



Teachers' Willingness to Use a Telepresence Robot for Consultation with Students with Autism Spectrum Disorder

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Abstract

A telepresence robot (TR) is one type of technology used to support teleconsultation in schools and may be preferred over other technologies due to its ability to provide immediate videoconferencing with mobility from a remote location. The aim of the current study was to examine teachers' willingness of using a TR as a training mechanism for working with students with autism spectrum disorder (ASD). Through constant comparative analysis of focus group transcripts, this exploratory qualitative study assessed six teachers' willingness of using TR. In total, 145 text fragments were coded and categorized. This process yielded three macro-categories, six micro-categories, nine primary codes, and 18 secondary codes. Advantages of using TRs, potential barriers, and future research directions are discussed.

Keywords Telepresence robot · Teacher training · Autism spectrum disorder · Teleconsultation

Many students present with a range of challenging behaviors that can be difficult for teachers to manage in a classroom setting. This may be especially true for students with autism spectrum disorder (ASD) who present with persistent deficits in social communication and interaction, which can lead to associated behavior challenges. The most recent surveillance data from the Centers for Disease Control and Prevention (2018) reports that the current prevalence of ASD is estimated to be 1 in 59 individuals. Furthermore, the number of students receiving special education services for ASD has nearly doubled between 2005 and 2016 (National Center for Education Statistics, 2013).

Possibly due to legislation requiring schools to educate students with disabilities in the least restrictive environment (No Child Left Behind [NCLB], 2001), more students are receiving special education services within the general education classroom—including students with ASD. Given the prevalence of students with ASD, it is important that teachers are equipped with the skills to address the complex needs of

students with ASD. Teachers working with students with ASD report feeling unprepared to address student problem behavior, and parents report frustration with the educational system in obtaining appropriate services (Pas et al. 2016). Furthermore, many teachers fail to accurately and consistently implement behavioral interventions due to inadequate training (Dufrene et al. 2014). When teachers implement behavioral interventions without treatment integrity, there may be untoward consequences (e.g., inadvertently reinforcing a problem behavior). Therefore, teachers require training in behavioral interventions to increase skill acquisition and decrease problem behavior (Martinussen et al. 2011).

There is a growing literature in support of teacher training (Zoder-Martell et al., 2018). Training procedures are generally classified as indirect or direct training. Indirect training is accomplished through didactic instruction and has proven to be generally ineffective when employed as the primary method of training (Dichaba and Mokhele 2012; Dufrene et al. 2014; Jimenez et al. 2016; Sterling-Turner et al. 2002). When examining the efficacy of didactic instruction in behavioral interventions, correct implementation rapidly decreases after initial training (Addison and Lerman 2009; Martinussen et al. 2011). Indirect training is time and resource efficient; however, it is likely insufficient for training teachers to meet the complex needs of students with ASD.

Direct training is a more intensive form of training compared to indirect training because it allows teachers additional opportunities to practice skills (Dufrene et al. 2014; Floress

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et al. 2017). Direct training may incorporate a variety of training procedures in addition to didactic instruction, such as scripts, modeling, rehearsal, performance feedback, coaching, and *in situ* training (Floress et al., 2017). Researchers have found that direct training may be superior to indirect training for increasing the probability that teachers acquire proper skills and maintain implementation over time (e.g., Dufrene et al., 2014; Sterling-Turner et al. 2002; Stormont et al., 2007). To ensure teachers maintain skills over time, training should be a continuous and direct process (Ayvaz-Tuncel and Çobanoğlu 2018).

Although direct training is generally purported to be effective, it is often time and resource intensive. Furthermore, geographical constraints may limit the consultant's (i.e., trainers) ability to meet with consultees (i.e., teachers). An alternative to traditional in-person consultation is teleconsultation. Teleconsultation has been used to meet similar consultative demands in the medical field (State et al. 2019) and is known for its convenience and efficiency. Teleconsultation traditionally includes telephone calls, interactive videoconferencing, email, or chats (APA 2013). Teleconsultation does not require travel and has shown to be as effective as in-person treatment (Bice-Urbach et al. 2018).

Teleconsultation can allow for consultation from a remote location, thereby increasing the resource efficiency of the consultative process. Incorporating videoconferencing into the teleconsultation process creates the opportunity for the consultant to conduct direct observation, coach the teacher, and provide targeted feedback from a remote location (Bice-Urbach et al. 2018). Although teleconsultation is seldom used in school settings, it may be a viable alternative to traditional school-based consultation, especially when traditional consultation is not feasible (e.g., under-staffed school districts, rural settings). Furthermore, teleconsultation can be used as a direct training procedure for teachers who require assistance in learning to implement interventions for students with ASD.

There are several technologies that allow for direct observation and can be used to support teleconsultation in schools. Video recordings (e.g., Floress et al. *in press*) webcams (e.g., Wilczynski et al. 2017), and SWIVLs (Zoder-Martell et al. 2020) have all been used in previous studies to collect data; however, there are some limitations to these technologies (Zoder-Martell et al. 2020). Stationary recording devices like video cameras and webcams are immobile, so the full classroom setting may not be captured. For instance, the teacher (or students) may go in and out of the frame making it difficult to follow his or her movements for training purposes. Robotic stands (like the SWIVL or PIXEM robot cameraman) are tethered to an iPad (or mobile device) for recording video. They are designed to follow an individual (e.g., teacher) by moving back and forth on a plane but are unable to move independently to view the entire classroom. For these reasons, stationary recording devices and robotic stands may not

provide a consultant an accurate understanding of the environment, nor can they be used to effectively provide training. Telepresence robots (TR) have the potential to overcome these limitations. A TR is a remote-controlled, wheeled device that has wireless internet connectivity. The robot uses a tablet (e.g., iPad) to provide video and audio capabilities and range in height from 3.5 to 5 ft. With these features, a TR is capable of immediate videoconferencing with mobility from a remote location. A consultant can maneuver the robot to view the entire classroom, all while the consultant is at a remote location. Therefore, the TR provides consultants the flexibility to use both indirect and direct training procedures while also allowing for direct observation.

TRs address several concerns that are noted in traditional teleconsultation. First, while visibility and mobility can be concerns, TRs overcome these issues because they are controlled by the consultant and can move through the classroom setting (Bice-Urbach et al. 2018). Consultants can view a classroom in its entirety without relying on the teacher to position the technology so the consultant can obtain a better view (i.e., hands-free for the teacher). Ensuring privacy and/or confidentiality is also a common concern; however, TRs have their own app to ensure videos are encrypted and secure (Double Robotics *n.d.*). Technology training is a concern in traditional teleconsultation. Similarly, consultants need to be well versed in TRs, so they can assist teachers in troubleshooting any challenges with using the technology (Bice-Urbach et al. 2018). Customer support is available along with training manuals and step-by-step instructions (Double Robotics *n.d.*).

