Increasing collaboration and knowledge in school communities to enhance outcomes for autistic students

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Abstract

Purpose – *This paper describes a case study of a developmental program evaluation on the Autism Community Toolkit, a collaborative skills training program for parents and school professionals. The purpose of this study was to examine the influence of the training on participants' knowledge, competence and perceived collaboration; and potential improvements to the training program.*

Design/methodology/approach – *The program included multiple training sessions for families and school professionals, designed to educate participants on autism, evidence-based interventions and to increase home-school communication and collaboration. Data collection methods included pre- and post-measures and feedback forms.*

Findings – *Results indicated that the training program was beneficial for participants overall. Pre- and posttest measures indicated growth in knowledge and competency in autism interventions. While there were no statistically significant differences in the quantitative measure of collaboration, qualitative results suggest that participants reported increased collaboration posttraining.*

Practical implications – *Overall, the training program was effective, and the ongoing implementation assessment was conducive to continuous improvement. The authors also discuss difficulties with implementation and recommendations for future intervention implementation.*

Originality/value – *This case study provides practical information about creating, evaluating and improving a unique intervention designed to support school–home collaboration.*

Keywords *Home–school collaboration, Parent training, Case study, Autism, Teacher training, Evidence-based interventions, Interventions*

Paper type *Research paper*

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Introduction

Autistic [1] children commonly receive support through schools as they often offer the most readily available services (Wei *et al.*, 2014). Families' reliance on educators for service provision necessitates effective communication and collaboration between home and school, and research indicates that working together constructively benefits the family, school-based professionals and students in many ways (Schultz *et al.*, 2016).

Home–school collaboration can contribute to increased reading achievement (Alston-Abel and Berninger, 2018; Cox, 2005; Esler *et al.*, 2008), overall academic achievement (Boonk *et al.*, 2018; Cox, 2005; Esler *et al.*, 2008), more effective transitions from preschool to primary school (Skouteris *et al.*, 2012) and provision of services and accommodation through the Individualized Education Plan (IEP) process (Underwood, 2010). Studies have also shown that successful family–school partnerships can lead to decreased student internalizing and externalizing behaviors (Blair *et al.*, 2011; Cox, 2005; Smith-Adcock *et al.*, 2019). Further, relationships between teachers and parents, specifically the frequency and

quality of teacher–parent contact, can influence a child's social competence, challenging behaviors, teacher–child closeness and teacher–child conflict (Cheung, 2019; Serpell and Mashburn, 2011). As indicated in the research, garnering support and fostering functional and productive relationships with family members is essential to student success, particularly for students with disabilities. However, the literature also reflects the many challenges both family members and school staff face when attempting to forge a fruitful partnership. In one recent study conducted by Tucker and Schwartz (2013), 83% of parents or caregivers (n = 135) of autistic students reported experiencing conflict with school-based teams. Despite the vital role parents and caregivers of children with disabilities play in the assessment and special education processes, school personnel do not always regard parents as equal partners (Kurth *et al.*, 2019; Park, 2008). Parents continue to report barriers to equal participation (Cavendish and Connor, 2018), including poor communication (Ouellette *et al.*, 2004; Tucker and Schwartz, 2013), feelings of alienation and lack of respect (Salas, 2004), cultural differences (Cho and Gannotti, 2005; Larios and Zetlin, 2012; Rueda *et al.*, 2005) and inequality of power (Pushor, 2012; Tucker and Schwartz, 2013). Barriers such as these can potentially obstruct or lead to breakdowns in collaborative efforts, negatively impacting families, school-based professionals and, most importantly, students.

