

## Assistive Technology Outcomes: Implementation Strategies for Collecting Data in the Schools

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**Abstract:** While the importance of measuring the outcomes of assistive technology (AT) is well documented, less information is available about how outcome data collection can be integrated into daily professional practice. The metaphor of a snapshot provides an intriguing method for thinking about the collection of AT outcome data. The purpose of this article is to summarize recent work by staff of the ATOMS Project to analyze four strategies that have been designed to collect AT outcome data in schools. A brief description of each strategy is provided along with an analysis of the pattern of snapshots revealed through each form of data collection. The implications of this work for future AT outcomes data collection systems in schools will be explored.

**Keywords:** Assistive technology outcomes in schools; Data collection snapshots; Models of data collection; Implementation issues associated with assistive technology outcomes

While the importance of measuring the outcomes of assistive technology (AT) is well documented (DeRuyter, 1997; Fuhrer, Jutai, Scherer, & DeRuyter, 2003), less information is available about how outcome data collection can be integrated into daily professional practice (Armstrong, 2003; Laskarewski & Susi, 2003; Reed, Bowser, & Korsten, 2002).

Although the word “outcome” has a sense of finality to it, when looking at the effect of AT on a person’s life, the reference to a final end-result is somewhat misleading. Often a person with a disability will use a system of AT that will change, be updated, and re-examined, as

the person’s needs, their tasks, and their environments change.

The analogy of a snapshot is helpful to consider when discussing AT outcomes (Fennema-Jansen, 2005). A snapshot provides powerful evidence (i.e., data) about what is going on in the life of the child, where they are, who they are with, and what they are doing. Obviously, if you take 10 snapshots in a day, you have a more complete picture of the child’s life than can be discerned from a single snapshot.

Likewise, snapshots taken over time allow viewers to gain a perspective on the use and influence of AT. For example, one can take close-up shots to examine finer aspects of technology use (e.g., how many words does the child combine to construct a sentence on her communication device?). Or, a person can use a wider angle and look at the influence that the technology has on a student’s roles and relationships. We can also take pictures in different environments to see the effect of the technology at home, school, church, park, or grocery store. On the other hand, the pictures professionals take might look different from those snapshots taken by the child’s parent, teacher, or friend. Their snapshots might focus on different things, use different angles than we would, or be taken at times of the day that we might not consider.

The snapshot analogy emphasizes the importance of looking at AT outcomes at many points in time, from many perspectives, in different environments, and considering the perspective of all of the important stakeholders. While the student remains the

primary focus within each picture, determining how, when, and where to take the snapshots are critical questions. In addition, attention must be devoted to developing a method for organizing and sharing the snapshots.

The purpose of this article is to summarize recent work by staff of the ATOMS Project (<http://www.atoms.uwm.edu>) to analyze four strategies that have been designed to collect AT outcome data in schools. A brief description of each strategy will be presented. Particular emphasis will be placed on understanding the pattern of snapshots revealed through each form of data collection. The implications of this work will be explored for future AT outcomes data collection systems in schools.

### **Survey of ATO Data Collection Systems**

The snapshot metaphor (Fenemma-Jansen, 2005) raises provocative questions about the nature of AT outcome (ATO) data collection efforts. Whereas the literature provides little information about the types of ATO data collection systems currently used in K-12 schools, the ATOMS Project staff assembled a list of four strategies that have been implemented by schools in efforts to address questions of AT outcomes. In the first section we provide a descriptive overview of each ATO data collection system. In the next section, we analyze the patterns of ATO snapshots that are revealed through each strategy.

#### *Assistive Technology Infusion Project*

The Assistive Technology Infusion Project (ATIP) is a large-scale project funded by the Ohio Department of Education to disperse \$9.2 million dollars of support to purchase AT and measure the outcomes in terms of access and participation in the general curriculum.

Individual schools applied for funding on behalf of an individual child using a web-based application system. Applications were reviewed and ranked by three individuals. Awards were made based on a qualifying score. In four phases of funding during 2001 - 2003, 3,479 awards were made. Award recipients were required to provide follow-up and outcome data on a specified schedule. Outcome measures were specially designed web-based instruments that assessed progress in the general curriculum and IEP goals.

ATIP has produced wealth of K-12 AT outcome data. While preliminary analyses are still being completed (<http://www.atoms.uwm.edu>), the ATO data has provided insight on the contribution of AT to improve outcomes concerning participation and progress in general education, achievement of IEP goals, performance on state assessments, and graduation rates.

