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Sapna Chakraborty
Missouri State University

Marc Willey
Missouri State University

Lisa Proctor
Missouri State University

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Abstract

Interprofessional education and collaborative practice (IPEC) are essential components of healthcare teams in the United States. This study aimed to explore the impact of a community-based Go Baby Go (GBG) project that used assistive technology and environmental adaptation skills to provide interprofessional education and hands-on collaboration between occupational therapy and speech-language pathology graduate students. The interprofessional collaboration (IPC) experiences provided to graduate students were centered on shared lectures and labs on role delineation, evaluation, and treatment focused on modifications through assistive technology and environmental adaptation. The culminating experience included labs with three to four students from each discipline in a team to evaluate and develop a battery-powered rideable toy car modification for a child with a disability. Students completed pre- and post-surveys followed by written reflections about the IPC experience. A paired-samples t-test was used to evaluate changes between pre- and post-survey scores. The mean score for the post-test survey scores demonstrated a statistically significant increase over the mean score for the pre-test. The themes from the qualitative analysis of student reflections included "role of each discipline," "collaboration," and "hands-on, real-life learning," indicating that community-based IPC experiences can be beneficial in promoting team collaboration, understanding role delineation, and professional scope of practice. The GBG project of modifying and fitting the battery-powered toy car can be a fun and impactful way to promote IPC and real-world evaluation and treatment opportunities for student learning.

Keywords

Interprofessional education, occupational therapy, interprofessional education and collaborative practice, speech-language pathology

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Impact of Community-Based Go Baby Go Project on Interprofessional Collaboration

Sapna Chakraborty, OTD, OTR/L

Marc Stephen Willey, Ph.D., CHT, OTR/L

Lisa Proctor, Ph.D., CCC-SLP

Missouri State University

United States

ABSTRACT

Interprofessional education and collaborative practice (IPEC) are essential components of healthcare teams in the United States. This study aimed to explore the impact of a community-based Go Baby Go (GBG) project that used assistive technology and environmental adaptation skills to provide interprofessional education and hands-on collaboration between occupational therapy and speech-language pathology graduate students. The interprofessional collaboration (IPC) experiences provided to graduate students were centered on shared lectures and labs on role delineation, evaluation, and treatment focused on modifications through assistive technology and environmental adaptation. The culminating experience included labs with three to four students from each discipline in a team to evaluate and develop a battery-powered rideable toy car modification for a child with a disability. Students completed pre- and post-surveys followed by written reflections about the IPC experience. A paired-samples t-test was used to evaluate changes between pre- and post-survey scores. The mean score for the post-test survey scores demonstrated a statistically significant increase over the mean score for the pre-test. The themes from the qualitative analysis of student reflections included "role of each discipline," "collaboration," and "hands-on, real-life learning," indicating that community-based IPC experiences can be beneficial in promoting team collaboration, understanding role delineation, and professional scope of practice. The GBG project of modifying and fitting the battery-powered toy car can be a fun and impactful way to promote IPC and real-world evaluation and treatment opportunities for student learning.

Introduction

Interprofessional education and collaborative practice (IPEC) are essential components of healthcare teams in the United States. It is vital for healthcare team members to understand each discipline's roles so they can provide effective and efficient medical care. Academic interprofessional collaboration (IPC) experiences allow students to team up with other disciplines and learn to be a part of a caring comprehensive team (Wei et al., 2020). Coufal and Scherz (2013) reported that health profession educational programs are trying to utilize various strategies to provide students with IPC experiences. According to the updated Interprofessional Education Collaborative (2016), core competencies for interprofessional collaborative practice include "values/ethics, roles/responsibilities, interprofessional communication and teams, and teamwork" (p.1-2). Healthcare systems and clients have better outcomes when equipped with teams working collaboratively and providing higher standards of care (Neocleous, 2014; Prast et al., 2016; Reeves et al., 2010).

Interprofessional education includes experiences that facilitate student learning "about, from, and with each other to enable effective collaboration and improve health outcomes" (World Health Organization, 2010, p.7). The updated Occupational Therapy educational standards (Accreditation Council for Occupational Therapy Education [ACOTE], 2018) emphasized that the entry-level curricula should include opportunities for students to develop interprofessional collaborative practice skills. Although the field of speech-language pathology (SLP) has discussed the importance of collaboration and teaming (Coufal & Scherz, 2013), interprofessional education does not appear to have been consistently established in SLP academic programs. A survey was conducted to advance interprofessional education and inter-collaborative practice (American Speech and Language Hearing Association [ASHA], 2017). The survey results stated that most practitioners had no education or training in interprofessional practice during the didactic or clinical portion of their training.