Considering the characteristics of effective collaboration and potential barriers teams may face outlined in related research, one possible way to foster more effective collaboration between families and school-based stakeholders is comprehensive training (Casagrande and Ingersoll, 2017; Murray *et al.*, 2011). Current and past literature continues to support that family training (e.g. psychoeducation, skill development, group-based support, etc.) serves as an impactful evidence-based practice (EBP) for improving the lives of autistic children and their families (Brookman-Frazee and Koegel, 2004; Deb *et al.*, 2020; Nicolaidis *et al.*, 2019; Zwaigenbaum *et al.*, 2015). Early intervention trainings for parents of autistic children have shown to ameliorate behavioral symptoms of autism (i.e. stereotypic behaviors, communication and social interactions), the child's functional and emotional developmental level, refine parenting skills, alleviate parental stress and enhance the quality of life for families from diverse backgrounds (Akhani *et al.*, 2021; Ho and Lin, 2020). Research also indicates that parent training that includes direct involvement in implementing interventions increases parental self-efficacy related to autism (Kurzrok *et al.*, 2021). In the school setting, teachers have a legal and ethical responsibility to use empirically based practices when working with students with disabilities [Individuals with Disabilities Education Act (IDEA), 2004]. Despite recent research highlighting several EBPs specifically for autistic students (Steinbrenner *et al.*, 2020), teachers often do not feel confident and prepared in their ability to implement EBPs in their classrooms (Layden *et al.*, 2022). Understanding the lack of self-efficacy in educators and parents, the need for parent and educator training, as well as the importance of collaboration between all parties when supporting autistic students, it is critical to understand the impact of shared training experiences that include both stakeholders. This project evaluated the efficacy of a training program for families and educators of autistic students. The goal of this study was to assess the impact of training on participants' knowledge, perceived competence and collaboration to evaluate its potential effectiveness and improve the program for future groups. The literature underscores the potential impact of parent and educator training and collaboration between home and school on student outcomes; however, there is limited empirical information available regarding how shared training experiences impact stakeholders' collective efforts. To address this gap in the literature, in addition to measuring the impact of training on participant knowledge and competency, the results of this study will provide clarity on the relationship between shared trainings and collaboration between families and educators.

This study focused on the following components of collaboration that were drawn from the literature:

- shared knowledge or understanding;
- shared planning or decision-making;
- shared power or responsibility;
- inclusion of all team members' input or active participation; and
- a positive relationship-building.

Researchers conducted a developmental program evaluation on the creation and implementation of a series of training sessions entitled the Autism Community Toolkit. Researchers designed the Autism Community Toolkit program to educate physicians, educators and families on identifying autism and best practices in intervention to improve care, improve self-efficacy and increase communication and collaboration between stakeholders.

Participants in the Autism Community Toolkit training received up-to-date information about autism and evidence-based interventions and strategies to promote positive home–school communication and collaboration. To establish to what degree the training influenced participants' knowledge, competence and perceived collaboration skills the research team reviewed pre- and post-assessment data. Researchers also explored the implementation process of conducting the training sessions and participant perceptions to determine improvements to the program. Investigators examined the following research questions:

RQ1. What influence does the Autism Community Toolkit training have on participants' knowledge, perceived competence and collaboration?

RQ2. What improvements can practitioners and researchers make to the Autism Community Toolkit training program?

Method and materials

The following section includes information on the intervention, case study methodology and procedure. The authors also describe the setting of the study, participants, measures used for data collection and subsequent analysis conducted.

Intervention

In partnership with clinicians working primarily with autistic children and youth, university researchers created the Autism Community Toolkit program. The program offered information on the identification of autism and best practices in interventions to improve care, raise feelings of empowerment and increase communication and collaboration between families and schools.

For the purpose of this study, a local university partnered with a Center for Autism and Neurodevelopmental Disorders to assist in designing and facilitating workshops intended for parents and educators at no cost. A primary objective of the training was to provide teachers (i.e. general education, special education, teachers with multiple credentials) and parents with information about working effectively with autistic students. The training modules for teachers and educators covered approximately 10 h of material focused on: an overview of autism, collaboration and communication in special education, intervention skills and behavioral strategies in the classroom and home and mental health in autistic youth. Facilitators delivered aligned information to both groups using the same terminology to increase team communication and collaboration on intervention strategies. Creators tailored discussions and activities specifically to the participants' questions and needs. A team of educators, school psychologists, clinical psychologists, behavior interventionists and pediatricians specializing in autism and education developed toolkit materials based on empirically supported strategies in each area, and the goal of this study was to evaluate

the training program's impact. School psychologists and education faculty delivered toolkit training sessions to teachers and parents.

