An Investigation of the Efficacy of Direct AAC Service Provision via Telepractice: A Case Study

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ABSTRACT

This case study examined the feasibility and effectiveness of direct AAC intervention services provided via telepractice. Student outcome data was collected and analyzed for participants who received traditional on-site services and were compared to matched participants who received telepractice services. The results of this case study suggest that the use of an online service approach is a valid and appropriate method for delivering intervention to individuals using AAC.

BACKGROUND

It is estimated 3.5 million Americans with complex communication needs use augmentative and alternative communication (AAC; Beukelman & Mirenda, 2005). AAC is a multidisciplinary field that is within a speech-language pathologists (SLPs) scope of practice (ASHA, 2010); however, not all SLPs have access to pre-professional coursework specific to AAC (Costigan & Light, 2010; Koul & Lloyd, 1994; Ratcliff & Beukelman, 1995). These limitations related to pre-professional education and training resonate in clinical practice and school settings where SLPs report low levels of AAC expertise and less than adequate educational preparation (Halsall, Hall, Choe & Andrianopoulos, 2012; Marvin et al., 2003; Simpson, Beukelman & Bird, 1998).

Although limited in number, published investigations have concluded that the lack of pre-professional education has significant implications on the quality of training for SLPs and the quality of services provided to individuals using AAC. To exacerbate matters, there is a documented shortage of SLPs (American Association for Employment in Education, 2008). The shortage of SLPs paired with the self-reported low level of expertise in AAC make it extremely challenging for individuals in need of AAC intervention to receive the needed services from highly qualified professionals.

In an effort to address these issues, Costigan and Light (2010) proposed that online, videoconferencing techniques could enable "AAC experts to efficiently and cost-effectively address large, geographically dispersed audiences" (p. 210). The use of online technologies for the delivery of services, termed telepractice, is defined as "the application of telecommunications technology to deliver professional services at a distance by linking clinician to client, or clinician to clinician, for assessment, intervention, and/or consultation" (ASHA, 2010, p. 1), and empowers professionals to provide services where there is a shortage of personnel (Mashima & Doarn, 2008). The use of telepractice enables experts in the field of AAC to engage in service delivery irrespective of their geographical locale.

Empirical research utilizing telepractice for consultation, supervision and fieldwork in AAC is limited; however, preliminary data provides support for a tele-AAC service delivery model (Boisvert, Hall, Andrianopoulos, & Chaclas, 2012; Hall, 2013; Quinn, et al, 2011; Styles; 2008). While the current state of technology enables experts in the field of AAC to offer high quality services to individuals, research is needed to directly compare the outcomes of student progress when AAC services are rendered on-site as compared to a telepractice service approach.

PURPOSE

The purpose of this investigation was to empirically demonstrate the feasibility and effectiveness of utilizing telepractice to provide direct AAC intervention. This study utilized a single-

subject, multiple baseline design to monitor the progress of student participants and compare outcome data when services were provided on-site or via telepractice (tele-AAC). More specifically, the study was designed to answer the following research question:

1. Is there a difference in student participant outcome data, as measured by the number of unprompted phrases versus prompted phrases produced by each participant, when treatment is provided on-site as compared to telepractice?

METHOD AND PROCEDURES

Subjects

Four (n = 4) students using AAC devices participated in the investigation. Two students received AAC services on-site and two engaged in tele-AAC intervention. All participants used Prentke Romich Company (PRC) AAC systems and were between the ages of 4.0 and 6.0 with an initial vocabulary of at least 50 words (based on Language Acquisition Monitoring (LAM) data). In addition, participants accessed their AAC systems via direct selection and were able to participate in reciprocal activities for at least 10 minutes requiring only minimal verbal redirection.

Four (n = 4) clinicians provided AAC intervention, either on-site or via tele-AAC. The clinicians were graduate students at the University of Massachusetts and were closely supervised by Master's level SLPs, who had training and experience in AAC to ensure their implementation of evidence-based AAC intervention strategies.

Procedures

On-site intervention was conducted at an elementary school. The therapy room for all participants remained consistent for the on-site sessions. During the on-site sessions, a desktop computer with a built-in high-definition webcam was used to display all treatment material. Telepractice intervention sessions were conducted in the same treatment room, but without the clinician physically present. Instead, the clinician provided direct intervention via the video conferencing software

installed on the computer. All treatment material was presented through the computer.

Intervention was focused on the use of morphological features during prompted and unprompted trials. Prior to the onset of treatment, baseline data was gathered for each student through shared book-reading activities with embedded probe questions designed to elicit morphosyntactic targets. Intervention phase goals were established based on the cumulative performance of the students and four distinct communication acts including the generation of subject + verb phrases, plurals, negatives, past tense verbs and prepositions. These communication acts served as session target phrase for each week of the four-week intervention phase.

Each student participant completed two individual 30-minute sessions per week, whether conducted on-site or via telepractice, totaling 8 sessions. Data was gathered regarding the prompted and unprompted target phrases produced by the participant. For each week of the investigation a new target phrase or communication act was addressed, thus amounting to four (4) distinct communication acts addressed twice a week for four weeks. Pre- and post-screens were administered to each participant at the start and finish of the investigation to measure overall progress on the target phrases.

