

Technology-Mediated Consultation to Assist Rural Students: A Case Study

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Abstract

Emerging videoconferencing technologies permit face to face communication in a virtual, real time manner so that educational expertise can be shared across geographical boundaries. Although demonstrations of successful use of videoconferencing to share expertise of teachers and related service personnel go back 20 years, the sustained use of technology for this purpose has yet to occur. This paper describes a case study in which consultation was delivered to a special education classroom in a remote region to help develop and implement the IEP for a young child with autism. While there was a clear benefit to the child in this case, collateral technological and programmatic challenges were never fully overcome, thus shortcutting the intended intervention. Issues that must be resolved for families and local education agency personnel to benefit from the expertise of consultants at a distance are discussed.

Since the 1980s, emerging technologies have revolutionized the sharing of expertise in many fields. In health fields, for example, "telehealth" technologies have been embraced for multiple purposes such as sharing of medical records and linking specialists with other health practitioners in order to offer services in areas where access to health care is limited (University of Alaska Statewide Health Program, 2004). In special education, distance education that incorporates various technologies is well accepted and its use documented in personnel preparation programs (e.g., Gruenhagen, McCracken, & True, 1999; Ludlow & Spooner, 2001; Simpson, Yocum, and Blum, 2005). In general education, practices such as videoconferencing are employed to permit face-to-face communication in meetings of administrators at various locations and for students' uses such as "virtual classroom" field trips (Texas Education Agency 'Region 10' Education Service Areas Case Study, n.d.). While these technologies offer the means to expand the expertise available to educators who serve children with developmental disabilities in programs where access to specialists is limited, descriptions of technology-mediated remote consultation that benefits special educators are infrequently reported. This case study describes one such experience.

Demonstration of Consultation via Teleconferencing

Prior to the advent of technologies that permitted face-to-face communication, educators had to rely on experts (e.g., related service personnel) who were willing to travel, often to remote locations, in order to gain the information they needed to improve service delivery for children whose disabilities presented special challenges. Videoconferencing technologies now permit experts and

educators in remote geographic areas to simultaneously see and hear one another, to observe classroom practices, and to consult with parents. Although the availability and reliability of telecommunications systems vary widely across locales, they open up exciting possibilities for consultation and sharing of expertise to help children in remote locations, particularly children with low incidence disabilities who need especially intensive or unusual programs.

In the mid 1980's, special educators at Utah State University demonstrated that consultation could be delivered remotely via interactive television; this technology used the state's newly-installed microwave transmission system that allowed high quality, simultaneous visual and audio communication. Consultation could be delivered in a manner that classroom personnel viewed as feasible and helpful (Stowitschek, Mangus, & Rule, 1986; Stowitschek & Rule, 1987). Moreover, such consultation was economical relative to traveling repeatedly to distant sites (Rule, DeWulf, & Stowitschek, 1988). For example, speech and language pathologists could effectively assess language and provide follow up consultation on language development to preschool service personnel located some 300 miles distant (Pitcher, Rule, Cocklin, Stowitschek, & Swezey, 1987). Between technology-mediated sessions, follow up consultation could occur through the exchange of mailed videotapes and telephone discussion of issues.

Case Study

In 2003, the National Center on Disability and Access to Education (NCDAE) began to further explore the feasibility of offering remotely located supports. The premise was that, given the array of videoconferencing options now available, most areas have access to the

technologies necessary to support videoconferencing. A pilot study conducted with a rural education agency explored using videoconferencing to permit a specialist to interact with classroom personnel to help them develop and implement programs for a young child with autism.

The study addressed a preschool child with autism who lived in an area so remote that his nearest available school was actually across state borders. Through arrangements between his local education agency and that in the nearby state, he was served in a special education preschool classroom for children of mixed ages. The family wanted the classroom personnel, who had no specialized training with young children with autism, to receive expert assistance. This assistance was available from an experienced faculty member at a university in the child's home state; however, the length of time required to travel to the child's home or school meant that even a short consultation took up an entire day of the consultant's time, much of it traveling over dirt roads.