All participants received the same number of hours of training by the same trainers; however, they divided the hours in different ways depending on professional development time and space. Generally, the teachers received the information over two days of professional development. The parents received the information over five evenings. The training facility (i.e. the school district) provided childcare and dinner to families to encourage and support participation.

Design

Researchers used a case study methodology (Merriam, 1998; Stake, 1995; Yin, 2018) to explore the project's implementation, development and outcomes. Patton (2011) and Peurach *et al.* (2016) recommend using the case study method when investigating the development of complex educational networks such as this. The case study framework allowed for a detailed investigation of the training program's processes as they developed. Through continuous data collection and analysis, the research team was able to make ongoing refinement of the program throughout the two-year implementation. The case materials consisted of investigators collecting pre- and post-evaluations of knowledge and perceived competence, as well as adjustments to the curriculum development documents, individual interviews, focus group data, observations of each training session, meeting notes from the weekly researcher process meetings and participant feedback forms.

Settings and participants in data collection

Before initiating the study, the primary investigators applied and gained approval from the Institutional Review Board at their university. Researchers implemented the project in two school districts located in suburban southern California. After working with the researchers on previous training sessions, the districts agreed to participate. Parents and school professionals attended separate sessions in classrooms on school campuses or at the district office. School districts advertised the training sessions for parents and professional staff and conducted the registration process. The research team sent invitations to parents and caretakers of children eligible for special education under the category of autism to attend the training. To be included as a participant, parents needed to be parents/caregivers of a school-aged child and agree to participate in all training sessions. Requirements for participating school professionals included employment with the school districts and agreeing to attend all training sessions.

Combining Year 1 and Year 2, there were 234 participants in the training sessions (94 parents and 140 school professionals). Only participants who completed all of the training sessions were included in the analysis. Of the 225 participants who completed the pre-measures, 86 were parents, and 139 were school professionals. The researchers did not collect demographic data for participants. Post-measures included responses from 45 parents and 126 school professionals. At the end of the training sessions, facilitators received 169 anonymous feedback forms (44 parents, 125 school professionals).

Procedure

Facilitators conducted separate training sessions for parents and school professionals within the same period (e.g. in the same month). Programming consisted of 10 h of training over several weeks with modules on autism and neurodevelopmental differences, special education law, collaboration, team communication, behavior principles and management, intervention strategies and mental health of autistic individuals.

At the first training session, trainers gave attendees a consent form, pre-measures to complete and handouts for the training. The pre-measures contained questions about their perceptions of knowledge and skills regarding collaboration, their perceived competency in autism intervention and collaboration and the extent of special education and autism-related knowledge. At the end of each training, facilitators distributed a "comment form" so that the participants could provide feedback on the efficacy of the session and what improvements the team could make for future presentations.

This case study consisted of trainings that took place over two years. In Year 1, the research team implemented a pilot version of the training. The pilot consisted of completing the initial draft of training sessions for both parents and school professionals. This initial program evaluation data collected during the pilot period helped inform and improve later training sessions the following school year. The research team met after each training session and reviewed feedback forms and observer notes to support continuous improvement. Following the initial year of data collection, the researchers reviewed data for areas of improvement and made adjustments for the following year of training sessions. Similarly, the research team used information gathered from the program evaluation activities of each of the Year 2 training sessions to enhance subsequent training sessions. The analysis and discussion sections will outline specific changes made after Year 1.

Measures

The measures used in this study were either modified from extant measures of the construct or created for this study using previous literature and research.

Perceived competency in autism intervention and collaboration scales. The *Perceived Competency in Autism Intervention and Collaboration* scales consisted of two subscale measures to ascertain perceived competence in autism intervention and collaboration, respectively. Each survey had four items using a Likert scale from one (not at all true) to seven (very true). These measures were an adaptation of the *Perceived Competence Scales*, which uses a list of short stem sentences conceptually tied to self-determination theory (Ryan and Deci, 2000), each of which can be adapted to the researcher's topic (e.g. autism intervention). Investigators calculated Cronbach's alpha coefficients to check the scale's reliability for school professionals and parents on the pre- and post-measures for each subscale during Year 1 and Year 2. The reliability coefficients ranged from 0.883 to 0.974 for the *Perceived Competency Autism Intervention* scale and from 0.848 to 0.958 for the *Perceived Competency Collaboration* scale.

