair users are required to learn special skills to navigate obstacles such as steep inclines, gravel, potholes, curbs, and non-automatic doors. Without the proper training these obstacles can lead to tips and falls which are a leading cause injury in this population (Hosseini et al., 2012). Unfortunately, many wheelchair users are not sufficient in the skills required to navigate these obstacles. Hosseini et al. (2012) demonstrated that even individuals with a spinal cord injury (SCI) who received care at medical facilities specifically designed for people with SCI did not have all of the skills that may be required for successfully navigating the community. Additionally, according to the research conducted by Hosseini et al. (2012), higher scores on the WST correlated with higher scores in a quality of life (QOL) measure.

The capstone student used the Social Model of Disability to guide the capstone experience and project. The capstone student maintained the Social Model of Disability as a foundation for the project. The larger goal of facilitating an opportunity for pediatric wheelchair users in the greater Indianapolis area to navigate their environment more confidently was considered throughout the doctoral capstone experience.

The Gap

The Skills on Wheels program is filling the gap in wheelchair skills training for the pediatric population in the greater Indianapolis area by providing this free program. The Skills on Wheels team plans to continue to grow this program and reach more pediatric wheelchair

users in the community. The capstone student planned to assist the Skills on Wheels team by identifying gaps within the current program and addressing them through the doctoral capstone experience. The capstone student planned to focus on addressing the gaps in volunteer training and participant screening processes that emerged with the growth of the program.

Through research and self-reflection, a gap was identified the capstone student's knowledge and experience with the pediatric wheelchair population. A lack of expertise with teaching and educating groups was also identified as a gap within the capstone student.

Problem Statement

With Skills on Wheels 2022 quickly approaching, the capstone student concluded through the initial needs assessment, review of the literature, and pilot experience, the volunteer training and participant screening processes would need to be improved to maintain the quality of the program after it undergoes significant growth. The capstone student planned to further discover the needs of Skills on Wheels through an on-site needs assessment and continue to develop a plan to address the gap.

Capstone Project Plan and Process

Upon beginning the capstone, the student continued to develop and tailor the plan based on the on-site needs assessment and hands on experience with the population. The next session of Skills on Wheels was scheduled to run Saturdays April 9-May 7, 2022, and the team was deep into the planning process during the capstone student's project. The capstone student planned to discuss the needs of the program with multiple stakeholders and determine realistic ways the capstone student could address the identified gaps within the parameters of the capstone project.

Project Goal and Objectives

Project Goal 1: The student will collaborate with site mentor and Skills on Wheels team to

determine areas of improvement that will fit the needs of the organization.

Objective 1: The student will conduct a needs assessment with the Skills on Wheels team in the first 2 weeks.

Objective 2: The student will review the current literature surrounding the Wheelchair Skills Program and compare to the current practices of the Skills on Wheels program.

Project Goal 2: The student will use evidence from current literature to improve standardization and adaptation of the Wheelchair Skills Program for the pediatric population.

Objective 1: The student will apply evidence from the literature and from clinical experience at the local children's hospital to make evidence informed decisions for adapting the Skills on Wheels program.

Objective 2: The student will train Skills on Wheels team on the modifications to the program and assessment.

Objective 3: The student will use program evaluation tools to assess the effectiveness of program modifications at the beginning and end of the Skills on Wheels program.

Project Goal 3: The student will educate OT students on the use of standardized assessments and programs in relation to the Skills on Wheels program.

Objective 1: The student will design and deliver a lecture on the Skills on Wheels program and the use of the Wheelchair Skills Test in this program

Objective 2: The student will conduct a lab activity with OT students incorporating the Wheelchair Skills Test.

Project Timeline

The capstone student planned to split her time between the local children's hospital and the affiliated midwestern university. The time at the local children's hospital would be spent in the Adaptive Equipment department spent gaining clinical skills and experience working with pediatric wheelchair users to better inform the project. The time spent the affiliated midwestern university was to include an on-site needs assessment, Skills on Wheels team meetings, updating the literature review, continuing foundational research, and creating materials. The last two weeks of the project were to include evaluation and data analysis (Appendix B).