To establish whether it was feasible to assist the child, the faculty consultant made four visits to the family, the local education agency, and the classroom personnel. Agreements were reached regarding the child's individual education program. Still, the problem remained of how to provide sufficiently intensive consultation to assist the classroom personnel in implementing the child's IEP. The faculty member simply could not devote the number of days required to provide adequate assistance by driving repeatedly to the child's school and/or home.

In order to study procedures necessary to implement electronically-mediated consultation, the National Center on Disability and Access to Education, which is located at the faculty member's university, agreed to provide a Polycom® system and technological support to permit consultation via videoconferencing.

Key questions. The NCDAAE sought answers to the following questions regarding technology-mediated consultation:

- Is the technology adequate in most rural areas to support videoconferencing with sufficient quality for a specialist to provide effective ongoing program development for a child with severe developmental disabilities (e.g., autism)?
- What infrastructure is needed for reliable videoconferencing?
- What support personnel are needed to assist specialists and educators?
- What agreements need to be in place between family, school personnel, local education agency, community, and specialists to make remote consultation efficient and effective?
- What costs in technology, support staff educators' and specialists' time are associated with successful remote program development and who will bear those costs?

- What are the primary dimensions of a model for technology-mediated program development for children with developmental disabilities?

The initial procedures in the study were conducted during the faculty member's visits to the school. He established that the local education agency had access to a T-1 line. The school administrator found a place where videoconferencing equipment could be housed and he identified someone who could provide technological support to classroom personnel when videoconferences were scheduled. An NCDAAE staff technology expert provided advice regarding installation and testing the equipment.

Prior to beginning the videoconference feedback sessions, the consultant traveled to the remote location and conducted a day long training workshop with classroom staff. In this workshop, staff was taught how to implement specific teaching procedures with the child. Videoconference sessions were scheduled so that the consultant could provide follow up coaching and feedback to staff on skills that were learned during the initial training. A secondary purpose of the videoconference sessions was to allow the consultant to evaluate the child's performance and make curriculum recommendations. Videoconference sessions were arranged such that the consultant could observe the child as classroom staff implemented the agreed-upon teaching procedures. The staff could see the consultant as they discussed his observations and offered advice. Weekly consultation sessions ranged in duration from 30 to 60 min. During these sessions, the consultant observed one or more of the classroom staff teaching the child. From the beginning, the plan was for the consultant to offer direct feedback and coaching during the course of the observed teaching session. Due to problems with the videoconferencing equipment (the classroom staff was unable to hear verbal instructions from the consultant through the videoconference unit), feedback was limited to the end of the teaching session when classroom staff would contact the consultant via phone and he would provide suggestions about the teaching session just observed. Approximately five consultation sessions were conducted using the videoconferencing equipment over the course of about two months. Technical difficulties were repeatedly encountered, particularly with the audio portion, during each videoconference.

Despite the limitations of the technology, the child made significant improvement over the course of the consultation. Child progress was measured via data collected by classroom staff during teaching sessions and summarized and presented orally or via email to the consultant. Even though some measure of child success was achieved via the consultation, the anticipated benefits of technologically-mediated consultation were not fully realized. As discussed below, the reasons may offer guidance to those who wish to harness these technologies for this purpose.

Findings

Despite the expectations of family, local education agency personnel, consultant, and a technology expert that the consultation was technically feasible and that there was mutual understanding of the expectations of the consultation outcomes, the necessary infrastructure was not in place for a successful experience. We briefly address each key question below.