Building collaborative communities (collaboration scale). Researchers developed the *Collaboration Scale* items from the major collaboration constructs identified in the literature, as a comprehensive assessment of collaboration between educators and families was unavailable in the literature. The important constructs included communication (Adams and Christenson, 2000; Tucker and Schwartz, 2013), shared responsibilities (Daniel, 2011; Mutch and Collins, 2012), relationship-building (Adams and Christenson, 2000; Ishimaru *et al.*, 2014), shared decision-making (Orchard *et al.*, 2012; Queen's University, 2009), active participation (Tucker and Schwartz, 2013; Weiss and Davis, 1985), common understanding/shared values (Esler *et al.*, 2008; Mutch and Collins, 2012) and shared goals (Adams and Christenson, 2000; Lindhardt *et al.*, 2008). The scale consisted of 26 items on a Likert scale from 1 (strongly agree) to 4 (strongly disagree). Cronbach's alpha coefficients for school professionals and parents on the pre- and post- measures during Year 1 and Year 2 ranged from 0.932 to 0.971.

Knowledge assessment. The *Autism-Related Knowledge Assessment* was explicitly designed for this study as there was no available measure that addressed all knowledge areas covered by this training program. Specifically, the training included components from related but different topics in autism (e.g. special education, collaboration, autism

characteristics, mental health, intervention strategies). It contained 30 multiple-choice questions regarding content presented in the training sessions. Items included questions on identifying autism (Autism Canada Foundation, 2014; Autism Speaks, 2014; Ontario Ministry of Education, 2007), special education law (National Center for Learning Disabilities, 2006; Organization for Autism Research, 2012; Turnbull *et al.*, 2002) and intervention (Kucharczyk *et al.*, 2015; Shivers and Plavnick, 2015; Virginia Department of Education, 2011). To determine the reliability of the knowledge measure, researchers used the Kuder–Richardson formula 20 (KR20), a special case of alpha appropriate for dichotomous (e.g. correct/incorrect) data (DeVellis, 2012; Nunnally and Bernstein, 1994). KR20 coefficients for both school professionals and parents on the pre- and post- measures during Year 1 and Year 2 ranged from 0.67 to 0.79. Caution should be used in interpreting the scores from the *Autism-Related Knowledge Assessment* given the low reliability and lack of variance in some items (i.e. some items were correct for all participants).

Individual session implementation feedback One researcher observed all training sessions to determine the level of participation and note the participants' comments. In addition, participants filled out an anonymous feedback form at the end of each session, disclosing their likes and dislikes. The research team shared feedback forms and observation notes with the presenters after each session to help them adjust the program as necessary.

Analysis

Analysis of the data consisted of both quantitative and qualitative approaches, with a focus on determining the potential impact of the training on participants in the areas of knowledge, competence and participation, as well as identifying improvements that could be made to the program. To examine potential impacts of the program, quantitative data analyses compared pre- and post-program measures. Frequency counts and descriptive statistics were used for the participants' demographic information and responses on each quantitative measure. After checking that assumptions were met (e.g. using histograms to check for approximate normality), the researchers used paired-samples t-tests to example pre/post differences in the three quantitative measures. All quantitative analyses were conducted using SPSS Version 26. Analysis of the qualitative data (i.e. responses on Feedback Form, researcher notes, observation notes) included both holistic and line-by-line coding. Researchers used the computer program *NVivo* (QRS International, 2022) to organize the initial qualitative data analysis and discuss and refine the main themes. Please see Table 1 for a data collection summary.