Clinical Experience

The capstone student's limited experience with pediatric wheelchair users and adaptive equipment was identified as a gap which the student planned to address by spending time with an OT in the adaptive equipment department at the local children's hospital. Through this experience the capstone student gained knowledge about adaptive equipment, positioning for function, and the diagnoses commonly requiring wheelchair use. This learning experience provided the capstone student with foundational knowledge for the capstone project.

On-Site Needs Assessment

The on-site needs assessment included informal interviews with the stakeholders and a review of an evaluation completed by volunteers and the therapy team after the pilot program. The capstone student wanted a comprehensive understanding of the program's needs and decided to interview stakeholders including the therapy team, the program lead, and students on the Skills on Wheels team.

Interviews with Stakeholders

Therapy Team

The therapy team consists of four OTs all of whom were involved in the pilot program of Skills on Wheels. The capstone student conducted and in person interview with each of the therapy team leads with specific objectives in mind (Appendix C).

Both team leads identified a desire to increase the number of participants for this session of the program. At the time of the interview, the only confirmed participants were two who had completed the pilot program. The Skills on Wheels team had been recruiting participants through social media, events, and word of mouth. Additionally, physicians and therapists at the local children's hospital had been keeping a master list of patients that may be interested or benefit from Skills on Wheels. The team leads suggested that the capstone student could assist with reaching out to these participants and confirm their interest in the program.

Although the therapy team wanted the program to grow, they expressed concerns about the appropriateness of each participant for the program, since not all these participants were familiar to the therapy team. A screening tool for new participants had been discussed in the initial needs assessment after the 2021 pilot program. The team leads expressed a screening tool was a priority for this session of the program to determine if participants recruited in various ways would be a good fit for the program.

An additional area of improvement suggested by the therapy team leads was increasing the standardization of the pre and post assessment. When asked what would improve standardization some of the suggestions from the team leads were keeping order of skills tested consistent for the pre and post test, standardized equipment, and consistency with cueing during the assessment.

. ***Student Team Members***

Four student team members who were involved in the pilot Skills on Wheels program were interviewed by the capstone student (Appendix C). When asked to identify some areas of improvement, most of the students expressed the training they completed for the pilot program did not prepare them for administering the assessment and teaching the skills. One student suggested going through the entire Wheelchair Skills Test during the volunteer training to improve education to the spotters. Additionally, the students proposed keeping the cues consistent during the assessment to create a more standardized process. These cues could be reviewed and practiced during the training session prior to Skills on Wheels.

Program Lead

In an interview with the program lead (Appendix C), the major need of the program was identified as maintaining the core values and purpose of the program while managing growth. This included growing the program and recruiting more participants, however ensuring these participants were able to be successful in this program. With the program growing so quickly, more volunteers will be needed and a streamlined process for training these volunteers would need to be developed. This would create a need for the role of volunteer coordinator as a part of the Skills on Wheels team. The volunteer coordinator would act as a point person for volunteer recruitment, communication, and training which would be beneficial for preparing the spotters and building their confidence in their role.

Review of Pilot Evaluations

Upon the conclusion of the pilot Skills on Wheels program a qualitative survey was given to volunteers. The results revealed suggestions for program improvement from volunteers, spotters, and therapists.

Table 2

Please include any feedback or suggestions you have regarding the pilot session of skills on wheels.	*Organized layout for the WST*
	Completing community day in place of the last training day
	Signs indicating location of each skill
	More specific training for volunteers/spotters
	Increased standardization of the WST including order of skills and cues
	More volunteers to assist with spotting and documenting
	Practicing the WST prior to the program to become more familiar with cues and how to measure each skill

On-Site Needs Assessment Results

Upon completion of the on-site need assessment, the capstone student identified the major gaps as participant recruitment and screening as well as volunteer recruitment, communication, and training. The capstone student planned to recruit participants using the master list from the physicians and therapists at the local children's hospital. The capstone student would meet with the Skills on Wheels therapy team and use their knowledge along with research to create a screening tool for the new participants. Once participants were committed the capstone student planned to schedule and administer these pre-assessments with the supervision of the Skills on Wheels therapy team leads. Throughout the process the student would be gaining clinical experience in the adaptive equipment department to provide her with foundational knowledge for creating and administering the screening tool. The capstone student

assumed the role of volunteer coordinator for the Skills on Wheels team and began the process of recruiting volunteers and developing a volunteer training. The clinical skills learned would also make the capstone student more qualified to educate and assist the volunteers working with this population. The volunteer training would be evaluated by the students and therapists using a survey.