Materials and Equipment

A range of off-the-shelf and customized equipment was used during both conditions of this investigation, including a combination of desktop and laptop computers and built-in and external webcams. A proprietary webcam mount, the Adjustable J-Mount©; Larivee, 2012) was also implemented to enable real-time AAC modeling and optimal virtual device viewing.

Telepractice was conducted using GoToMeeting software, which offers HIPAA compliant web-based videoconferencing and screen-sharing options for virtual meetings. GoToMeeting is a fee-for-service, Internet-based tool that allows the clinician and the client to interact through a shared screen.

All materials utilized during each intervention session were electronic and were presented on the desktop monitors. Materials were accessed through Big Universe, a fee-for-service, Internet-based resource hosting mainstream and customized books.

The intervention sessions were recorded using the embedded audio recording feature of GoToMeeting for the telepractice condition, and CamStudio, a free desktop capture software, for the onsite services. The words and phrases generated on the participants' devices were recorded as text files using the built-in LAM feature within the Prentke Romich devices.

Data Analysis

AAC intervention outcomes were evaluated for the on-site conditions and compared to the outcomes of sessions offered via tele-AAC. Repeated data collection gathered from shared book-reading activities provided information regarding any changes in the target skill.

A variety of procedures were implemented for this single-subject design case study including visual inspection and nonparametric statistical analyses (Horner et al., 2005; Kazdin, 2011; Ottenbacher, 1986). More specifically, nonparametric descriptive measures and percent change were used to compare unprompted and prompted targets generated by the students across stages. The Mann-Whitney U test was used to assess any differences between on-site and telepractice service delivery.

RESULTS

Visual inspection and statistical calculations revealed no significant difference between the number of unprompted and prompted targets generated by participants when receiving services on-site as compared to the matched participants receiving services through tele-AAC.

More specifically, visual analysis of the data gathered for the on-site and tele-AAC cohorts was conducted to determine whether any patterns were evident between the two groups. In general, the participants in the on-site condition and those in the tele-AAC condition demonstrated positive percent changes in the number of unprompted targets produced, and negative percent changes in the number of prompted targets produced from the first to the second session within each week thus suggesting an increase level of independence with respect to the use of the target phrase.

To determine group difference between the two conditions, a Mann-Whitney U test was calculated.

This analysis compared whether one of the two service delivery conditions had larger values than the other. Although comparisons were made with a small n, and relatively small data set, the comparison of the group data is essential to the determination whether or not a telepractice service delivery model is as effective as an on-site service delivery approach. This analysis revealed no significant difference in participant outcome measures between the numbers of unprompted or prompted phrases generated by the participants in either service delivery condition. A comparison of unprompted target generation was $U=148$, $p = .47$ and therefore not statistically significant. A comparison of prompted target production was $U=146.5$, $p = .49$, and was also not statistically significant.

DISCUSSION

The study provided empirical evidence in support of telepractice as a valid and appropriate service delivery method for individuals in need of AAC intervention. Visual inspection and statistical calculations reveal no statistically significant difference between the number of unprompted and prompted targets generated by participants when receiving services on-site versus telepractice. The results suggest that it may be possible for individuals using AAC to receive evidence-based interventions through an on-site or telepractice service delivery approach.

Limitations

There are several limitations associated with this study. This investigation includes a small number of participants who used only one type of device. As such, the ability to generalize the results to other individuals using AAC systems is limited. In addition, this study employed a quasi-experimental and qualitative research design, rather than a more tightly controlled quantitative design, resulting in less experimental control exerted throughout the study.

Maturation is a limitation of this study. The quick succession of stages helps ensure the novelty and challenge of the session goal, but it is inevitable that learning will take place during the course of the study. It is also important to note that the embedded probes were not standardized, nor was there a target number of probes to be completed each session. This,

and the very design of the study, significantly limits the ability to compare individual participants to one another. In addition, pre-determined intervention materials were used to ensure consistency across sessions and students. Therefore, materials were not developed based on each client's interest and preference.

CONCLUSIONS

Although this investigation involves a small number of participants the implications for the delivery of evidence-based AAC interventions to underserved areas are tremendous. As previously mentioned, there is a critical shortage of SLPs with the training and experience in the use and application of evidence-based AAC interventions. By employing telecommunication technologies individuals in need of services can access evidence-based treatments irrespective of their geographical location, and clinicians can maximize time and efficiency by staying in a central location. Furthermore, equipment designed for the individual using AAC, such as The Adjustable J-Mount[©], significantly broadens the tele-AAC candidacy pool by allowing for real-time AAC modeling and service intervention for individuals who may not be literate and therefore dependent on the videographic representation of device navigation.

Future Research
Given the success of this case study in the provision of direct tele-AAC services it is essential that this research strand continue to be investigated. Future research should replicate the existing study to support generalization of the results to a greater number and more diverse group of people using AAC. It is critical that additional research is done to explore different populations using AAC and to examine whether or not differences exist in their receptiveness and success with tele-AAC. In addition, further research must be done to solidify the technological requirements of tele-AAC service delivery.

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