Results

Quantitative data analysis

Results from the three quantitative measures administered (i.e. Collaboration scale, Perceived Competency in Autism Interventions and Collaboration scales and the *Autism-Related Knowledge Assessment*) *were analyzed to determine the program's potential impact for participants in Years 1 and 2 of program implementation.*

Year 1. Results indicated a differential impact of the program on school professionals and parents. School professionals' scores (as shown in Table 2) on all measures increased after participants completed the training program, with significant pre-post increases on *Knowledge, Perceived Competency in Collaboration* and *Perceived Competency in Interventions* scales. No significant differences were found in the *Collaboration* measure, indicating that although school professionals' perceptions of their own competence in collaboration improved after the program, they did not note any differences in the actual collaboration behaviors they were engaged in. In contrast, although three of the four measures showed a similar trend of increased scores from pre- to post-training program participation for parents (as shown in Table 3), no differences were statistically significant.

Table 1 Data collection summary

Measure	Time of administration	No. of responses: Parents	No. of responses: School professionals	Relevant citation(s)
Perceived competency in autism intervention and collaboration	Pre-training	86	139	Ryan and Deci (2000)
	Post-training	45	126	
	3 months after post-training	10	16	
Collaboration scale	Pre-training	86	139	Adams and Christenson (2000), Daniel (2011), Esler *et al.* (2008), Ishimaru *et al.* (2014), Lindhardt *et al.* (2008), Mutch and Collins (2012), Orchard *et al.* (2012), Queen's University (2009), Tucker and Schwartz (2013), Weiss and Davis (1985)
	Post-training	45	126	
	3 months after post-training	10	16	
Knowledge assessment	Pre-training	86	139	Autism Canada Foundation (2014), Autism Speaks (2014), Kucharczyk *et al.* (2015), National Center for Learning Disabilities (2006), Ontario Ministry of Education (2007), Organization for Autism Research (2012), Shivers and Plavnick (2015), Turnbull *et al.* (2002), Virginia Department of Education (2011)
	Post-training	45	126	
Training feedback form	Post training	44	125	Green (2011), Krueger and Casey (2000)

Table 2 Year 1 pilot: efficacy results for school professionals

Measure	Mean (N)	SD	Paired t-test: t-value	df	Sig (two-tailed)
Collaboration pre	82.92 (41)	9.33	1.063	39	0.294
Collaboration post	84.89 (41)	10.67			
Knowledge pre	23.55 (41)	2.10	5.699	40	0.000
Knowledge post	25.50 (41)	1.92			
Perceived competency-collaboration pre	23.31 (41)	3.20	4.012	40	0.000
Perceived competency-collaboration post	24.74 (41)	2.99			
Perceived competency-intervention pre	22.77 (41)	3.35	3.505	37	0.001
Perceived competency-intervention post	24.13 (38)	3.53			

Table 3 Year 1 pilot: efficacy results for parents

Measure	Mean (N)	SD	Paired t-test: t-value	df	Sig (two-tailed)
Collaboration pre	83.16 (17)	12.05	−0.706	15	0.491
Collaboration post	84.37 (17)	13.05			
Knowledge pre	18.89 (17)	3.75	1.569	14	0.139
Knowledge post	20.05 (17)	4.81			
Perceived competency collaboration pre	22.06 (15)	5.79	−1.297	13	0.217
Perceived competency collaboration post	22.40 (17)	4.39			
Perceived competency intervention pre	21.48 (12)	4.74	−0.724	9	0.487
Perceived competency intervention post	21.45 (17)	4.75			

Year 2. Results from the school professionals' measures after Year 2 are provided in Table 4 and were like those from Year 1. There was no significant difference on the *Collaboration* measure from pretest to posttest, and there were statistically significant increases in scores on the *Knowledge*, *Perceived Competency in Collaboration* and *Perceived Competency in Intervention* measures from before and after participation in the program. There was a difference in the results from parent participants in Year 2 (provided in Table 5) in comparison with Year 1, as there was a statistically significant increase in scores on the *Knowledge* measure from the pretest to the posttest. However, there were no other significantly different scores on any of the other measures given to parents in Year 2.