Implementation

The capstone student began creating materials and implementing the project after the on-site needs assessment was complete. Prior to beginning the implementation phase of the capstone experience, the student received IRB exemption for not human subjects' research.

Clinical Experience

The capstone student spent a total of seven weeks with an OT in the adaptive equipment department at the local children's hospital. The capstone student gained clinical skills including how to evaluate and recommend wheelchairs and other adaptive equipment. The capstone student acquired knowledge in assessment of positioning and how to modify equipment to promote optimal function and propulsion. This clinical experience gave the capstone student an opportunity to work with the pediatric wheelchair user population and gain an understanding of the basic skills require to maneuver a manual wheelchair.

The capstone student gained experience in teaching and addressed the gap in educational expertise through teaching the Measurement and Assessment lab to the first-year OT students at the affiliated midwestern university. Developing a plan for the lab and the teaching experience helped the capstone student prepare for developing and training the spotters.

Participant Recruitment

The capstone student used the master list created by the therapist and physicians at the local children's hospital. Each participant on the list was called and the capstone student provided their caregiver with detailed information about Skills on Wheels 2022. If the caregiver was interested in receiving additional information and possibly registering for the program, email consent was provided and documented. The capstone student then forwarded these emails to the participant coordinator to assist with registration.

Participant Screening

As the list of registered participants continued to grow, the capstone student began researching and deciphering the minimal skills needed by a participant to be successful in the Skills on Wheels program. The capstone student used previous knowledge of the Wheelchair Skills Program, the pilot Skills on Wheels experience, the therapy team's expertise, and relevant literature to develop a screening tool (Appendix D).

Development of the Screening Tool

Precautions

Prior to beginning the physical screening, the participants and their caregivers would be asked to list any precautions or recent surgeries. An understanding of each participant's precautions and limitations would help the OTs decide if the participant would be appropriate for the program. If the participant was able to participant within their precautions, these would be documented in their pre-assessment to inform any volunteer working with them.

Range of Motion

A child's range of motion (ROM) affects their ability to optimally propel their chair. Upper extremity ROM and mobility including the thorax, shoulder complex, elbow, and wrist all impact a child's ability to be successful while operating a manual wheelchair. Although a study

of the biomechanical forces of these joints in pediatric manual wheelchair users reports range of motion demands are greatest at the glenohumeral joint (Slavens et al., 2015). This was considered while creating the Skills on Wheels Pre-Assessment. Part of the pre-assessment was to include a gross ROM evaluation of the participant's upper extremity and trunk.

Strength

Basic strength can be measured using Manual Muscle Testing (MMT). MMT is a widely used technique to measure strength for therapists. Since the wheelchair user will be using their upper extremities to self-propel a chair, it was determined by the expertise of the therapy team that upper extremity MMT would be assessed during the pre-assessment. The participants would be asked to perform each movement against resistance in the standardized positions. The OT or capstone student would record based on the MMT scale, which is as follows: 0, no muscle contraction; 1, palpable or visible muscle contraction; 2, active movement through full range of motion with gravity eliminated; 3, active movement through full ROM against gravity; 4, active movement through full ROM against moderate pressure; 5, full ROM against maximal pressure. (Pendleton & Schultz-Krohnand, 2018). The OTs used clinical judgement to determine that the participant must display a minimum of a 4/5 to be successful in the program.

Basic Skills

The Skills on Wheels program is tailored to each individual participant based on their baseline skills. There are no basic skill pre-requisites for participating in the program listed in the Wheelchair Skills Program manual, however for the purpose of the Skills on Wheels program, the therapy team decided on propelling the wheelchair independently and reaching outside base of support as the two basic skills requirements require for participating. The participant will have to attempt the skills during the program independently, so self-propelling their chair forward is a

baseline for being able to complete the rest of the tasks. As the skills get more difficult, the participant will need to display some trunk control and balance to be successful. Reaching outside their base of support gave the therapists insight into the participants safety while completing the higher-level skills.