The methods used to train teachers to implement interventions should be acceptable, immediate, and resource efficient (Bice-Urbach et al. 2018). Teleconsultation is a method that potentially meets these needs. When asked about the acceptability of teleconsultation, teachers who had engaged in teleconsultation, reported teleconsultation to be as, if not more, acceptable than face-to-face consultation based on completion of the Distance Communication Comfort Scale, Technology Acceptance Model Instrument-Fast Form (TAM-FF), the Behavior Intervention Rating Scale, and the Consultation Acceptability Rating Scale (Fischer et al. 2016). Although Fischer and colleagues (2017) reported that teachers found teleconsultation to be acceptable, their study relied solely on teacher completion of surveys to assess acceptability, rather than directly asking teachers about their perceptions, opinions, beliefs, and attitudes (POBA) about teleconsultation. Teleconsultation may be preferred over traditional, face-to-face consultation because services can be delivered immediately (i.e., no travel is required of the consultant). Without the need for travel, behavioral problems are addressed in real time and teachers can be trained to utilize the intervention in the naturalistic setting under relevant stimulus conditions (Bice-Urbach et al. 2018). Another reason teleconsultation may be preferred over traditional consultation is that it may be less expensive.

When teachers are inadequately trained, it is often related to lack of funding and resources (Butrymowicz and Mader 2017). Videoconferencing may be less expensive than in-person treatments, and therefore more resource efficient (Bice-Urbach et al. 2018). Preliminary research suggests that teleconsultation is approximately 16% less costly than in-person appointments (Richardson et al. 2009).

Identifying technology that is acceptable to teachers is an important issue. Fischer et al. (2018) evaluated the use of a TR to facilitate problem-solving consultation to assist teachers in increasing student compliance. Student participants had a variety of disabilities including traumatic brain injury, intellectual disability, and autism spectrum disorder. Teachers were trained to use a three-step prompting procedure that used least-to-most prompting. Teachers completed the Technology Acceptance Measure-Fast Form (TAM-FF, Chin et al. 2008). Based on the TAM-FF, Teachers rated TRs as a highly acceptable teleconsultation method (Fischer et al. 2018). However, all teachers completed the TAM-FF after consultation with the TR. Furthermore, the TAM-FF only assesses usefulness, ease of use, and predicted usage. Understanding teachers' POBA can help to further inform the practice of consultants who are considering the use of a TR to facilitate teleconsultation in the schools.

Before implementing TRs in the schools, it is important to assess teachers' thoughts and opinions regarding this technology to determine whether teachers would be willing to use this type of technology. This study extends upon research conducted by Fischer et al. (2018) by qualitatively examining teachers' POBA of using a TR as a training mechanism for working with students with ASD. Specifically, the research questions are (1) what are teacher's POBA of working with students who have ASD? and (2) what are teachers' POBA of the use of a TR as a means of consultation for supporting students with ASD?

Method

This study was part of a larger grant-funded study seeking to evaluate outcomes following use of a TR to support school-based teleconsultation for teachers who work with students with ASD. In the larger study, we had difficulty recruiting teachers who were willing to participate in research using a TR. This study was conducted, in part, to assess teachers' willingness to engage in consultation and professional development via a TR. A goal was to identify situations when teachers would be willing to use the TR as well as potential barriers that may be encountered. To accomplish our goals, we analyzed the focus group transcript of six teachers.

Moderators

A moderator and a graduate research assistant facilitated the focus group. Author 1 served as the moderator of the focus groups. The moderator is a Caucasian female with a doctoral degree in School Psychology. She is a licensed psychologist a Board Certified Behavior Analyst-Doctoral. She has doctoral training in interviewing and participated in a week long post-doctoral training through the RIVA Institute about facilitating focus groups. During this training, she facilitated a focus group and received coaching and feedback from a Master Moderator. The moderator has clinical and research experience in assessing and treating individuals with autism spectrum disorder, school-based consultation, and teacher training. Currently, her research focuses on the use of teleconsultation to support consultees in implementing behavioral interventions. She has received grant funding to evaluate the use of a telepresence robot for training teachers in underserved and under-resourced communities to work effectively with students who have autism spectrum disorder.

The graduate research assistant had a master's degree and was making progress toward a doctoral degree in School Psychology. The graduate research assistant was responsible for obtaining informed consent, collecting rating scales, and demonstrating the use of the TR.

Participants

All procedures were approved by a university Institutional Review Board. A convenience sample was used to recruit participants (i.e., teachers participated in a previous unrelated study, and indicated interest in participating in future studies). The focus group moderator did not have any prior interaction with any of the participants (Levitt et al. 2018). Six teachers were emailed and invited to participate and all six agreed. The six teachers were from different schools in the Midwestern region of the US. All participants provided informed consent and received a \$200 stipend for their participation. To be included in the study, a teacher had to (a) be a certified k-12 teacher, (b) have taught at least one student with ASD, (c) had experience receiving consultation, and (d) did not have experience with teleconsultation.

Participant 1: Participant 1 was a Caucasian male and held a master's degree. He was an 8th grade general education math teacher with 14 years of teaching experience. He taught in a rural setting and approximately 49% of students in the district received free or reduced lunch.

Participant 2: Participant 2 was a Caucasian female and held a master's degree. She was a general education, kindergarten teacher and had 13 years of teaching experience. She taught in a rural setting and approximately 72% of students in the district received free or reduced lunch.

Participant 3: Participant 3 was a Caucasian female and held a bachelor's degree. She was a general education, kindergarten teacher and had 20 years of teaching experience. She

taught in a rural setting and approximately 49% of students in the district received free or reduced lunch.

Participant 4: Participant 4 was a Caucasian female and held a master's degree. She was a general education, kindergarten teacher and had 18 years of teaching experience. She taught in a rural setting and approximately 49% of students in the district received free or reduced lunch.

Participant 5: Participant 5 was a Caucasian female and held a master's degree. She was a general education, first grade teacher and had 12 years of teaching experience. She taught in a rural setting and approximately 49% of students in the district received free or reduced lunch.