The importance of having a variety of IPC for health professionals designed to meet core competencies has been discussed in allied health education literature (Coufal & Scherz, 2013). The IPC experiences include case-based learning situations, simulated patient experiences, problem-solving, and the development of the interdisciplinary diagnostic team (Bell, 2019). Meyers and O'Brien (2015) proposed an online training program for multi-disciplinary professionals, including physical therapy (PT), occupational therapy (OT), and SLP. The best practices for the three disciplines were described with an emphasis on the importance of developing collaborative skills, which are essential in developing students who will work in school-based settings. ASHA (2017) stated that speech-language pathologists working in schools should be prepared to provide various services to children, be culturally competent, and collaborate with other school professionals.

Neill et al. (2007) described how a community-based wellness program in a rural older adult setting where students from different disciplines worked in teams to provide care facilitated inter-collaborative practice. The student perceptions in this study were measured using the pre and post-test research design. The knowledge changes before

and after the IPC experiences were reported to be significant in professional competence, cooperation, and sharing of resources across disciplines, and learning to refer individuals for evaluation to the other profession. All the students reported increased knowledge of the different disciplines' roles and responsibilities. In another study, the speech-language pathologist noted increased knowledge about OT during a service-learning experience that included collaboration with an occupational therapist. Most students indicated the hands-on experiences were valuable (Chakraborty & Proctor, 2019).

The Go Baby Go (GBG) program is a community-based outreach program started at the University of Delaware (n.d.) that can be used as an innovative way to provide IPC experience to OT and SLP students. The GBG program can be used as a research, teaching, and clinical treatment program providing pediatric equipment for mobility and socialization (Logan et al., 2017). Interprofessional collaborative experiences like GBG can allow students to collaborate with other disciplines to promote team building, critical thinking, problem-solving, and "real world" patient evaluation and treatment skills essential for successful future practice (Kelly et al., 2018, p.8). A GBG program was started as a part of an internal University Curricular Innovation grant. This research project was designed to explore the effect of this GBG program and its use of assistive technology and environmental adaptation skills to provide interprofessional education and hands-on collaboration (Olson & Bialocerkowski, 2014) between OT and SLP graduate students at the University.

Method

A mixed descriptive research design using both quantitative and qualitative research components was utilized for the study (Creswell & Creswell, 2017). Data collected included pre-and post-surveys and thematic analysis (Castleberry & Nolen, 2018) of written reflections completed by 46 graduate students. The median age of 24 ranged from 22-28 years, with 45 females and one male. All participants (22 OT students and 24 SLP students) completed the requirements for their respective professional programs. The Institutional Review Board approved the study at the university. The graduate students from OT and SLP programs consented to participate in the research study. The research study lasted for four weeks, with pre surveys conducted at the beginning and post-survey and reflections at the end of the project. The IPC comprised shared lectures and labs by the OT and SLP faculty.

Lectures, Labs, and Assignments

The OT faculty lectured the SLP students while the SLP faculty taught OT students. Lecture objectives focused on the instruction of role delineation, effective and efficient practices, decision making, and interprofessional evaluation and treatment. The lectures were followed by the three labs and a culminating car fitting event where students from both disciplines participated in modifying a ride-on car for a child with a disability.

The initial labs consisted of assessment of each child's individual needs, and modification of the switch operated cars. Eight children for the project were recruited by contacting the local therapist and through a flyer on social media. All the children had developmental disabilities/delays including cerebral palsy, autism spectrum disorder,

and Down syndrome. A phone interview was utilized to assess each child's motor and sociability issues. Information gained from this interview allowed for preparing the car's individualized adaptation and planning communication with the child.

On the day of the culminating event students met with the children and their families to provide individual adaptations (e.g., seating) for the cars. During this time, students could consult with OT, SLP faculty, and a retired engineer that assisted with the project by problem solving how best to individualize the car adaptation. Each group had three to four students with at least one student from each discipline to collaborate during the culminating car fitting event. Parents were present throughout the lab and provided input regarding adaptations and car use. At the end of this event, all the children could take home an adapted car.