Cognition

The Skills on Wheels program requires the participant to follow instructions given by the spotter. The skills that would be completed during Skills on Wheels may be unsafe if done incorrectly and the participant will need to be able to follow directions, especially when asked to stop something that is unsafe. The therapy team determined that basic cognition would be informally assessed throughout the pre-assessment. Throughout the assessment the therapist or capstone student would ask the participant to do simple tasks such as "raise your arm above your head" or "try to touch my hand". While demonstrating self-propulsion, the therapist or capstone student would ask the participant to stop halfway. If the participant was able to follow directions consistently and safely, they would pass the cognition screening.

Completing the Pre-Assessments

The pre-assessments were completed for each new participant at the local children's hospital. The capstone student completed the Pre-Assessments under the supervision of a therapy team lead. Each participant was accompanied by one or more caregivers. The pre-assessment began with an informal interview of the participants in which the capstone student asked their interest, likes/dislikes, and what they were hoping to learn during Skills on Wheels. The remainder of the assessment was completed and afterwards the OT, capstone student, caregiver, and participant discussed the results. All screened participants were approved for the program.

Evaluation of Pre-Assessments

Since the completion of the Skills on Wheels program will not fall within the time parameters of the capstone experience, the capstone student was unable to evaluation the effectiveness of the participant screening process as a part of this project. The capstone student will continue to be a part of the Skills on Wheels team after this project has ended. At the conclusion of this year's program the capstone student plans to meet with the therapy team and team lead to evaluate the pre-assessment and make any changes for future programs.

Volunteer Training

The capstone student took on the role of volunteer coordinator for the Skills on Wheels team. This role included recruiting, contacting, and training the volunteers. The capstone student used the results of the needs assessment to inform the processes for creating and implementing spotter training for the volunteers.

Volunteer Recruitment

With the number of registered participants growing quickly and with number 5x that of the pilot program, a significant number of volunteers would be required for Skills on Wheels 2022 to run smoothly. During the pilot program each participant was assigned a primary and secondary spotter. The primary spotter was an upper-level graduate student or a therapist and the secondary spotter was a volunteer that did not meet the primary spotter requirements. This design was successful during the pilot program and through discussion with the program lead, a goal of two spotters per participant was agreed upon.

The capstone student focused on recruiting volunteers who participated in the pilot program and other OT and physical therapy (PT) students and therapists. Emails was sent to all past volunteers, PT and OT outpatient therapists from the local children's hospital, and OT and PT students from the midwestern university. The capstone student met with the Skills on Wheels

social media team and a link to sign up as a volunteer was posted to the Skills on Wheels Facebook and Instagram pages.

A total of 64 volunteers were recruited including 40 eligible primary spotters and 24 secondary spotters. The capstone student gathered data on each volunteer's availability in a spreadsheet.

Development of the Spotter Resources

To address the gap identified in streamlining the process of the assessment and student confidence for training the skills, the capstone student created spotter resources to be used during the program. The Wheelchair Skills Program manual is over 300 pages and although it has plenty of useful information, the past student volunteers identified difficulty with accessing important information quickly during the assessment and training sessions.

The capstone student created one document that included the Wheelchair Skills Test, the appropriate cues for the assessment, scoring criteria, and spotter considerations. This would provide each spotter with all the information necessary to be successful while administering the Wheelchair Skills Test all in one place. The capstone student inferred if the spotters were able to access the information quickly and easily, the process for administering the assessment would be easier for the spotters as well as more consistent between testers since each spotter had access to the same information. Additionally, the student made a document including training tips for each skill to be used during the two training sessions to promote confidence in the spotters while teaching the skills.

Development of the Spotter Training

The capstone student used Kolb's experimental learning theory to guide the development of the spotter training. Kolb's theory states, "learning is the process whereby knowledge is

created through the transformation of experience" (Kolb, 1984 as cited in Meriam & Bierma, 2018). According to this theory, effective learning includes involving yourself in new experiences, reflecting on these experiences and creating theories, and then using those theories to make decisions (Meriam & Bierma, 2018). The capstone student planned to incorporate experiential learning into the training by allowing the spotters to practice each skill after a brief introduction and then coming together after groups of the skills to reflect on the experience and apply it to training or assessing Skills on Wheels participants (Appendix E).