#### *GoalView*

GoalView is a commercial Individual Education Plan (IEP) web-based product that is designed to facilitate the development and monitoring of student IEPs. As a leading vendor in electronic IEPs, GoalView has been widely implemented across the U.S..

GoalView does not specifically address the measurement of AT outcomes. However, the company supports district adoption by providing customized features. Kenosha Unified School District (Kenosha, WI) is in the process of adopting and implementing GoalView as the standard IEP development tool. Their strategy is to collaboratively implement customized prompts related to the consideration of AT and subsequent collection of AT use and impact data.

Linking ATO data collection to the IEP is a powerful strategy since it logically aligns instructional planning with outcome

measurement. It also eliminates the need to collect redundant data (e.g., student age, disability, instructional goals) as is required in stand-alone ATO data collection systems. In addition, it provides a single source for locating aggregate information about the number of students using AT or specific information about which students use a particular type of AT device. Finally, storing ATO data in the standard IEP system provides a means for archiving current and historical data.

### **AT Assessment Trial Data**

It is commonly expected, as part of AT best practice, that AT providers will collect trial data as part of an initial AT assessment process. However, little information is available about how often this expectation is actually implemented nor what the trial data reveal.

One example of an easy-to-use end-user AT assessment database is found in the literature (Laskarewski & Susi, 2003; Susi & Laskarewski, 2003). The authors describe the Filemaker Pro-based database as an essential tool for AT decision-making. The database is designed as a case management tool that allows users to track individual students and record the device that was used, and the trial data that was collected. Built-in search tools allow the user to locate information by student, date, device, etc. The product has been used in many school districts in Connecticut and North Carolina in a consultant-support model.

Routine collection of AT performance data, both in trial phases and over time after adoption, has important implications for ATO data collection. The advantages of end-user customization may be offset by the lack of a centralized multi-user database (silo vs. multiuser). The underlying assumption of this model involves designating responsibilities for

ATO data collection to a single individual who will then monitor the data and prepare reports as necessary.

### **Year-End AT Device Loan Survey**

AT loan banks often utilize a consumer satisfaction survey to gather data about the use of specific AT. One district, Kenosha Unified School District (Kenosha, WI), distributes a year-end survey to all staff that have utilized AT devices through the district's loan bank.

The most recent survey was a three-item open-ended paper-based survey. The instrument solicits information on how often the device was used by the student, whether or not the device contributed to student progress on IEP goals and objectives, and a description of any unanticipated outcome (positive and/or negative) that resulted.

The survey results are compiled annually and reviewed by the AT staff and district administration. Outcomes can be examined by AT device, disability, or grade level. At this point, the survey illustrates a developmental process in moving an organization along in its efforts to address the questions of AT outcome. Without demographic information (e.g., AT device, disability, grade level), this approach to ATO is perhaps best considered as formative program evaluation. However, it also illustrates a developmental process in moving an organization along in its efforts to address questions of AT outcomes.

### **Analysis of the Snapshot Data Produced by Each Strategy**

The previous section described four recent school-based efforts to collect AT outcome data. The variety of implementation strategies illustrate that each agency has developed a system for collecting ATO data that makes sense to them in an effort to answer

important questions. In this section, we seek to analyze the types of ATO data snapshots that are obtained through each approach.

In early work on measuring AT outcomes in schools, Silverman, Stratman, and Smith (2000) created a framework known as “Continuum of Assessment in Assistive Technology.” This theoretical framework was developed in an attempt to define the phases of data collection associated with AT service delivery in schools as a means of profiling the specific or general function of AT outcome measurement instruments. The framework was based on the following sequential phases of AT assessment: screening, referral, comprehensive assessment, matching person and technology, acquisition, implementation, follow-up, and educational impact.

For the purposes of understanding how the four different ATO data collection efforts might yield different patterns of snapshots, we utilized the framework created by Silverman et al. (2000). As illustrated in Figure 1, the phases are represented as columns and the models of school-based ATO data collection are represented as rows. A “yes” response is placed in a cell if the model yields outcome data in that specific phase of the process.

The data in Figure 1 indicate that the four school-based ATO models yield very different patterns of snapshots. Of the four approaches, the Assistive Technology

Infusion Project (ATIP) produces the most comprehensive sequence of outcomes snapshots. GoalView is also a solid ATO data collection strategy but has noticeable deficits in the areas of screening for the need for AT and factors associated with matching the person and technology. The Trial Data and Year-end Loan Survey provide contrasting snapshots (beginning vs. end of the process) and seem to suggest only a glimpse of the total picture by capturing snapshots in only three of the eight possible data points.