To enhance the project and opportunities for collaboration, students also participated in an Augmentative and Alternative Communication (AAC) lab where SLP students showed AAC devices to OT students, including devices with alternative access modes. During this lab, SLP students took a lead role. Throughout the lectures and labs, students had opportunities for informal interactions and observation of collaboration of all those participating in GBG.

The OT and SLP instructors asked the students to provide a written reflection on the IPC. The OT prompt for the reflections discussed what students learned about environmental adaptations and interprofessional collaboration with SLP through the shared lectures and lab experiences. The SLP prompt was to complete the assignment, which included the questions: (a) "briefly discuss your understanding of and experiences with the core components (e.g., goals, roles/responsibilities, effective and efficient practices, communication, collaborative decision-making, and evaluation) of successful interprofessional practice"; (b) what have you learned about how speech-language pathologists work with other team members for providing children with disabilities with access to toys and play and other environment adaptations and why is this important?"; (c) "what have you learned regarding the need for speech-language pathologists to consider other developmental domains (e.g., motor, social) when developing communication goals for children who use AAC"; (d) "what have you learned regarding the scope of practice of occupational therapists and specifically about their role in AAC and Assistive Technology assessment and intervention?"; (e) "what have you learned about assistive technology and how it can impact the lives of people with disabilities?".

Survey Development

The goals for student learning in the project were developed based on course objectives and core competencies of interprofessional collaboration (IPEC, 2016). The researchers in consultation with the University's assessment office developed the survey in Table 1 to document student achievement of course goals. The survey questions focused on environmental modifications relating to adapting the powered toy cars, role delineation,

and teamwork. The scores on the survey were based on a Likert Scale of 0-10 with text corresponding to a range of numbers – no knowledge (0-1), a small amount of knowledge (2-3), average knowledge (4-6), above average knowledge (7-8), and most knowledgeable (9-10).

Table 1

Survey Questions

-
- 1) I understand the purpose and specific details of modifying the controls of the battery-operated powered toy car.
 - 2) I possess specific knowledge in the areas of environmental modification to collaborate, plan and make intervention plans working with speech-language pathology/occupation therapy students in the area of assistive technology.
 - 3) I possess specific knowledge/skills in how advancing motor skills can enhance an individual's communication skills.
 - 4) I possess specific knowledge of how to integrate communication goals with movement-based activities.
 - 5) I possess specific skills in switch utilization for adapting battery-operated cars (or toys) to allow individuals with movement and communication disabilities to engage in selected activities.
 - 6) I possess specific knowledge of the collaborative role of speech-language pathology and occupational therapy working with assistive technology as a team.
 - 7) I possess specific knowledge on how assistive technology can make a significant difference in achieving developmental milestones goals with individuals with disabilities.
-

Note. The survey used a Likert-type scale of 0-10, where 0 represented no knowledge, and ten meant having the most knowledge about the content discussed in class.

Results

Quantitative data was examined through the SPSS program, version 26, for data accuracy, missing values, and the assumptions of the univariate analysis. The data was accurate, and no missing data was found. Homogeneity was assessed with Levene's test of equality of variances; tests showed p values greater than .05, showing homogeneity. Univariate normality plots showed that results were normally distributed. All the participants completed the survey with their instructors before and after the project.

In all the post-surveys, OT students circled text rather than numbers. In these cases, the average number was used (e.g., "small amount of knowledge" was scored as three, "no knowledge" was scored as one, and "very knowledgeable" was scored as ten).

Before the survey results were analyzed, the reliability and item analysis were done on the survey items used for the survey. Two reliability analyses were computed to determine the psychometric properties of the pre-and post-knowledge assessments. Cronbach's alpha for the pre-test was $\alpha = .918$. Specifically, the subscale is reliable and shows consistency between the individual pre-test items. Cronbach's alpha for the post-test was $\alpha = .862$, indicating that the knowledge assessment is reliable and obtains consistency between the individual post-test items.

An item analysis was computed to assess the individual questionnaire items for the pre-and post-knowledge assessments. The descriptive statistics for the items are displayed in Table 2. Summary scores of the pre-test and post items were calculated, and item analyses were performed. A series of correlations were computed to examine the relationship of the summary score with the individual items to determine if any "bad" items would hinder the scale's psychometric properties. Correlation coefficients for the pre-test were positive and above .3, suggesting that the items in the pre-test are "good" items that measure the construct. Lastly, correlation coefficients for the post-test were also positive and above .3, suggesting that the items in the post-test are "good" items.