Feedback forms From the anonymous feedback forms filled out at the end of each session, participant ratings ranging from 1 to 10 (not useful to extremely useful) revealed an overall mean average rating of 8.2 for the training. Year 1 parent training ratings averaged 8.9 and 9.0, whereas the training with school professionals had ratings of 8.5 and 8.8. Parent ratings during Year 2 averaged 8.0 and 10.0. Ratings from the Year 2 school professionals were slightly lower, with averages at 6.9, 8.0 and 7.9.

Qualitative data analysis

The research team collected qualitative information from responses to open-ended questions on the feedback forms given to parents and school professionals to evaluate the Autism Community Toolkit's effectiveness, understand participant perspectives and determine possible improvements. Investigators read and reread the responses to become familiar with the data and jotted down general impressions. Researchers then used the computer application *NVivo* to help organize the data for analysis through classification (coding) and sorting into themes (QSR International, n.d.). Initial codes for open-ended

Table 4 Year 2 efficacy results for school professionals

Measure	*Mean* (N)	*SD*	*Paired* t-*test* t-*value*	df	*Sig (two-tailed)*
Collaboration pre	103.03 (73)	15.02	−0.095	64	0.925
Collaboration post	102.88 (65)	13.81			
Knowledge pre	19.32 (73)	2.79	12.009	65	0.000
Knowledge post	23.06 (66)	2.28			
Perceived competency collaboration pre	22.77 (73)	3.92	3.016	64	0.004
Perceived competency collaboration post	24.14 (65)	3.35			
Perceived competency intervention pre	18.62 (73)	4.88	4.976	64	0.000
Perceived competency intervention post	21.62 (65)	3.90			

Table 5 Year 2 efficacy results for parents

Measure	*Mean* (N)	*SD*	*Paired* t-*test* t-*value*	df	*Sig (two-tailed)*
Collaboration pre	108.95 (44)	10.70	−0.808	19	0.429
Collaboration post	107.11 (22)	9.84			
Knowledge pre	17.00 (43)	4.03	5.180	18	0.000
Knowledge post	21.26 (22)	3.56			
Perceived competency collaboration pre	22.90 (46)	3.77	0.396	19	0.696
Perceived competency collaboration post	23.25 (22)	3.75			
Perceived competency intervention pre	21.60 (46)	5.58	1.211	19	0.241
Perceived competency intervention post	23.05 (22)	4.91			

questions on evaluation forms were reviewed from the lens of the program evaluation questions, which were then used to inform the line-by-line coding. The line-by-line coding results were sorted into conceptual categories using the NVivo program, which was subsequently used to identify themes (Saldana, 2009). All qualitative feedback from program participants (i.e. parents and school professionals) was analyzed collectively. As themes were clarified, supportive evidence was identified from each group. Themes that were supported by the data, coherent and distinct from one another were retained (Braun and Clarke, 2006). Through this deductive thematic analysis, the following themes were identified: *knowledge/learning, feeling more competent, skills for collaboration, satisfaction, active participation, difficulties in implementation* and *measures*. Consistent with the quantitative results suggesting an increase in perceived competency regarding knowledge of autism interventions and collaboration, several participants mentioned specific content from the workshops that led to perceptions of increased *knowledge/learning* and *competence* (56 references, i.e. "I learned many aspects of the IEP process," "I learned that I have the right to request an interpreter," "Part 2 was most helpful [. . .] because we got to dive in and really go over specific strategies/tools. It was a great time for me reflecting on my own strategies and new ones. I'm glad to be a part of something meaningful and positive"). Although quantitative measures suggested perceived collaboration between the home and school did not increase due to the training, qualitative results indicated many participants felt that they had learned various skills that could potentially contribute to enhanced *skills for collaboration* (108 references, e.g. "how to develop better collaboration with families," "how to communicate with parents during the IEP meeting").