Participant 6: Participant 6 was a Caucasian female and held a master's degree plus 24 graduate credits. She was an elementary, special education resource teacher and had 22 years of teaching experience. She taught in a rural setting where approximately 50% of students in the district received free or reduced lunch.

Materials

Focus Group Guide A focus group guide was developed for the moderator to use during the focus group. Prior to facilitating the focus group, the guide was reviewed and edited by a Master Moderator from an external agency who was not affiliated with this study. The Master Moderator provided suggestions for interventions as well as revisions to the questions. The guide included semi-structured, open-ended questions; sample probes; and two task-based activities (i.e., a word map, pros/cons list) that were used during the focus group. Table 1 provides an outline of the focus group session.

The focus group guide was divided into the following sections: "Introduction," "Self-introduction," "Intervention," "Baseline," "Product questions," "Final question," and "Closure." During the introduction, the moderator provided an initial greeting and information about herself. Participants were thanked for their participation. An overview of the session was provided.

The purpose of the self-introduction was to learn more about the participants. In the self-introduction section, each participant provided their name, current position, number of years in the position, and one thing that they enjoy doing in their free time.

The purpose of the intervention was to gain insight into participants' experience working with students who have ASD. It is labeled "intervention" because the participants completed an activity. Specifically, during the intervention, participants completed a "Word map" where they wrote things that they associate with students with autism. After each participant completed their word map, there was a discussion of the topics written by each participant, including identified challenges, factors that were considered, previous training, and skills needed to effectively teach students with ASD.

The baseline questions were designed to assess participants' baseline use and knowledge of technology. The purpose of these questions was to evaluate teachers' experience and to determine if those who use technology more regularly would have different POBA than those who did not. Additionally, the TR was introduced. During baseline, teachers were specifically asked questions about their use of technology during their day and in their classroom. Participants were asked what comes to mind when they hear the term "Telepresence Robot." After this question, the moderator stepped out of the room and a graduate research assistant provided an overview and demonstration of the telepresence robot that lasted approximately 12 minutes. After the demonstration concluded, the moderator returned to the room and asked participants about ways in which a TR could be used in their current school.

Following the baseline section and after the demonstration, the participants responded to product related questions. Initially, questions broadly assessed teachers' thoughts about how a TR could be used in their schools, advantages of using a TR, and challenges. Questions transitioned to assessing teachers' POBA about using a TR to provide teachers with the training and supports needed to work effectively with students with ASD, as well as advantages and barriers to using a TR in training and consultation.

The final questions posed to the participants was "Given what you have seen and talked about today, use your thumb to show your level of interest in incorporating this kind of technology into your classrooms to help you work with students who have ASD?" Participants were thanked for providing time and insights about using the TR.

Telepresence Robot A Double 2 TR (<https://www.doublerobotics.com/>) was used during the demonstration. The TR uses an iPad Air 2 or iPad Pro, which is purchased separately. It comes equipped with an audio kit, camera with 150-degree wide angle lens, and charging dock. The TR can maintain a charge for 6–8 h and is fully charged within 3 h. It has lateral stability control, is self-balancing, and has dual kickstands. The TR is equipped with video and audio capabilities via the iPad. Although Double Robotics does not specifically provide a statement regarding compliance with the Family Educational Rights and Privacy Act (Family Educational Rights and Privacy Act of 1974) or the Health Insurance Portability and Accountability Act (HIPAA, 2004), video and audio is reported to be secure and encrypted. A driver app (<drive.doublerobotics.com>) is necessary for using the TR.

iPad Two fifth-generation iPads were used to video record the focus group and to operate the TR for the focus group demonstration.

Table 1 Focus group moderator's guide

PURPOSE: To explore local teachers' and school administrators' POBA about the use of a telepresence robot to facilitate school-based consultation so that training can be tailored to teachers' needs	
INTRODUCTION	Greeting: Good morning. My name is _____. For the next 2 hours we are going to be talking about the use of technology for teacher professional development.
	Moderator Information: Today I am interested in learning about your opinions regarding a new technology that can help to provide teachers with professional development.
	Acknowledgement: I want to thank you all for coming today and for making time in your schedule. Your input will provide valuable information about the use of the new technology to facilitate teacher professional development.
	Roadmap: During today's group we will discuss your current teaching practice as well as your attitudes toward technology. This is a free flowing discussion and there are no wrong answers. I am looking for different points of view. In addition to our discussion, we will do a short group activity.
	Ground rules: Today we will be talking for about 2 hours. I will not offer any breaks, but you should feel free to get up and walk about the room or leave the room. The only thing that I ask is that only one person leaves the room at a time. I've asked for pizza to be delivered at 5:30. In the meantime, there are some refreshments on the table. Please help yourself to anything that you would like.
SELF-INTRODUCTION	In order to make our discussion a little more fun I want to get to know you a little better. Please introduce yourself to the group: <ol style="list-style-type: none"> 1. Your name? 2. Current position and # of years in this position 3. What is one thing that you enjoy doing in your free time?
INTERVENTION	<p>Questions</p> <p>Context: Most of you spend part or all of your days interacting/instructing students and some may have experience working with students who have Autism Spectrum Disorder. As a context for our further discussion about technology, I want to dive right in with an exercise designed to uncover thoughts and feelings associated with teaching students who have autism.</p> <p>WORD MAP Title: Teaching students with autism</p> <ol style="list-style-type: none"> 1. I want you to create a word map. Keep in mind that there are no wrong responses. I bet that you have taught your students to use a word map, but I am going to show you a quick sample before you get going. This is a word map of Disney world. Notice that the writer uses a combination of words and pictures to create "branches." 2. Now I want you to take about 10 minutes and create your own word map. In the center of your map, I want you to write "Students with Autism." Please write down things that you associate with students with autism. 3. Let's take a little time to talk about some of the things that you wrote on your word map for students with autism. 4. What are some challenges that you face or anticipate you would face when teaching students with ASD? 5. What are some factors that you considered when creating your word map? 6. Tell me about your previous preparation or training for teaching students with ASD. 7. What skills do you think a teacher needs in order to effectively work with students who have ASD? 8. What supports do you think teachers need to effectively work with students who have ASD?
	<p>Sample Probes</p> <ol style="list-style-type: none"> 1. Basic services: Anything else? 2. What about things like.... 3. How so?
BASELINE	<p>5-10 FINGER EXERCISE</p> <ol style="list-style-type: none"> 1. When I use the term <i>technology in the classroom</i>, what words come to mind? 2. How do you use technology into your current day? 3. Tell me about the use of technology for teacher professional development. 3. When I use the term <i>telepresence robot</i> what do you think of? <p>Definition: Graduate research assistant (GRA) will provide a brief description of the telepresence robot. GRA will demonstrate the use of the telepresence</p> <ol style="list-style-type: none"> 1. Is there anything else that comes to mind? 2. What are some reasons for thinking about technology this way? 3. What are some ways in which technology helps you to be more efficient?