Adequate technology and infrastructure. The infrastructure that initially seemed adequate to support videoconferencing using a Polycom® system did not prove sufficient. As mentioned, the consultant needed to be able to see and hear the adult and child in the classroom with reasonable clarity and to talk to the classroom personnel. Polycom® systems can permit such interactions under the right conditions. However, while the district's access to a T-1 line initially seemed adequate to transmit high quality audio and video signals, the incorporation of the Polycom® system into the school's network introduced bandwidth limitations. These could not be easily fixed because of the established network configuration at the remote site. Thus, audio and video quality were affected. While video images of poor quality were an annoyance, the consultant could observe most classroom interactions clearly enough. For example, he could see whether the child displayed repetitive motor behaviors or was non-compliant. However, the unreliable and low quality audio signal prevented him from understanding the verbal content of the adult-child interactions and talking with the classroom teacher and assistant.

Technology challenges are not unique to this study. In using videoconferencing to observe preservice teachers as they administered reading assessments, Pemberton, Cereijo, Tyler-Wood and Rademacher (2004) reported transmission barriers including firewalls that required negotiation with local education personnel. Clearly, when conducting consultation via videoconference, considerable pilot testing is needed to ensure that technology that theoretically *should* work actually *does* work under the specific conditions that will be encountered. Pilot testing should assess dimensions such as minimum transmission rate, signal consistency and quality at different times of the day, and the availability of equipment at varying times when consulting might be scheduled.

Support personnel. In this case, the NCDAAE provided a technology support expert who assisted via telephone and videoconference in addressing technology issues. He conferred both with the consultant and with a school staff member with technical expertise who was to assist classroom personnel. However, given the multiple demands on the school staff member's time, it was not feasible for him to make network changes and support all consulting sessions, especially when technological difficulties arose. Having an expert at both ends to set up the equipment and to conduct a pilot session was insufficient to support the consultant and classroom personnel during subsequent sessions. To assure a successful consulting experience, it is necessary that

technical support personnel are available as needed, preferably at the beginning of every consultation session.

Agreements between family, school personnel, local education agency, community, and consultants. This case study identified several levels of agreement that need to be in place before undertaking technology mediated consultation. These would vary, of course, according to factors such as the scope of consultation, length of the consulting arrangement, and desired outcomes.

In this case (and, indeed in all such cases), the initial and most important agreement was the child's individual education program (IEP) and those aspects in which classroom personnel needed support. The family and school personnel negotiated the IEP. In this case, the process was somewhat complicated by the fact that two local education agencies were involved—the district where the child lived and the one that was contracted to deliver service. Inserting a consulting arrangement to implement the IEP added a complication to an already complex and somewhat vague contractual arrangement between the two LEAs. In essence, it became clear that, if a consultant is to assist school personnel, an agreement about (a) the desired outcomes for the child, (b) the role and authority of the consultant in suggesting classroom procedures and changes, (c) the scope of changes that classroom personnel are willing and able to undertake, and (d) the needed administrative support for making the recommended changes are fundamental to a successful outcome. At the outset, a process should be agreed upon to address issues that may arise when the consultation is underway. As the child's knowledge and behavior changes over time, the classroom personnel will need to change teaching strategies. Thus, regular and frequent communication is needed to assure that expectations are adjusted regarding the consultant's role and the amount of support required to maintain the child's progress.

The second necessary prior agreement has already been discussed—agreements about the technology equipment and ongoing space and support for the technology-mediated consultation. In this case, consulting sessions took place in a multi-use space which could not always be dedicated to consulting. When space or availability of equipment is at issue, it may be possible to look to the broader community for resources. For example, other community agencies may have the necessary equipment. Clinics that use telemedicine, for example, may be able to make the equipment available to the school for scheduled consulting sessions. In such instances, some other form of technology might be used between sessions to support the consulting arrangement. For example, videotapes of classroom sessions might be mailed in advance to the consultant for his or her assessment of child progress; these would provide the information necessary for the consultant to make appropriate recommendations for changes. Telephone conversations might suffice to address simple issues.