Additional items on the qualitative feedback form asked participants for suggestions regarding the most compelling aspects of the training, how the training could be improved and any other suggestions participants had for the implementation team. Many participants expressed *satisfaction* with their training involvement (388 references, e.g. "I really really enjoyed this program/training sessions"). Several participants mentioned that *active participation* throughout the training was a valuable component for them (599 references, e.g. "opportunities to problem-solve with peers," "I loved the practice and discussions," "The activities were really useful and the best part of the training."). Participants also provided feedback on *difficulties in implementation* that could be improved upon for future training (120 references, e.g. "better balance of old and new material," "font needs to be larger on slides," "could be more parent-friendly"). Researchers included an additional code of *what worked in implementation* as they reviewed qualitative data. Common types of participant statements or trends emerged (109 references, e.g. "going over interventions," "The most valuable pieces were learning about the different interventions and mental health as it relates to autism").

Application of feedback in Year 2

Based on the anonymous Feedback Forms and observation notes from Year 1, the investigators adjusted the intervention to respond to the feedback and improve sessions for Year 2. The data indicated that the overall content appeared to be beneficial, but the focus and delivery approach had some areas for improvement. Specifically, in Year 2, the content of the presentations focused more heavily on the practical intervention components, and the structure of how information was presented was altered. For example, opportunities for collaboration with other participants were increased. Sessions included more interactive elements such as small group discussion questions after content sections, case studies based on the age and setting of the participants' target population and time to actively solve current challenges in the classroom or at home. Researchers and school administration attempted to schedule sessions further apart in time to allow for active practice of the skills, and subsequent training sessions incorporate time for reflection on "wins" and challenges from implementation. In addition, the slides and handouts were adjusted to improve

readability in terms of font size and simplify the language used. These slight alterations in the second year of implementation and Year 2 feedback allowed for continued improvements and led to recommendations for future years.

Discussion and recommendations

The authors designed this case study to evaluate the efficacy of the Autism Community Toolkit program and gain insight into program effectiveness, program improvements, the implementation process and the concept of collaboration. The research team gathered information through questionnaires, survey measures, debriefs with trainers about how the training sessions went and anonymous feedback forms.

The first research question evaluated the degree of improvement in the autism-related knowledge and skills of the participants and the beneficial outcomes or usefulness of the training. Quantitative and qualitative data from both years one and two indicated that the school professionals significantly increased their perception of their collaboration skills and intervention skills (Akhani *et al.*, 2021; Black and Therrien, 2018; Ho and Lin, 2020) and their knowledge related to autism (Deb *et al.*, 2020). These results confirm the benefits of training on Autism and related interventions for parents and school professionals (Akhani *et al.*, 2021; Black and Therrien, 2018; Deb *et al.*, 2020; Ho and Lin, 2020). However, there was no significant improvement on the general collaboration scale, indicating that school professionals did not perceive any actual changes in how they practiced collaboration This result contrasts with the quantitative and qualitative results indicating that they perceived improvement in their own collaboration skills. In contrast to the results from school professionals, the parent data indicated no significant improvement in the parents' perception of their collaboration and intervention skills or actual collaboration. There was a significant improvement in their autism-related knowledge in Year Two but not in Year One. Although the analysis of the collaboration pre- and post-measures revealed no statistically significant difference in the level of collaboration for parents, qualitative data revealed some participants believed they had learned about collaboration skills and strategies. Some of the methods highlighted in the qualitative findings amongst parents included gaining familiarity with the IEP process, parental rights in IEP team meetings and best practices in participating in an IEP (Burke *et al.*, 2018; Goldman and Burke, 2017). School professionals reported learning more about how to better communicate with parents in IEP team meetings and improve collaboration amongst stakeholders (Casagrande and Ingersoll, 2017; Murray *et al.*, 2011; Underwood, 2010).

These results suggest that participants did develop a better understanding of how to collaborate more effectively and may improve their collaboration skills in the future should they implement skills from training. However, because participants were examining their collaborative skills via self-report rather than direct observation of these skills, the impact of response bias in self-report measures should be considered (Althubaiti, 2016). Although self-report data can help understand the perception and experiences of participants, future studies should consider additional data collection to assess the long-term impact of programming on collaboration and direct measurement of collaboration skills during observable interactions.

The second research question explored the implementation and ongoing development of the program. One of the unique components of this study is that the research team reviewed weekly data, especially post-session feedback forms and researcher observations, and made formative adjustments to the program throughout the implementation and evaluation process. Some of the changes suggested by participants and researchers were adding more content in various areas, modifying pedagogical practices in sessions, etc. (e.g. larger fonts, slower pacing, more interactive and more activities).