Table 1 (continued)

	robot. GRA will answer any questions about the telepresence robot (max 12 minutes).	
PRODUCT QUESTIONS	<ol style="list-style-type: none"> 1. How do you see the telepresence robot working in your school? 2. What do you see as some reasons for using a telepresence robot in your school? 3. CHARTED BEN FRANKLIN: What do you think are some of the advantages having a telepresence robot in your school for teacher professional development? 4. What concerns do you have about using a telepresence robot? 5. Who do you think is most likely to benefit from the use of a telepresence robot? 6. Who do you think is least likely to benefit from using a telepresence robot? 7. How can a telepresence robot be used to provide teachers with the training and supports to work effectively with students who have ASD? 8. What are some advantages for using a telepresence robot to train teachers to work with students with AS 	<ol style="list-style-type: none"> 1. What influences, swayed, or moved you in your decisions about using a telepresence robot in your school? 2. What did you consider or reject when thinking about the reasons for using a telepresence robot in your school? 3. Please tell me more about your concerns about using a telepresence robot.
FINAL Q	1. Thumbs up/Thumbs down: Given what you have seen and talked about today, use your thumbs to show your level of interest in incorporating this kind of technology into teacher professional development?"	
CLOSURE	I want to thank you for your time and for providing your insights about the telepresence robot. I learned a lot today!	

Tripod Three rolling portable tripod stands for tablets were used to hold the iPads to video record the focus group. The tripod accommodated tablets between the sizes of 7 to 13 inches and could be placed on a table or the floor.

Technology Acceptance Measures Prior to the moderator joining the focus group session, each teacher completed the Distance Communication Comfort Scale (DCCS) and the Technology Acceptance Measure-Fast Form (TAM-FF, Chin et al. 2008). The DCCS includes 27 items, related to comfort with the use of telephone, videoconferencing, and face-to-face meetings. Each item is rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The DCCS has adequate internal consistency ($\alpha = 0.81\text{--}0.88$; Schneider 1999).

The TAM-FF is a 12-item measure in which consultees rate the extent to which technology is acceptable on the factors of ease of use, usefulness, and predicted usage. The TAM-FF uses the statement, "To aid me in my [accomplishment of task], overall, I feel [technology type] as a [task/method/system] is:" and has users rate on a 7-point semantic differential scale where participants rated technology based on efficiency ($-3 = \textit{inefficient}$ to $+3 = \textit{efficient}$). The TAM-FF has adequate internal consistency across the three factors ($\alpha = 0.93\text{--}0.97$; Chin et al. 2008).

Setting

A focus group was conducted with the six participants prior to the start of the COVID-19 pandemic. The focus group was conducted in a quiet classroom on the campus of a

Midwestern University. The tables in the classroom were moved together to provide a large table with enough room for each participant and the focus group moderator. Two iPads on tripods were set on tables adjacent to the main table to record each participant. An easel with memo paper and markers were slightly to the right and behind the moderator. Two hours and six min of video recordings were transcribed at a later date by a different graduate research assistant. The transcription was 44 pages.

Data Analysis

The research team was interested in exploring teachers' willingness to use a TR to facilitate school-based consultation for students with ASD. The authors employed an exploratory, qualitative research approach incorporating elements of phenomenology (Patton 2002), thematic analysis (Braun and Clarke 2006), and grounded theory (Strauss and Corbin 1990). Barden and Cashwell (2014) highlight the importance of multiple perspectives when investigating complex issues within a qualitative research framework. Therefore, we utilized a research team for conducting this study and data analysis. Authors 1 and 2 planned the study. Author 1 moderated the focus group. Author 5 transcribed the sessions. Authors 3 and 4 came together to debrief, discuss, and reach consensus regarding modifications of the coding schema following each round of coding.

Identifying information was removed from the focus group transcript. The mnemonic *P* and an assigned participant number was used to report participants' statements. We conducted a thematic analysis of the focus group transcripts (Braun &

Clarke, 2006) using elements of grounded theory data analysis procedures. To this end, the research team employed constant comparative analysis via a multileveled and iterative coding process. Coding involved multiple iterations, or rounds, of reading and analyzing text, chunking text, developing codes, assigning codes to chunked text, refining codes, recoding, and clustering codes into thematic categories (Corbin & Strauss, 2008). All codes, categories, and themes were developed and refined through these processes.

Our analysis began with Authors C and D analyzing the focus group transcript and developing a preliminary code sheet in Excel. The responses of one participant were independently coded to test and refine the coding process. Subsequently, the first two participants' responses were coded using the revised code sheet to determine and establish reliability. Discrepancies were discussed and context and concept codes were further refined. The first two participants' responses were independently recoded and compared. Through discussion of agreements and disagreements, refinements were made until coders reached a minimum of 90% agreement. The coders divided and coded the remaining data.

The initial round of coding involved assigning context (e.g., POBA-tech, POBA-robot, pros, cons) and content (e.g., academic, costs, mobility, reflective practice) codes to participant responses. A 'comments' column was included to allow coders to capture additional interpretations of the coded text. This process continued with coders confirming and disconfirming instances of codes and discussing and refining code names. During each subsequent iterative round of coding, data were recoded to reflect changes (i.e., refinement and revision) to the code sheet and emergent themes were further refined. During the final rounds of coding, thematic analysis was conducted by filtering codes into macro- and micro-categories. Propositions were then composed to both capture the thematic findings and identify direct quotes that represented the proposition. Overall, this iterative process yielded three macro-categories, six micro-categories, 9 primary codes, and 18 secondary codes. In total, 145 text fragments were coded and categorized.

Trustworthiness

The methodological rigor of qualitative research is discussed in terms of trustworthiness pertaining to the confirmability, credibility, dependability, and transferability of findings (Lincoln and Guba 1985; Shenton 2004). The goal was to identify credible themes through both a multi-leveled coding process and reflexive analysis. To facilitate transferability of the findings, there were attempts to sufficiently contextualize the purpose and procedures that guided this study. An audit trail, documenting methodological steps and decisions, was also maintained by the research team; however, space

limitations prevent a more detailed accounting of the analytic methods.