Implementing the Spotter Training

The capstone student held four spotter training session the week before Skills on Wheels 2022 began. The training sessions were done in small groups ranging from 5-12 students at a time. The capstone student began the training with a brief overview of the program and the structure of the sessions. The Wheelchair Skills Test would be administered the first and last session as a pre and post assessment, session two and three would be training sessions, and session four would be a community day where participants would have the opportunity to practice the skills in a new environment. The capstone student then educated the students on the role of a spotter and demonstrated the proper technique for spotting. The general scoring criteria for the Wheelchair Skills Test was reviewed and then the capstone student briefly explained the first section of skills. At this time the spotters were encouraged to practice these skills and the capstone student checked in with the groups, assisting when needed. After the spotters appeared confident with a section of skills, the group would come together to reflect and discuss what they learned. This process was repeated for the next two groups of skills and the spotters were provided with the re-formatted WST made by the capstone student along with the scoring criteria, access to the Wheelchair Skills Program manual, and videos of each skill.

Evaluation

The evaluation of the spotter training took place using a survey sent to the spotters following the training (Appendix F). The survey was reviewed by the capstone student's site mentor for measurement errors. Six questions utilized a Likert scale for spotters to evaluate the program structure and content, then three questions utilized a Likert scale for spotters to evaluate the capstone student. Open ended questions asked the spotters to provide one thing they enjoyed about the structure and content of the training and the capstone student, then one thing they would improve about each.

Results

The results of the survey were derived from 20 responses. According to the quantitative data, the spotters felt least confident in training the skills. Many of the open-ended responses included more emphasis on training tips and increased time for the training. Additionally, many responses recommended practicing skills in the real testing environment. From the open-ended responses regarding things the spotters enjoyed about the spotter training included hands on experience and peer-learning.

The quantitative data in response to the capstone student's performance as trainer indicates the spotters were most satisfied with the capstone student's response to questions and knowledge of the material, both with a mean of 4.89 and SD of .31. The open ended responses indicated that the spotters believed the capstone student was approachable, answered questions, and allowed spotters to have autonomy while learning the skills. Some responses indicated the capstone student could have explained or demonstrated certain skills, such as the wheelie, more clearly.

Table 3

As a result of participating in the Skills on Wheels volunteer training…	**Mean (SD)**
I understand my volunteer role and responsibilities	4.63 (.58)
I have a better understanding of spotter technique	4.74 (.55)
I have a better understanding of spotter safety	4.68 (.57)
I am more familiar with the Wheelchair Skills Test	4.68 (.46)
I feel more confident administering the wheelchair skills test	4.42 (.49)
I feel more confident training participants in the wheelchair skills	4.32 (.46)

Table 4

Summary of Qualitative Data	
What did you like best about the training?	*The opportunity to participate in and practice skills ourselves, helping us understand how they might be trained*
	Hands on practice spotting the skills
	Learning from others
	Peer feedback from those familiar with teaching the wheelchair skills
	Fun and interactive
	Understanding through practice how difficult the skills are for these kids
What can be improved with regard to content, structure, and/or materials?	*More time to practice skills*
	Walk through the binder and the order of events on test day
	More emphasis on training tips
	Practice the skills in the Natatorium including equipment set up and tear down
	Walk through entire Wheelchair Skills Tet
	Watch videos of each skills during the training

Table 5

Please rate the trainer on the following…	**Mean (SD)**
The trainer explained the information in a clear and concise way	4.79 (.41)
The trainer was responsive to my questions and answer appropriately	4.89 (.31)
The trainer displayed knowledge of the material	4.89 (.31)

Table 6

Summary of Qualitative Data	
What specifically did the trainer do well?	*Explaining and demonstrating the skills in an easy to understand way*
	Allowed autonomy for learning and figuring out skills
	Answering questions in laymen's terms
	Very approachable and checked in with each spotter
	Clearly articulated safety concerns with each skill
	Professional and present, spoke loudly and clearly
What recommendations do you have for the trainer to improve?	*Explaining the wheelie skill more clearly*
	Provide more tips for teaching the skills
	More detailed explanation of the scoring criteria for each skill

Discussion

Overall, the results of the evaluation indicated that the capstone student provided the spotters with an interactive and informative training which was perceived as successful in preparing them for their role at Skills on Wheels. Major themes for improvement to the training included practicing the skills in the environment Skills on Wheel would take place including set

up and tear down of the equipment, extended time to practice the skills, and walking through the entire assessment.