During the study, parent and school professional training sessions took place separately. Through the feedback processes, it was determined that the program developers should consider adding interactive, collaborative opportunities between parent and school professional groups that would allow attendees to practice the skills they learned. Recent literature supports that integrated teacher–parent training programs and collaborative discussion models can lead to more effective problem-solving related to supporting autistic students (Azad *et al.*, 2016). Attendees may have been more likely to report a change in the overall collaboration between families and schools if allowed more time and opportunities for their skills in this area to develop. One recent study by Bearss *et al.* (2015) found that parents of autistic students who engaged in a training program rather than an educational program reported significant reductions in disruptive behavior. The present and previous studies (Bearss *et al.*, 2015) indicate that interactive components, skill practice and provision of feedback are critical in reinforcing parents' ability to effectively implement tools provided in training programs. Parent and professional interactive sessions would also provide an opportunity to test strategies and receive trainer feedback on specific case examples. Co-attended sessions would also allow for continuity of intervention implementation across home and school environments.

Some participants' feedback indicated they continued to feel uncertain about implementing the concepts within their homes or classrooms. Although the program developers intended for strategies presented in the Autism Community Toolkit to be general and adaptable to various student needs, more time in direct application instruction might help attendees feel more comfortable using the methods they learned. Time to practice the suggested strategies in the training sessions would allow attendees to receive feedback from the trainers regarding correct use, which would help improve their understanding of the concepts and their confidence in applying them following completion of the training. Also, the paperwork (permissions, filling out the scales, etc.) presented at the beginning of the training seemed to affect the initial tone of the training negatively. Practitioners and researchers should consider conducting the initial data collection before the training start date to avoid this barrier to initial rapport building. Other challenges include the logistics of program implementation within the two school districts and issues with language translation, physical space and technology.

Other recommendations focused on the program's interactions with the school district's administration. It would have been beneficial to work with the administration to assess the specific needs of the parent and school professionals. For example, although the program's team met with district personnel to review the content before the training, some participants commented that the content was a review or not relevant for them. Trainers reported higher levels of engagement amongst voluntary school participants compared to those whose districts required them to attend. Practitioners and researchers should consider this in future implementation, particularly when working with sites to facilitate recruitment.

A limitation of this study was lower rates of enrollment and inconsistent attendance amongst participating parents. For future research, practitioners should consider ways to promote consistent attendance (evening meetings, focus on parents' and teachers' current concerns, etc.) to ensure fidelity of intervention implementation and consistent data collection, allowing for more sophisticated statistical analyses. The lack of change in collaboration after the three-month follow-up period indicated participants might benefit from more time to implement learned skills and develop relationships with their collaborative counterparts. Refresher sessions reviewing information and adding to it may support further collaboration. Future studies may find more program effects in a longer timeframe for the follow-up. In addition, the sample was obtained using convenience sampling and was limited in size. The findings of this study are relevant to the current sample, and further research should be conducted to determine if the results replicate with a broader population.

Finally, because collaboration is a broad topic with many components (Kurani *et al.*, 2009; Mutch and Collins, 2012; Pushor, 2012; Underwood, 2010), the aspects selected for this study's collaboration measure may not fully represent manifestations of collaboration amongst participants. The measure may need to be changed or supplemented in future studies. Also, there might not have been a measured change in collaboration because there were not enough training opportunities for participants to practice their new skills. Future researchers should include more comprehensive collaboration measures and establish a data collection timeline that captures gradual change over an extended period.

Conclusions

This case study describes an educational process designed to increase collaborative behavior in the education of children, which can serve as a template for future efforts. The process concepts and constructs were research-based and implemented within an ongoing developmental evaluation, allowing for continuous incremental change and improvement over two years.

Note

1. Rather than using the descriptor person(s) with autism, this paper uses the term autistic. Emerging international research indicates that this population, specifically autistic adults, prefers identity-first language (National Autistic Society, 2021; Organization for Autism Research, 2020).

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