In the context of qualitative research, it is often impossible for the researchers to fully suspend their own biases and beliefs when interpreting data. Both of the coders were conscientious of how their own POBA might influence the coding. They each independently coded the transcripts and then had discussion about how personal biases and beliefs may impact the interpretation of findings.

Results

The findings related to participants' statements about the use of a technology and TRs to support students with ASD that emerged throughout the focus group discussion are presented. Analysis of coded data yielded three macro-categories: POBA about (1) technology and TRs, (2) using TRs for training and support of students with ASD, and (3) prior experiences with technology. Most of the codes were aligned with the POBA category, nearly a quarter fell under the category of using TRs for training and support, and the fewest codes were related to prior experiences with technology. In the following sections, findings by category are presented. Additionally, themes related to specific focus group questions are included in Table 2.

POBA Related to Technology and TRs

More than half of the coded statements were categorized as POBAs about the use of a technology and TRs. Within this category, more than three quarters of the participant responses were related to the pros and cons of technology. The remainder of POBA statements pertained to those who may benefit from the use of TRs and general statements about participants' willingness to try new technology.

Pros and Cons of Technology

All participants discussed advantages of and concerns about the use of technology and TRs. Advantages and concerns were most frequently discussed in terms of logistical considerations; followed by familiarity with technology; interacting with and through technology; and using technology for monitoring purposes, respectively.

Logistical Considerations Logistical considerations were discussed nearly equally in terms of advantages and concerns about technology and TRs. Participants discussed logistical considerations such as access and reliability, cost, convenience, and mobility as advantages, concerns, or both.

Access and reliability were discussed exclusively in terms of participant concerns. More specifically, participants were concerned with having enough technology for all students and

with reliability of internet connections. Concerns about internet connections stemmed from inconsistent access to WiFi in their facilities, and the potential implications such disruptions would have for using TRs, “I know that there are a lot of times that our Wi-Fi would break down and then, what do you do?” (P5). These concerns were also noted in terms of inconsistent connections within the same building, “Based on the room even. So he [TR] can try and go to the next room and he falls apart because the WiFi doesn’t reach there” (P1).

The convenience that TRs provide was discussed exclusively in terms of advantages of the technology. Participants noted that “you can’t always schedule a consult when you need a consult” (P2). They went on to discuss how TRs would instead allow them to “take a professional development but not have to go there” (P3).

Cost was discussed in terms of advantages and concerns. Participants most frequently commented about costs in relation to the cost of TRs versus costs of traditional professional development and consulting models. Some participants commented that TRs would be the more cost-effective option, stating “rather than having to pay for a consultant to come and having to pay for their hotel and their travel, you could just have that robot in the front of the room with a bunch of teachers and the person on the other room is doing just what we’re doing. You’re just having the conversation with the robot instead” (P4). Yet others posited that using current technology might be as sufficient and perhaps more cost effective, “If you just used your laptop, which you already have, you also don’t have to pay for [TRs] and you don’t have to pay for shipping. So, to me that would be a disadvantage not an advantage” (P1). Later in the discussion, P1 reiterated this position in terms of efficiency stating, “this method is not the most efficient method. So, I think it’s an inefficient way of accomplishing what you want with for advantages. I think we have better tools to do those same things.”

Lastly when discussing logistical considerations, half of the participants commented on the mobility of TRs as a notable advantage. Multiple participants commented specifically on the *hands-free* nature of TRs, stating, “It’s hands free! ...and as a teacher you don’t have to worry about where it’s going or what it’s doing, it’s taken care of it for you” (P2). As noted earlier however, mobility may also present a concern when the access to and reliability of internet connection is considered.

Familiarity with Technology Familiarity with technology was discussed almost exclusively in terms of novelty and comfort levels. Comments related to the novelty of technology, including the evolution of technology in other settings (e.g., medical), addressed both advantages and concerns. Participant statements about comfort levels with learning and using new technology highlighted concerns.

The novelty of TRs were discussed in terms of capturing people’s attention, “It’s definitely flash bang. It definitely gets the, you know, would get their attention. They’ll be like ‘Oh, Wow. Look at that cool thing going on’” (P1). Some participants were concerned that the novelty of TRs would be distracting to students, “I was thinking of my little people, though, and I’m thinking they would just be right up to it. It would be very distracting to them, at least initially” (P4). Despite being novel, participants still indicated a willingness to try using the technology. P5 stated, “It’s something new and so out of the box for us that it just seems like ‘Woah, I’m not quite sure.’ So yes, I would like to try in hopes that it would give something that I had not thought of before, because it is out of the box thinking for us.”

Nearly half of participants discussed their comfort levels with technology and reported being *resistant to change* and *set in their ways*. Participants stated, “I have a hard time accepting change. I’m very much like students with autism, when you mess with my schedule, you know” (P6). Concerns such as troubleshooting (P3) and general perceptions of TRs as being “hard to use” (P6) were noted. One participant later noted that the technology would likely be difficult for younger students, stating “I mean even just using a tablet is difficult for them, so to have a moving interaction, I don’t know. At this moment I don’t see that” (P4).

Although several participants addressed concerns about learning and implementing new technology, some made connections to adapting to new technology. For example, P1 noted, “This reminds me of all the cell phone stuff came out, all the psychologist people were saying ‘oh this is terrible our kids are not gonna wanna interact’ and now years later when everyone’s used to it they’re like ‘well, better than nothing, I’m used to it.’...So we settle for it” (sic). P6 drew parallels between robots in the classroom and technology in other fields and settings, stating,

[I]sn’t that the way the medical profession is moving? The doctors are now using that little robot to check in with patients?...Are we going to head that way for classrooms? I mean will I be standing in my living room talking to...We’re already checking out our own groceries. And now we have Amazon who will walk in, shop, scan my phone, and I’ve purchased my groceries without any human interaction. So, I think this is the way we’re headed.

Interacting with and via Technology Social interaction and skills building were discussed in terms of engagement and disconnection, with participants citing advantages and concerns related to both. Some participants noted that using the TR would be like other forms of technology they currently use. Specifically, P6 noted that “it would be like how often do you guys use FaceTime, with family members? ... But she’s on the other end of the screen, right? Aren’t you on the other

end? ... Because to me, I think that would be the equivalent to like FaceTime, which we do all the time.”