Table 2

Descriptive Statistics of the Knowledge Items Split by Test and Group

Question	Pre-Test				Post-Test			
	OT		SLP		OT		SLP	
	\bar{x}	SE	\bar{x}	SE	\bar{x}	SE	\bar{x}	SE
1	3.18	.45	3.54	.54	8.50	.26	8.33	.32
2	2.86	.41	4.33	.44	8.41	.25	8.67	.31
3	3.77	.46	5.96	.40	8.32	.35	8.92	.34
4	2.86	.40	6.21	.39	7.64	.39	9.08	.26
5	2.14	.49	3.54	.55	8.50	.26	8.29	.31
6	3.27	.47	7.25	.37	9.09	.22	9.29	.20
7	4.18	.44	8.46	.36	9.00	.22	9.54	.16

A mixed ANOVA was conducted to determine whether there were statistically significant differences in knowledge between the pre-test and post-test summary scores and the OT ($n = 22$) and SLP groups ($n = 24$). There was a statistically significant difference between pre-test and post-test scores, $F(1,44) = 293.09$, $p < .001$, $\eta^2 = 0.87$. For the group main effect, there was a statistically significant difference between the OT and SLP group scores, $F(1,44) = 18.65$, $p < .001$, $\eta^2 = 0.30$. The interaction was also statistically significantly different, $F(1,44) = 16.75$, $p < .001$, $\eta^2 = 0.28$. A simple effect

analysis using paired samples t-tests with a Bonferroni correction was conducted to detect differences between the pre-test and the post-test for each group. The descriptive statistics are displayed in Table 2. The post-test was significantly different from the pre-test for the OT group ($p < .001$, $d \text{ diff} = 2.49$). For the SLP group, the post-test was significantly different from the pre-test ($p < .001$, $d \text{ diff} = 2.80$).

Table 3

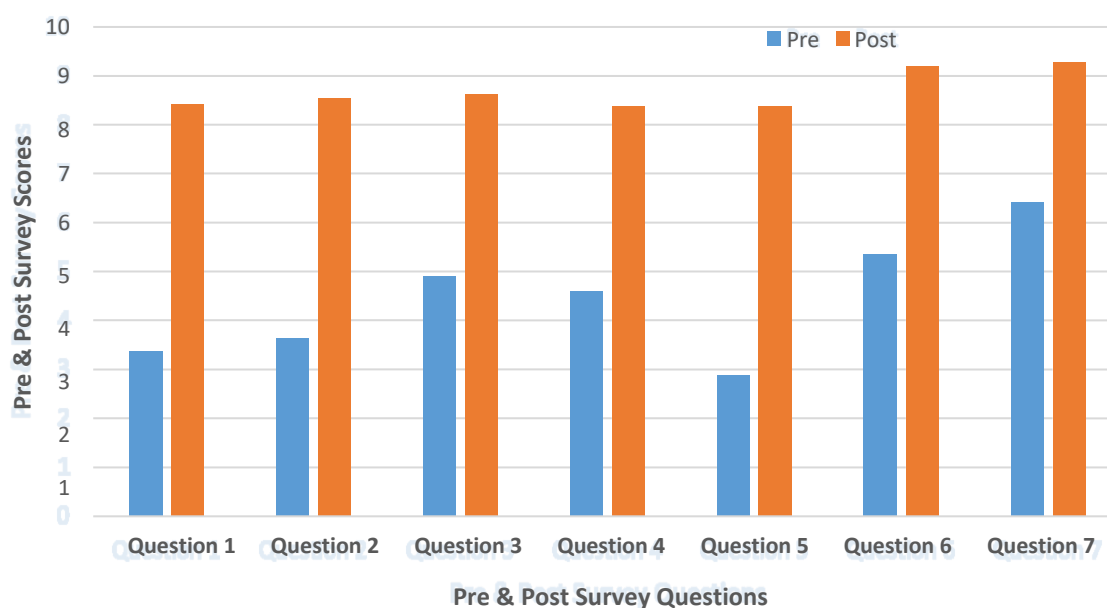
Knowledge Summary Score Means and Standard Errors Split by Group

	Pre-Test		Post-Test	
	\bar{x}	S.E.	\bar{x}	SE.
OT	22.27	2.52	59.46	1.51
SLP	39.29	2.42	62.13	1.44

For each group, the post-test knowledge scores were significantly higher than the pre-test knowledge scores; however, there was a larger standardized difference between the pre-test and post-test for the OT group (assessed by Cohen's d). Figure 1 displays the means and 95% confidence interval of the knowledge scores on the pre and post survey for OT and SLP students.

