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# Portable data assistants: Potential in evidence-based practice autism treatment

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ABSTRACT

The emerging era of "evidence-based practice" emphasizes that human service agencies need to find effective and efficient means of training staff and implementing systems change based on scientific evidence. Additional advancements in technology use across populations and settings within the field have also served as a catalyst for the development of contemporary staff training techniques. Therefore, the purpose of the current study was to train management-level staff employed at an agency for individuals diagnosed with autism spectrum disorders to collect agency-wide data using personal digital assistant (PDA) data collection systems.



Many human service fields promote the use of "evidence-based" practice (e.g., evidence-based education, healthcare, medicine, rehabilitation, social work) with definitions revolving around the same central theme of implementing effective interventions based on rigorously, scientific research and professional wisdom (Blom, 2009; Bodner, 2007; Individuals with Disabilities Education Act, 2004; National Registry of Evidence-Based Practices and Programs (NREPP), 2009; No Child Let Behind Act, 2001; The Wing Institute, n.d.; Whitehurst, 2003). As a result, evidence-based practice requires human service organizations to empirically measure treatment progress, reliability, fidelity, and maintenance which, while serving numerous clients and employing additional staff, can be a daunting task. Typical methods by which to gather such information involve numerous data sheets, client files, and physical space for record keeping. Furthermore, in an era of governmental, environmental awareness (US Department of Health & Human Services, 2009), behavior analysts may be at the forefront of implementing organizational contingencies to reduce their ecological footprint (Merkel, 2003).

While many sectors of the medical community integrate new technology into the workplace, other human service industries often delivering behavior analytic services lag behind. Not only are new technologies (e.g., personal digital assistants, PDAs) used daily within the medical community but their benefits have been empirically recognized through numerous research efforts. For example, the use of PDAs by medical professionals and patients has shown to increase data collection accuracy and data receipt (Walker et al., 2004), and decrease the duration of data entry (Lal et al., 2000) and data transfer (Rivellese et al., 1991). Altogether, these findings support the need for practicing behavior analysts to accept technology as a help rather than a hindrance in their daily practice. Applied Behavior Analysis has entered an age where evidence-based practice includes not only empirically based *treatments* but empirically based *data collection methods*, as well.

Emerging in the behavioral literature are increasing numbers of research articles that have begun to integrate modern technologies into behavior analytic research settings. For example, Heal and Hanley (2007) used handheld computers to

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collect 10-s interval data on two of four preschool participants exhibiting undesirable behavior. Additionally, Thompson and Iwata (2007) used handheld computers during functional analyses to collect data on the frequency of problem behavior of 12 adult participants diagnosed with severe to profound mental retardation. Using handheld computers equipped with the packaged software program !Observe©, Tarbox, Tarbox, Ghezzi, Wallace, and Yoo (2007) also collected data on the object mouthing of two boys diagnosed with autism.

While technology *can* be superior to paper and pencil systems within behavior analytic settings, one must realize that computer hardware (e.g., the PDA, the laptop, the desktop) can only be as good as its software (e.g., the data collection program). As Malott (1984) stated about the development of teaching machines, "good software is hard to come by" and may require a "tremendous amount of work" and "more talent than most people have" (p. 54). Although Malott offers completely valid points for the time, recent resources for customizing software to meet the specific needs of human service agencies are now feasible (Dixon, 2003; Jackson & Dixon, 2007; MacLin, Dixon, & Jackson, 2007).

A number of technical reports and publications by Dixon and colleagues (Dixon, 2003; Jackson & Dixon, 2007; MacLin et al., 2007) have provided the specifics for creating customized data collection systems for desktops, laptops, and PDAs using the programming language of Microsoft® Visual Basic. These resources allow researchers and practitioners alike to create and utilize their own data collection systems for functional analyses, match-to-sample programs, relational responding and contextual control programs (e.g., Becky, Mark, & James, 2010; Hoon, Dymond, Jackson, & Dixon, 2008a; Hoon, Dymond, Jackson, & Dixon, 2008b; Nastally, Dixon, & Jackson, in press), complex schedules of reinforcement programs (e.g., Dunkel, 2008; Jackson & Dixon, in press; Pozzie, 2007), and practically any other observation across a variety of behavioral dimensions.

Perhaps the reason, since several likely causes are at play, why the application of such technology is lagging behind the potential is a failure to construct effective staff training programs to allow for ease of application of computerized data collection. To date, Organizational Behavior Management researchers have identified a number of behavioral skills training variables related to the successful integration of basic computer technology into agency and industry work places (Godbey & White, 1992; Karlsson & Chase, 1996; Mankin, Bikson, & Gutek, 1984). However, even more technologically advanced staff training methods, such as video modeling (e.g., Moore & Fisher, 2007; Lavie & Sturmey, 2002), may be necessary to increase the effectiveness and efficiency of training staff to use newer technologies. With Organizational Behavior Management researchers having had such significant impact and contribution to services for individuals with disabilities (Sturmey, 1998), it was the purpose of the current study to extend this impact by implementing a tech-savvy method of training management-level staff to collect agency-wide data using personal digital assistants (PDAs).

## 1. Method

### 1.1. Participants

Three management-level staff working at an agency for individuals diagnosed with autism spectrum disorders served as participants in the current study. All participants were responsible for supervision and training of approximately 50 direct-care staff including teachers, aides, and vocational coaches. Susan was a school program coordinator and had never used a PDA prior to the study. Natalie was the school behavior intervention team leader and also had never used a PDA prior to the study. Doyle was a school program coordinator and had used a PDA everyday for more than 2 years.

### 1.2. Materials

The personal digital assistant (PDA) used in the current study was an Archer Ultra-Rugged PDA from Juniper Systems, Inc. (see Fig. 1). This PDA meets all standards for being shock-proof, waterproof, debris-proof, and temperature-proof (Juniper Systems, 2009). Each PDA was equipped with the *Autism Extension Services Task Analysis Program* (*AES TAP*) created by a behavior analysis graduate assistant using Microsoft® Visual Basic 2007. The *AES TAP* allowed observers to collect data on a variety of behaviors of both staff and clients (see Fig. 2). The task analyses targeted during the current study included staff implementation of Behavior Management Protocols (BMPs) outlined in Table 1 (i.e., Choices, Escape Extinction, Premack Principle, Prompting, and Redirection). Paper BMP task analyses were used during baseline assessments. A total of 25 videos of agency staff implementing the 5 BMPs were created by the first author and scored by two independent observers to create a Reliability Key. The *Data Collection with the PDA Trainer* was a Microsoft® PowerPoint presentation created by the first author and included information on the potential and importance of PDAs, screen captures and diagrams of how to use the PDA and *AES TAP*, information on becoming a reliable data collector, and operational definitions with video screen capture examples of each step in each of the BMPs. The *Data Collector Requirements* contract outlined the mastery criterion for PDA Use (i.e., 100% accuracy) and Reliability (i.e., at least 80% Reliability for each BMP) before each participant could become a primary data collector. The *Time Tracker* data sheet was used to collect self-report duration data of the number of minutes spent with the PDA and *Data Collection with the PDA Trainer*. Additional materials included a Toshiba Satellite laptop equipped with Windows® Media Player to view BMP videos and SOTI Pocket Controller-Professional software to create and view screen captures.

### 1.3. Setting

Assessments were conducted in the agency's school speech booths (2.1 m × 2.1 m) which included desks, chairs, and shelves. Trainings were conducted in the participants' offices at the school which included desks, chairs, cabinets, and