Limitations

The greatest limitation of the capstone student's experience was that the Skills on Wheels 2022 program dates continued outside the time parameters of the capstone experience. The capstone student would have loved to use results and feedback from the 2022 session of Skills on Wheels to continue to improve the processes involved with volunteers and participant screening. Unfortunately, the capstone student was not able to complete these things within the timeline of this project.

Impact and Sustainability

As Skills on Wheels continues to grow, processes will need to continue to be refined to maintain the quality of the program. This capstone student's project helped to prepare the spotters with a strong foundation and knowledge of the program, to best support the participants and help them to grow their confidence in their wheeled mobility skills. The first session of Skills on Wheels 2022 occurred within the last week of this student's capstone experience and the capstone student received positive feedback about the training from spotters during the session, once they had put the skills they learned into action.

The capstone student has confidence the Skills on Wheels team and future capstone students will continue what was started in this during this capstone experience. The capstone student left all the materials created during the experience along with results of the evaluation for the capstone site to use in the future. The capstone student plans to continue to be a part of the Skills on Wheels team and assist with making the improvements to the spotter training for the next session based on the evaluations and feedback from this session.

Conclusion

This doctoral capstone experience provided Skills on Wheels with useful materials and processes for maintaining quality of the program as it continues to grow. The capstone continued to keep the Social Model of Disability at the core of this project. Through collaboration with multiple stakeholders, the processes and materials completed during this experience promoted positive change for pediatric wheelchair users. The Skills on Wheels team will continue to work toward the goal of empowering pediatric wheelchair users to confidently navigate their community.

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Appendix A

1. Can you tell me more about the original wheelchair skills program and where it has previously been implemented?
2. What parts of the program are the same and what parts have been adapted to cater to children for the Riley program?
3. Who will be participating in this program? (diagnosis, how are they recruited, etc.)
4. What will the daily schedule of the program be?
5. What will OT's role be in the program?
6. What is your current involvement with the wheelchair skills program?
7. Tell me more about your research surrounding the program at this point?
8. What are your goals for future research and what other directions are you looking to take in future research?

Appendix B


Doctoral Capstone Experience Timeline
Week 1
Orientation to Site
Attend team meetings
Meet with site and faculty mentors
Week 2-4
Clinical Experience
Evaluate and assess adaptive equipment and positioning with an OT at Riley Hospital for Children
Week 3-7
On-Site Needs Assessment
Semi-structured interviews with stakeholders
Continue to attend Skills on Wheels team meetings
Develop project plan
Begin participant recruitment
Week 7-10
Clinical Experience
Evaluate and assess adaptive equipment and positioning with an OT at Riley Hospital for Children
Meet with OTs to discuss pre-assessment
Week 7
Develop Pre-Assessment
Literature review and meeting with Skills on Wheels therapy team
Week 8-10
Administer Pre-Assessments
Week 10-12
Design and Implement Spotter Training
Design materials for spotter training
Teach IU OT measurement and assessment lab
Hold 4 volunteer trainings
Week 13-14
Evaluate and Analyze Results
Design and send survey to spotters
Analyze survey results and report

Appendix C

Interview Objectives

1. Understand each stakeholder's role in the past and future sessions of Skills on Wheels
2. Determine what went well during the pilot session of Skills on Wheels
3. Understand area of improvement from the experience of various stakeholders
4. Brainstorm with stakeholders ways in which the capstone student can address gaps and assist in program improvement within the time parameters of the doctoral capstone experience