Figure 1

Pre and Post Survey Results



Note. Means and 95% Confidence Interval of the Pre & Post Survey knowledge scores for OT and SLP students.

After the project, a qualitative analysis of the OT student reflections and SLP assignments were conducted using thematic analysis (Castleberry & Nolen, 2018). The OT instructor asked students to provide a written reflection regarding the IPC experience. The OT student reflections discussed the knowledge gained by students during this research project through the shared lectures and lab experiences. All the data was organized using Microsoft Word and spreadsheets, instead of using a software package, by two different faculty members to get a better understanding of the student learning (Swain, 2018). The OT student reflection transcripts were coded separately by the investigating faculty members. Each faculty performed an independent data analysis, found some key themes, and achieved a consensus on the final themes.

The three key themes found in the written reflections by OT students were "engaging and fun," "collaboration," and "scope of practice." All the students commented that they learned from exchanging knowledge and experience while interacting with students of other disciplines, children, and family members. They discussed looking at the child and talking to the families as "exciting," "informative," and "interactive." Several students shared with the instructor how "working alongside" helped them work as a team and "learn a lot from each other." Students sharing by engaging with another professional brings a different perspective to a similar issue (Chakraborty & Proctor, 2019) that helps to understand discipline specific roles and responsibilities. It also gave them insight on "when to contact SLP for referral and assistance." Some students expressed how it enabled them to practice interacting with children and their families and "ideas to adapt the cars."

The SLP instructor graded the assignments using a rubric and summarized key concepts that students learned during this project. The SLP assignment included in the study was graded using a rubric of 1-5, where one is for the unacceptable answer and five is for the excellent solution; most of the students scored above four on all the answers except one student who scored three as graded by both faculties. The summary of each response was graded, data from each assignment was analyzed, coded and main themes were found by each faculty.

The themes related to central concepts learned by SLP students were "roles of each discipline," "working together," "hands-on, real-life learning," and "scope of practice." The students shared that they understood the scope and role of assistive technology in improving the lives of persons with disabilities. The themes from SLP assignments matched with the findings by Chakraborty and Proctor (2019) that students valued the hands-on experiences and learn skills as a group where they can learn from each other. A consensus was reached on the final themes for the SLP assignment. After identifying key themes, faculty observations, assignment grades, and central concepts were compared with the key themes.

Based on Castleberry and Nolen's (2018) recommendation of additional data sources, student performance on projects and the author's observations were used to triangulate the data. A third faculty member was asked to review and check the validity of the

themes generated from the reflections and the concepts from the assignment. To assess interprofessional collaborator competency, one must observe students individually and in a team (Shrader et al., 2017). The faculty members in the class assessed the students' responses to assignments and progress on individual reflections. The other ways to determine the impact of IPC would be by looking at the gains patients make in practice settings when the team of professionals provides services (Wei et al., 2020). Researchers consistently observed all the groups of students during their interactions with peers, families, and children to monitor the advancement in their knowledge and understanding involving the IPC experience. As a result of the community-based interprofessional GBG project, the children and their families learned how to facilitate mobility and communication with their children by using the adapted toy cars.