Costs in technology, support staff, educators' and specialists' time and who pays. In most consulting arrangements, costs are borne by the local education

agency. Because in this study the equipment was furnished by NCDAE, its purchase was not at issue. However, that issue would need to be resolved before other issues were considered. Costs of usage (i.e., cable lines, satellite costs, DSL lines, etc.), if any, as well as purchase of equipment must be determined. Purchase of dedicated equipment may not always be advisable, especially if it cannot be thoroughly tested before it is purchased. As already suggested, other agencies in the community—such as hospitals or vocational rehabilitation offices—may have teleconferencing equipment that could be used on a courtesy or on a fee-for-service basis.

Likewise, the cost of personnel must be assessed. If the education agency can make a technology specialist available, the costs are in-kind. Sometimes support may be available for specific tasks at reasonable cost. For example, high school students may be able to operate equipment and problem-solve, once systems are set up and tested. Finally, consulting fees must be negotiated. In this study, the NCDAE supported those.

What are the primary dimensions of a model for technology-mediated program development for children with developmental disabilities? This study identified five primary dimensions of a model: Administrative infrastructure, technology infrastructure, personnel, costs, and evaluation.

- Administrative infrastructure: Consultation efforts require that goals be identified and decisions made about support systems, ongoing project monitoring, and decision-making. Someone must be accountable for the project and have the authority to contract with other parties involved such as families, local education agencies, teachers and consultants.
- Technology infrastructure: As discussed above, the type of technology that best fits the local context must be identified, installed at each site, and maintained.
- Personnel and staff: Personnel must be identified and prepared for their respective roles and ongoing supervision arranged. Also, a forum for problem solving must be arranged and include all active participants.
- Costs: Planning for the full range of costs is critical to a consultation effort. These include initial procurement of the technology, installation and operation, technical support staff, consultant, education agency personnel, and materials.
- Evaluation: Evaluation is critical in any intervention model. Its scope may vary considerably. However, several elements are essential. First, evaluation data are needed with regard to the student's progress (or lack thereof). Second, evaluation might include an assessment of the fidelity with which the intended

teaching and intervention procedures are actually implemented; this includes consistency in the conduct of sessions, how carefully procedures are followed, and the extent to which key participants are involved as planned. Third, the extent to which stakeholders are satisfied with the effort should be assessed. Finally, costs should be evaluated and, if possible, whether child outcomes are maintained over time.

Summary

This study focused on the role of technology in supporting remotely-delivered consulting for a child with severe disabilities. To summarize lessons learned in formulating model components, we found that a number of agreements must be forged to promote the successful use of technology-mediated consultation. Family, school personnel, and specialist must agree on the desired outcomes and on the process (objectives for child, roles in implementing specialist's recommendations, and frequency of communication between all parties). Three lessons seem paramount:

- The technology must be tested in the specific intended location and times of day before finalizing consulting agreements. Limitations such as bandwidth may interfere with quality and reliability of videoconferencing and these may not be initially apparent unless extensive testing is conducted in realistic conditions;
- Technical support personnel must be available at both ends for each videoconference session; and
- There must be a clear understanding among all parties (preferably in writing) about the roles, responsibilities, authorities, and support systems to be used in the consultation process and on the intended outcomes.

To permit successful consulting, travel to meet family, agency personnel, and the child is necessary. However, this travel can be substantially less than it would otherwise be were consultation delivered live (i.e., face to face). From this study, we learned about technological components that can mediate consultation. As other related consultation issues (e.g., Dinnebeil, McInerney, Roth, & Ramaswamy, 2001; Gable, Mostert, & Tonelson, 2004; Greenwood, Arreaga-Mayer, Utley, Gavin, & Terry, 2001; and McWilliam, 1995) are extensively addressed elsewhere in the literature, they are not discussed here.

This study clarified some of the issues associated with technology-mediated consultation. Addressing these before engaging in a consulting effort should contribute to successful outcomes for rural special educators and students with significant disabilities.

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