Appendix D

Skills on Wheels: Pre-Assessment

Name: _____

DOB: _____

Date of Eval: _____

Time In/Out: _____

Primary Contact: _____

Phone Number: _____ Text or/and Call

Past Medical History:	
Precautions:	
Recent Surgeries:	
Type of Wheelchair:	
Wheelchair User Since:	

Hobbies & Interests:

-

Range of Motion	Left	Right
Shoulder Flexion:		
Shoulder Extension:		
Shoulder ER:		
Shoulder IR:		
Back/Trunk:		
Elbow:		
Wrist:		
Hand:		

MMT		
Gross UE		
Wheelchair Skills		
Propel 50 ft:		
Reach outside BOS:		

Paperwork: Physician Release _____ Liability _____ Research Consent _____ Photo Consent _____ Covid Consent _____

Evaluation completed by: _____

Appendix E

Spotter Training Format

Intro
- Thank volunteers
- Review program dates and schedules (assessments, community days)

Overview
- Explain assessment and groups of skills
- Plan for today's training session
- WHOM-YP

Assessment
- Coaching vs cueing
- Explain examples of cues and how much they can be altered
- Giving feedback
- Meaning of scores (3, 2, 1, 0, TE, NP)

Spotting
- Proper technique
- Balance between preventing injury and stepping in during skill

Indoor Skills
- Encourage groups of 2-3 to read skill on assessment, how to properly score, and cues for each one
- Therapists, ATPs, and experienced students walk around and provide tips for coaching skills as questions arise
    - Rolls forward
    - Rolls backward
    - Turns in place
    - Turns while moving forward
    - Turns while moving backward
    - Maneuvers sideways
    - Reaches objects
    - Operates body positioning options
    - Shifts weight
    - Performs level transfers
    - Gets through hinged door

Discussion including how to spot, things to focus on, teaching tips for participants and answer any questions.

Community Skills
- Encourage groups of 2-3 to read skill on assessment, how to properly score, and cues for each one

- Therapists, ATPs, and experienced students walk around and provide tips for coaching skills as questions arise
    - Folds and unfolds wheelchair
    - Performs ground transfers
    - Ascends slight incline
    - Descends slight incline
    - Ascends steep incline
    - Descends steep incline
    - Rolls across side- slope
    - Rolls on soft surface
    - Gers over obstacle
    - Gets over gap
    - Ascends low curb
    - Descends low curb

Discussion including how to spot, things to focus on, teaching tips for participants and answer any questions.

Advanced

- Encourage groups of 2-3 to read skill on assessment, how to properly score, and cues for each one
- Therapists, ATPs, and experienced students walk around and provide tips for coaching skills as questions arise
    - Ascends high curb
    - Descends high curb
    - Performs stationary wheelie
    - Turns in place in wheelie position
    - Rolls forward and backward in wheelie position
    - Descends high curb in wheelie position
    - Descends steep incline in wheelie position
    - Ascends stairs
    - Descends stairs

Discussion including how to spot, things to focus on, teaching tips for participants and answer any questions.

Appendix F

Spotter Training Evaluation

Q1 Please indicate the training session you attended

April 4 at 2:30pm

April 4 at 5pm

April 7 at 1pm

April 7 at 3pm

Q2 As a result of participating in the Skills on Wheels volunteer training....

	Strongly Disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I understand my volunteer role and responsibilities (1)	○	○	○	○	○
I have a better understanding of spotter technique (2)	○	○	○	○	○
I have a better understanding of spotter safety (3)	○	○	○	○	○
I am more familiar with the Wheelchair Skills Test (4)	○	○	○	○	○
I feel more confident administering the wheelchair skills test (5)	○	○	○	○	○
I feel more confident training participants in the wheelchair skills (6)	○	○	○	○	○

Q3 What did you like best about the training?

Q4 What can be improved with regard to content, structure, and/or materials?

Q5 Please rate the trainer:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The trainer explained the information in a clear and concise way (1)	○	○	○	○	○
The trainer was responsive to my questions and answered appropriately (2)	○	○	○	○	○
The trainer displayed knowledge of the material (3)	○	○	○	○	○

Q6 What specifically did the trainer do well?

Q7 What recommendations do you have for the trainer to improve?