Discussion

Evidence in the literature shows that IPC and comprehensive care can benefit healthcare providers and clients (Rossit et al., 2018). The findings of the study were found to be consistent with the literature about IPEC. Interprofessional education and collaboration can be effectively utilized to teach real-world skills essential for future practices in OT and SLP (Bell, 2019). This study aimed to develop and explore a community-based interprofessional collaborative experience as a part of an educational curriculum that teaches problem-solving around assistive technology and environmental modifications to OT and SLP students. Earnest and Brandt (2014) advocated for the interprofessional team-based approach in healthcare settings to increase efficiency, lower cost, and improve patient satisfaction. The results from this study showed improved knowledge across all four core competencies, "values/ethics, roles/responsibilities, interprofessional communication and teams, and teamwork" (IPEC, 2016) in a cost effective and efficient manner. The children and families were pleased with the care and customized services gained through the GBG project. In the areas of values/ethics, roles, and responsibilities, the students reported an increased understanding and appreciation of each profession's specific role when working in environmental adaptations. Before the experience, the OT and SLP students reported limited awareness of each other's discipline. Assigning both student groups into working teams, communication was paramount for team success. Each car was custom fitted to a given client's needs (both physical and social). The adaptations required each discipline to problem solve utilizing the skills from their discipline. All the students gained essential teamwork skills by participating in the interprofessional process of adapting the car.

The educational programs can benefit from an IPC team-based approach to train healthcare professionals to be prepared to meet the changing demands of the healthcare community (Wei et al., 2020). The needs of children with mobility and sociability issues were served by the team of occupational therapists and speech-language pathologists more efficiently as a part of the study when professionals solved the problems collaboratively with families. Students from both the programs expressed that the project gave them a chance to problem solve individually with families and

create custom seating and assistive technology on the ride-on cars for children with disabilities. The shared learning experience helped them to learn to work as a team and taught them the role of the other discipline in providing services to children and their families.

Most of the time, the IPC concepts are taught online or in a simulated environment (Bell, 2019). In some IPE experiences, students review case studies without helping anyone in real life. The GBG project was a face-to-face and fun way of learning and provided services to real clients. The results showed that the increase in the mean score for the post-test survey were statistically significant over the mean score for the pre-test survey. Interactions across disciplines were also examined. The primary reaction from students, in general, was that they learned about the scope of practice of the other profession and the importance of working as an IPC team. There were many opportunities to communicate professionally during social conversations with peers, faculty, and family members about the specific values of each discipline. At the project's end, children could take home individually adapted cars.

A program like GBG shows how IPC is integral to graduate programs in healthcare professions. GBG project assisted the OT and SLP programs in teaching their students about the roles of each discipline and increasing knowledge in their respective fields to prepare for future interdisciplinary clinical practice. Interprofessional collaborative experiences can promote team collaboration, understanding of role delineation, and professional scope of practice. The students experienced first-hand the benefits of assistive technology to explore options and advocate for clients with disabilities. The study provided insight that understanding the roles of each discipline, working together, and hands-on, real-life learning can be engaging and fun.

Limitations and Future Research

This study's limitations included a small sample size. Also, the facilitators may have biases as the IPC experience was part of a required course within OT and SLP programs. Additionally, the student responses could be biased as students may not have wanted to display negative aspects and responded positively for the sake of the study and the program. The generalization of the results would be challenging as researchers created the survey utilized in the study and could have limited the results to the items essential to the specific courses taught in the OT and SLP programs. Since the survey utilized was not standardized, in future research, a standardized tool that has been tested by other researchers for reliability and validity (Shrader et al., 2017) could be used to measure the impact of community-based interprofessional experiences. Since there are numerous interprofessional educational activities, future research can examine the factors that make interprofessional education successful including the difference in the effectiveness of face-to-face versus online IPC activities. It would also be beneficial to explore the roles and perceptions of parents participating in IPE projects to understand their experiences with the healthcare team.

Implications for Occupational Therapy Education

Healthcare educational programs, including OT, must prepare students for real-world practice to collaborate with other disciplines by using a variety of IPC experiences, such as community-based programs, in the curriculum. The study of the effect of the IPC experiences can assist OT educators in choosing the most impactful way to teach IPC. The curriculum in occupational therapy education programs can facilitate a culture of collaboration with other healthcare professionals. The students can learn to work in teams and understand different disciplinary roles to serve and connect with the clients in their future practices through IPC experiences.

Conclusion

The study explored the effectiveness of community-based programs like the GBG project to teach IPC to students from different health profession's educational programs. The impact of the IPC in this study was significant as measured by the change in the survey scores developed by the researchers and described by themes originating from student work. The GBG project indicated that modifying and fitting the battery-powered toy car can be a fun and impactful way to promote IPC and real-world evaluation and treatment opportunities for student learning. Interprofessional education and collaboration can effectively teach core competency skills essential for future practices in the health profession's comprehensive care teams.

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