One participant was concerned that students already had too much exposure to technology, stating, “I feel like that they, children today, get so much of that at home that they don’t need it at school” (P3). Concerns were also raised about TRs perpetuating disconnection, though it was acknowledged that technology may not be the culprit, “Breaking down social interactions, and I think that’s really important. But I don’t know that’s the technology” (P4). Although parallels had been drawn between using FaceTime or Skype and TRs to communicate remotely, some participants indicated that they would rather talk with someone face-to-face. For example, P1 commented, “So when you’re talking about Skyping with family members, in the past all we had was audio, but it was long distance and this is all you have. But it still, if you compare it what about being in the room with your family member? Most of us would be like “oh man, I’d rather be sitting down over a cup of coffee” (P1). Still, several participants associated the ‘robot’ with being disconnected. P5 reported “when you say that ‘telepresence robot’ there’s something about a robot that, to me, can sound cold and disconnected.”

Using Technology for Monitoring Participants discussed the advantages and concerns about using TRs to monitor the classroom and the behavior of students with ASD. Participants commented on the advantages of having the TR to document student behavior and as a means for reflecting on their own practice. Some concerns were raised about privacy and the need to acquire parental consent for monitoring. Specifically, P3 noted, “I think that parents may have a problem with it, because I think that, you know, parents maybe don’t want- some parents don’t want their children to be monitored like that.” Additionally, P1 stated, “Legal issues. You’d have to get the permission and all that, for videotaping students.”

Benefiting from and Willingness to Incorporate Technology Throughout the conversations about POBA, statements were made in which all participants directly and indirectly identified individuals or entities who might benefit from the use of TRs. Participants noted that new (P2) and veteran (P6) teachers, alike, could benefit from the use of TRs. One participant (P1) mentioned that technology companies would also stand to benefit from the use of TRs in schools. Acknowledging the benefits TRs may provide for students, nearly all participants indicated their willingness to try “anything that might help the kids” (P1). One participant specifically addressed working with students with autism, stating “I think when it comes to working with kids with autism, I will try anything. I will do whatever” (P6).

Using Technology for Training and Support

All or most participants commented on the use of technology for training and support of both teachers and students, respectively. Most statements about the training and support were focused on teachers, with less than a third of statements pertaining to the use of TRs supporting students.

Teacher Training and Support Comments related to teacher support and training most often focused on classroom monitoring, followed by the convenience of TRs, using the technology to consult with others, and engagement levels. Participants most frequently discussed using TRs to monitor the classroom as a means of supporting them. Half of the participants noted that using TRs to observe student behavior would allow them to reflect on their own practice. Self-reflection was exclusively discussed in terms of how they could modify their practice, such as “oh maybe I should not have said this, or, I should not have done this. Maybe I triggered this” (P6) to address or prevent student behaviors. A few participants mentioned that TRs could be used to document, or provide evidence, of student behaviors when talking with families about their children. P5 noted,

[W]hen I think about parents too, when it follows their child throughout the day. As a teacher I can see, ‘ok I don’t have them during specials, but what are some of the triggers? Is it the gym that’s too loud? Is it the art [teacher] trying to [get the student to] perfection?’ Then as a parent, ‘ok what is a typical day like for my child? What do they go through?’ Because we can talk but they can’t see it... well no, let me show you. This is what everything is like and what’s going on.

Some participants also discussed the convenience and immediacy of using TRs for in-class support and professional development. Reflecting on a conversation about students with autism, one participant described a scenario in which a TR could have provided needed supports stating,

I had my first student [with autism] and I was at a loss. I had no idea what I was doing. I think it would be very helpful to have, to be able to say, ‘see, this is what I’m dealing with. We have four computers and he has to have a certain one and if he doesn’t get that computer then he hits it or breaks it. What do I need to do? Or how do I get him to handle transitions?’ Just to have somebody there that can observe and offer immediate feedback (P2).

Participants reported that accessing training via TRs has the potential to be more convenient, in that the equipment would be readily available, or right there and they could access training at a time that worked well for them, “It would be immediate. We wouldn’t have to go next month to a workshop offsite. It’s almost immediately because you’re talking to someone who knows what they’re talking about” (P6). Some participants, however, were concerned with the cost of

using TRs in place, stating that, “you’re getting the same benefits from just sitting in front of a laptop. You know you don’t have to spend it on an iPad on a robot in a classroom if you want to have those things. You know, you can do two-way videos back and forth, like you said on Skype and things like that. That would be more cost effective and probably just as efficient.” (P1)

Most participants discussed ways in which TRs could be used to consult remotely with other professionals who have expertise working with students who have ASD. A participant suggested using the TR to connect remotely with a consultant in lieu of having them physically go to the school to deliver services. Others discussed the possibility of on-going, or sustained, consulting via the TR, “you could have, you could maybe have them longer, so sometimes you have just professional developments that one time, this could be over more time...you could have it for a month or something, off and on. I don’t know, I think that you could get more out of it than just one time for three hours sitting there” (P3). In addition, P6 presented the following scenario in which a TR could be used to consult remotely,

Okay so can we think outside the box? ... Let’s think outside of our district. So why couldn’t we teleprompt people in other districts going through similar experience? Like I wish I would’ve talked to these women and this young man earlier because everyone’s got different experiences but yet they’re so similar and if we could have collaborated beginning of the school year that would’ve been nice, even if it was just on video. Because we’re all busy before school, after school. We have ten minutes here, ‘hey do you have ten minutes free so and so is online or on robot.

In addition to discussing the use of TRs for consulting with other professionals, participants briefly commented on whether using TRs to support them would result in more (or less) engagement. Although P2 noted that they would be engaged with a TR, P4 stated that “it would be a whole lot easier to become distracted.” One participant (P1) questioned “what would [TRs] offer that other less intrusive versions of video conferencing would not offer?”

Student Support Nearly all participants commented on the use of TRs to support students with ASD, with most statements related to intervention and support. Intervention was consistently discussed in terms of providing social, emotional, and/or behavioral support to students via the TR. Participants mentioned using the TR to deescalate behaviors suggesting “technology is a lot easier for them to deal with than a regular person” (P4). Participants also discussed using TRs to implement social and behavioral strategies for students with ASD. More specifically, participants mentioned playing calming music, presenting social stories, using video modeling, and displaying visual schedules when students with ASD were engaged in problematic behavior.

