

The Value and Limits of Automated Data Logging and Analysis in AAC Devices

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ABSTRACT

Some AAC devices can collect client-generated language samples. Using such data can help inform decisions about intervention but this must be done with caution because such data has limitations. This paper highlights such limitations while demonstrating the value that can come from logging and analysis.

SUMMARY

Automatic data logging is a feature of some voice output communication aids. Such data can be useful in providing clinicians with information on how a client is using a device and, more importantly, how well that client is using it to communicate effectively. There are limitations to the data, which include;

- a. Absence of input from communication partners
- b. Absence of any multi-modal elements.
- c. Absence of social/geographical context.
- d. Need to mark explicitly if someone else is using the device for modeling/teaching.

Given that these limitations are recognized, it is still possible to use the information in a fruitful and constructive way. For example, one simple measure of AAC use is to count words used, which can give an idea of an individual's knowledge of the lexicon available to them in their AAC system. Another is to measure the time period between linguistic events so as to get an idea of communication rate. A third may be to look at the type of words being used and determine the spread of different parts of speech.

However, it is important to note that automated data collection in of itself is NOT evidence-based practice but should be seen as "a technique to use evidence of SGD use in clinical practice (Higginbotham and Golinker, 2008)." Its value is that it can provide longitudinal data that face-to-face observation and third-party oral reports cannot capture. Careful analysis of the data along with being aware of the limitations mentioned above can lead to better informed practice.

More and more studies are using data logging to support intervention strategies and client improvements (c.f. Cross, 2004; 2005; Hill, 2003; Tullman and Hurtubise, 2000), and attempts are being made to find some common standards in device operation measurements (Higginbotham, Leshner & Moulton, 1999). Pioneering work in supplementing simple data logging with contextual support tracking has been undertaken by the Rehabilitation Engineering Research Center (RERC) c.f. Higginbotham and Engelke, 2013), which could lead to more comprehensive methods for measuring aided communication.

Once data has been collected, the findings have to be processed either manually or by an automated process. These include SALT (Miller and Chapman, 1983), AQUA (Leshner, Moulton, Rinkus, and Higginbotham (2000), PERT (Romich, Hill, Seagull, Ahmad, Strecker, & Gotla, 2003) and QUAD (Cross, 2010).

A new web-based automated data analysis software has been in beta test for nine months. The system allows for the uploading of a log file to a secure server, where it is parsed in a number of ways to as to present summary data in the form of a visual dashboard to a clinician. The system does not provide any interpretation but rather makes the data easier to inspect and investigate For example, a basic weekly calendar arrangement in the center of the screen shows the time periods when a client's AAC device is being used and the time periods when it is being used more or less than any other. By clicking on any half-hour time period on the calendar, the clinician can then see, in a second window, the actual words being used. There is also data available on the time period between words, which gives an indication of communication rate.

The nearest the system comes to making comparisons is with a feature that matches the words used by the client against a database of high frequency words found across a number of AAC vocabulary studies (e.g. Balandin and Iacono, 1999; Banjee, DiCarlo & Stricklin, 2003; Clendon, Strum & Cali, 2013, and Fried-Oaken and More, 1992).

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