**Discussion**

Given the lack of information in the literature about strategies for implementing AT outcomes data collection, ATOMS Project staff identified four different ATO outcome systems currently used by schools as part of their local efforts to collect ATO data. A brief description of each model was provided to illustrate where the model is being implemented and the basic elements of data collection that are utilized. A framework created by Silverman et al. (2000) was then used to analyze the various types of ATO snapshots generated by each outcome system.

The findings indicate that the metaphor of a snapshot has potential value in understanding the nature of ATO data produced by different initiatives. The results suggest that comprehensive models like ATIP and GoalView provide more snapshots than

**Figure 1. Pattern of data snapshots produced by each model of AT outcome data collection.**

Model	Screening	Referral	Comprehensive	Matching P&T	Acquisition	Implementation	Follow-up	Educational Impact
ATIP		Y	Y	Y	Y	Y	Y	Y
GoalView		Y	Y		Y	Y	Y	Y
Trial Data	Y	Y			Y			
Loan Survey						Y	Y	Y

focused models like Trial Data, and Loan Bank Survey that yield a smaller number of snapshots in a narrower range of phases of the entire process. Therefore, comprehensive models that produce more snapshots over time may be more helpful in answering outcome questions than ATO data collection models that produce only a few snapshots within a short period of time.

It should also be noted that while the pattern of snapshots produced by ATIP are notable, it is important to point out that the entire data collection enterprise is at risk, in the context of being developed through grant funding, if the system cannot be subsequently institutionalized. As a result, in the current pilot study, the potential value of integrating AT outcome measurement into the IEP system appears to be particularly promising method of creating and archiving a comprehensive collection of ATO snapshots.

### **Future Research and Practice**

The results indicate a considerable range in the types of snapshots generated by various AT outcome data collection systems. Additional research is warranted to understand the various patterns that emerge from different ATO data collection systems. For example, when do snapshots need to be taken? How many pictures are needed? From what angle? In what environments? Can snapshot protocols be standardized for all forms of AT or must the data collection timeline and procedures be customized for classes of technology (e.g., mobility, communication, learning)?

While the purpose of this project was not to conduct a comprehensive review of school-based ATO data collection efforts, it represents our initial efforts to explore the notion of ATO data snapshots. Subsequent research should focus on state and national surveys to assess the variety of ATO data

collection efforts currently being implemented.

The analysis framework to organize the snapshots produced by the four ATO models should also be subjected to additional research. However, for the time being, this framework may be useful to practitioners as they begin developmental initiatives to assess AT outcomes.

Finally, the snapshot metaphor and subsequent development of snapshot theory appears to hold promise as a key construct in AT outcomes research. While the current project focused on issues of when and how many snapshots might be taken, additional work is needed to focus on issues of storing and utilizing ATO data snapshots. For example, the term, “digital shoebox,” is currently used to describe an array of software and web-based products designed to organize and archive digital pictures (An updated extension of the old practice of simply storing family photos in a shoebox.) However, it is important to note that AT outcomes research will not be advanced by efforts that simply produce random collections of pictures. Rather, we need purposeful albums in which snapshots are organized. This line of inquiry may be facilitated by emulating professional practices associated with x-ray and Magnetic Resonance Imaging (MRI) protocols that standardize the time, sequence, and focus of snapshots. Similarly, research and professional development efforts will be required to enhance the ability of practitioners to interpret ATO snapshots.

### **Outcomes and Benefits**

The purpose of this pilot project was to gain insight into four different efforts that school-based leaders have implemented to gather data concerning the outcomes of AT. It is important to view such efforts as essential, but developmental, in terms of advocacy and

leadership in moving the profession along a continuum of evidence-based practice.

The results of this project suggest that the metaphor of snapshots is a practical means of considering when and how to capture ATO data. However, there is much still to be learned. As a result, professionals and practitioners can continue the dialogue and make important contributions to professional practice by exploring the use of snapshots at many points in time as students are completing many different performance tasks with their AT.

While initial research and development efforts are likely to focus on practical issues of when, where, and how to take ATO snapshots, as snapshot theory evolves, considerable attention must also focus on methods of organizing, sharing, and interpreting the data obtained through data snapshots. The ultimate purpose of this work is to improve data-based decision-making about the outcomes of AT (Edyburn & Smith, 2004).

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