Throughout the discussion of using TRs to support students with ASD, participants highlighted features of TRs that make it appealing for implementation in the classroom, namely mobility. Some participants highlighted that the mobility of the TR allows students to receive support quickly, “if I have one of my students is starting to really get upset and I just need him or her to talk to somebody, there could be a consultant on the other end and just off to the side and you go ahead and talk to this person right here. So that’s not even pulling someone out of another classroom” (P4). Despite noting potential uses for supporting social/behavioral skills, one participant was apprehensive about using TRs for academic instruction citing that the technology may be too difficult to use, “[F]or kindergarten, I don’t see that as being an academic tool for them to use. I mean even just using a tablet is difficult for them, so to have a moving interaction, I don’t know. At this moment I don’t see that” (P4).

Prior Experiences with Technology

Participants discussed the various ways in which they used technology in the classroom and experienced technology during prior professional development (PD) experiences. More specifically, participants discussed the various types of technological equipment in their classrooms and how the equipment was used to conduct daily activities such as attendance, grading, and instruction. In addition, most participants described prior experiences during PD in terms of content delivery methods and attendee engagement (or a lack thereof).

Technology in the Classroom Nearly all participants mentioned having some type of technology in their classroom. Half of the participants reported having a Smartboard or Smart table in their classroom. Half of the participants indicated they had computers, including notebook computers, in their classrooms. One third of the participants reported having both Smartboards and computers in their classrooms. Despite access, few reported using the technology specifically for academic instruction. P3 explained, “I feel like that they, children today, get so much of that at home that they don’t need it at school” and reported that the notebook computers in the classroom are only used “when someone else [is] there to help, to troubleshoot as they go.” In response, P5 stated, “I have a completely different viewpoint on that. Because I have some students that never, don’t have a computer, or are very limited. And in some ways that’s what gets them calmed down. So when we have our centers I rotate, you know, I only have 2 computers that the kids use.” When discussing their use of technology in the classroom, half of the participants reported using technology to teach keyboarding/typing skills, noting “we’re now having to teach them how to keyboard and how to manipulate and highlight so we’re also getting them familiar with the keyboard and teaching that part” (P5). Although half

Table 2 Categories and codes resulting from data analysis

Macro category	Micro category	Primary codes	Participants	Example from participant responses	
POBA	Pros	Logistics	1, 2, 3, 4, 5, 6	<i>You don't have to manipulate it with your hands, and it can go wherever a child goes.</i>	
		Interaction	1, 2, 3, 6	<i>I think I would be engaged.</i>	
		Monitoring	1, 4, 5	<i>More of a reflective, being able to look back and say, "Aha! I was up at the board and Johnny's over here, you know, pulling Susie's hair and I didn't know that."</i>	
		Familiarity	1, 5	<i>It definitely gets...their attention. They'll be like 'oh wow look at that cool thing going on'.</i>	
	Cons	Logistics	1, 2, 4, 5, 6	<i>Legal issues. You'd have to get the permission and all that, for videotaping students.</i>	
		Interaction	1, 3, 4, 5	<i>When you say 'telepresence robot' there's something about a robot that, to me, can sound cold and disconnected.</i>	
		Monitoring	3, 4	<i>Parents may have a problem with it, because...parents maybe don't want their children to be monitored like that.</i>	
	Benefits	Who	Familiarity	1, 3, 4, 5, 6	<i>You'd have to read the handbook to understand.</i>
			Who	1, 2, 3, 4, 5, 6	<i>I see a child could benefit from it, if it's calming if it allows them to deescalate, or learn.</i>
	Training/support	Teachers	Logistics	1, 2, 3, 6	<i>Just to have somebody there that can observe and offer immediate feedback.</i>
Interaction			1, 2, 4, 5, 6	<i>What would this offer that other less intrusive versions of video conferencing would not offer?</i>	
Monitoring			4, 5, 6	<i>I think it goes with the observation.</i>	
Students		Logistics	1, 4, 5	<i>Mobility</i>	
		Intervention	4, 6	<i>Technology is a lot easier for them to deal with than a regular person.</i>	
Prior tech experiences	PD	Interaction	1, 3, 4, 5, 6	<i>Webinars . . . PowerPoint . . . Clickers.</i>	
	Classroom	Daily activities	1, 3, 4, 5	<i>We do the lunch count on our smartboard.</i>	
		Equipment	2, 3, 4, 5	<i>I have four little notebook computers that I put in a [center] on occasion.</i>	

POBA perceptions, opinions, beliefs, attitudes; PD professional development

of the participants noted that technology was used during centers, only one participant mentioned using it to teach academics, "I do more than just lunch count, we do math" (P5). Most participants reported using classroom technology, including Smartboards, to carry out daily activities such as recording attendance, conducting lunch counts, and entering grades.

Technology During PD All participants discussed their experiences with the use of technology during PD sessions that they have attended. Most comments pertained to the way information was delivered during the PD. Participants cited the use of webinars and videos (i.e., DVDs, video clips, and YouTube) as the primary methods with which they experienced technology in PD sessions. One participant commented on the use of PowerPoint slides and another mentioned using response clickers.

Most participants noted a lack of engagement on the part of attendees during PD. Specifically, participants stated that PD tends to be "one sided" (P4, P6) and attendees "just do other things and listen" (P3). Reflecting the consensus of the group,

P6 commented about a common type of PD delivery method within the context of attendee engagement, "Um, and its usually one sided, they go through a PowerPoint and discuss things and if you have a question you have to click on [the chat]... it's pretty boring, kinda (sic) one sided."

Technology Acceptance Measures

Teachers completed the DCCS and TAM-FF prior to being introduced to the TR. Mean scores for the DCCS for each participant are provided in Table 3. Across participants, the mean score for the DCCS was 4.75 (range 3.63–5.19). Three participants (i.e., Participants 1, 3, and 5) rated distance communication as favorable. Participant 2 and Participant 3 rated distance communication as neutral. Participant 6 rated distance communication as slightly unfavorable. The overall group mean was 4.75 (range = 3.63 – 5.41), indicating the entire group was neutral regarding distance communication.

Scores from the TAM-FF (Table 3) yielded lower levels of acceptability of technology compared to the DCCS. The

average sum of scores across participants was 17 (range = 0–28); however, Participant 6 seemed to be an outlier. Based on administration of the TAM-FF, participants expressed varying degrees of technology acceptance. Participant 1 perceived technology to be unacceptable. Participant 2 viewed technology as acceptable ($M = 2.33$). All other participants were more neutral regarding technology acceptability (Range = 1.42–1.83).

Discussion

Given that teachers are increasingly tasked with meeting the needs of students with ASD who often present complex needs that can be challenging to address in the classroom setting, the need for consultation, training, and feedback is more apparent than ever. The purpose of this study, therefore, was to explore teachers' POBA with regard to the challenges of teaching students with ASD and the benefits and limitations of receiving consultation via a TR. Qualitative research methodology was selected to obtain teachers' POBA, beyond the completion of rating scales, regarding a novel technology. Specifically, we asked (1) what are teacher's POBA of working with students who have ASD? and (2) what are teachers' POBA of the use of a TR as a means of consultation for supporting students with ASD?

The goal of qualitative methods is to establish, to the greatest extent possible, an understanding of study participants' perspectives in relation to a phenomenon (Pathak et al. 2013). To these ends, this study attempted to establish a true representation of participants' experiences with and perspectives about technology and TRs. This study extended the findings of Fischer et al. (2018) by directly assessing teachers' POBA of a TR to engage in consultation and training for students with ASD (Table 4).

In earlier studies, teachers rated acceptability by completing rating scales (i.e., DCCS, TAM-FF) after receiving consultation using a TR (Fischer et al. 2018). Teachers in this study completed the same measures to allow for comparison; however, in this study, none of the teachers had experience with teleconsultation. This is an important distinction because teachers with less familiarity with a particular technology may be less willing to use novel technology. In fact, the participants in Fischer et al.'s (2018) study perceived teleconsultation to be highly acceptable based on completion of the DCCS and TAM-FF, whereas the overall scores for participants in this study were more neutral.

This study also extended the findings of earlier researchers who evaluated the acceptability of teleconsultation in the schools (e.g., Fisher et al., 2017; Fischer et al. 2018). By facilitating a focus group, participants engaged in dialogue regarding the challenges encountered when educating students with ASD, current

comfort with technology, and POBA related to using novel technology (i.e., TR). These discussions were useful in providing insight that went beyond rating scales and allowed for discussion identifying the advantages of using a TR (e.g., convenience, monitoring, immediate support, professional growth and development) and potential limitations of a TR (e.g., reliability of the Internet connection, "being set in ways," student exposure to technology, reactivity, privacy). Several factors (e.g., cost) were discussed in terms of advantages and limitations. Overall, all participants reported their willingness to try using a TR in their classroom and identified utility for assessment (e.g., special education assessment, functional behavior assessment, problem solving consultation). Teachers' willingness to use a TR in their classroom would allow for expert consultation in remote, under-served, and under-resourced communities.

This study has several potential implications for consultants who are interested in using a TR to provide consultation to teachers to meet the needs of students with ASD. As the number of students with ASD increases, teachers would benefit from consultation, training, and feedback. There is a robust literature that evaluates consultation and teacher training procedures. When effective training procedures are used, teachers are more likely to use behavioral interventions (Zoder-Martell et al. 2019). Most of the existing literature has evaluated the effectiveness of traditional or in-person consultation. However, due to a variety of factors (e.g., time, geographical constraints, resources), in-person consultation from a consultant with expertise in ASD may not be feasible, especially in under-served and under-resourced communities. With advances in technology, it is possible for consultation to occur from a remote location (i.e., teleconsultation). Teleconsultation is widely used in other disciplines (e.g., medical field), but is seldom used in school settings. Although each of the teachers discussed initial hesitation with using telepresence robots, ultimately all were willing to try using a TR in their classrooms.

Teachers' willingness to use a TR may be influenced by their prior use of technology. Specifically, teachers who are unfamiliar with a technology may be more resistant to using the technology in their classroom. In this study, teachers completed their ratings of the TAM-FF and DCCS before seeing the TR and the acceptability scores were lower than in earlier studies where teachers completed the ratings after consultation with the TR (Fischer et al. 2018). Therefore, consultants may need to introduce teachers to the technology (i.e., TR) prior to suggesting use in the classroom.

Although teachers expressed some concerns regarding the use of a TR, all were able to identify some benefits. Furthermore, all participants noted their willingness to use a TR in their classroom for consultation with students who have ASD. One of the benefits noted by teachers was the ability for

Table 3 Mean scores of distance comfort communication scale

	Telephone mean	Videoconferencing mean	Face to face mean	Overall mean
Participant 1	4.11	4.78	6.33	5.07
Participant 2	3.22	5.33	4.78	4.44
Participant 3	5.33	4.67	5.56	5.19
Participant 4	4.67	4.89	6.67	5.41
Participant 5	2.78	4.56	7.00	4.78
Participant 6	3.89	3.33	3.67	3.63
Overall	4.00	4.59	5.67	4.75

a consultant to be able to observe the child's behavior across multiple school environments to gain a better sense of behavioral concerns.

Limitations and Future Directions

There are some limitations of this study that warrant discussion. This focus group was conducted prior to the COVID-19 pandemic. This pandemic has required school districts to rapidly shift to using technology to provide educational services to students. It's conceivable that teachers' POBA may have changed since the COVID-19 pandemic. This study consisted of one focus group with six participants selected from a convenience sample. This raises questions about achieving saturation in the data. Ideally, multiple focus groups should be conducted; however, the onset of COVID-19 prevented additional focus groups. The participants who agreed to participate formed an ethnically homogenous group. Additionally, all teachers worked in rural school districts with a high percentage of students receiving free and reduced lunch. Increasing diversity of the sample of participants is an important factor to increase generalizability. However, the TR is particularly useful in under-served rural school districts.

At the start of the focus group, the teachers were shown the TR, and were provided with an overview and a brief demonstration. None of the teachers operated the TR or used it during classroom instruction. Their POBA of using the technology

may have been different if they used the TR in their naturalistic classroom setting. Future researchers should explore teachers' POBA after use of the TR in the naturalistic setting.

Finally, the extent to which TR is effective as a means of consultation and training was not quantitatively explored. In other words, it is unknown if teachers would increase treatment integrity of interventions with students with ASD following consultation using a TR. Future researchers should explore the effectiveness of using a TR to increase teachers' treatment integrity of behavioral and academic interventions while concomitantly monitoring changes in student behavior.

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Table 4 Mean scores of technology acceptance model-fast form

	Perceived usefulness	Perceived ease of use	Mean score
Participant 1	1.67	1.17	1.42
Participant 2	2.00	2.67	2.33
Participant 3	2.00	1.67	1.83
Participant 4	1.00	2.00	1.50
Participant 5	1.67	1.17	1.42
Participant 6	0.50	-0.50	0.00
Overall	1.47	1.36	1.42

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