Assistive Technology Outcomes and Benefits
Volume 10, Summer 2016, Volume 1 pp 38-50
 ISSN 1938-7261
Available online: www.atia.org/atob

Multiple Means of Measurement: Tools for Collecting and Analyzing Evidence of Student Progress

Christopher Bugaj
Loudoun County (VA) Public Schools

Beth Poss
Montgomery County (MD) Public Schools

Abstract

Evidence should be the guiding factor for educational practices before, during, and after the implementation of technology. Evidence about student performance can come from a variety of sources including images, video, audio, work samples, and both formative and summative assessments. Once the raw evidence has been compiled, educators must analyze and synthesize the information into a product that is consumable and comprehensible to everyone involved in the decision-making process.

Affordable, efficient, efficacious, and easy-to-use tools are available to streamline the evidence collection process. Contemporary visualization tools and techniques for effective representation of the evidence show how change has or has not occurred following the implementation of assistive technology. Implementation of these tools can transform the decision-making process into one that consistently and confidently uses reliable evidence to inform instruction when implementing assistive technology.

In considering the use of assistive technology as a tool to improve access to curriculum and support the attainment of proficiency toward educational standards, evidence needs to be collected to determine the efficacy of the tool being used. While evidence may be collected on a student's use of a tool, what actually needs to be measured is the student's demonstration of proficiency toward the standard or learning objective. Evidence needs to be collected to measure growth as a means of evaluating attainment of skills and knowledge. The same tool used to demonstrate the attainment of these skills might be used for a range of students, including those with disabilities, for whom the provision of the tool is documented in an Individual Education Plan (IEP), and those without disabilities, who are simply provided access to the tool as a part of a Universally Designed for Learning classroom.

"Not everything that counts can be counted and not everything that can be counted counts." - Albert Einstein

Keywords: data, assessment, technology

Introduction/Background

The Individuals with Disabilities Education Improvement Act (20 USC §1400 et seq., 2004) requires public schools to monitor and document a student's progress towards mastery of annual goals outlined in the Individual Education Program (IEP) When student work is primarily done via pencil and paper, data collection and teacher feedback to students is also typically limited to pencil and paper. Tests are scored, graded and marked with number of correct items over total number of items (e.g., 20/25) on the top of the paper, while essays are marked with the infamous red pencil. Special education teachers learn creative ways to keep hash marks to track observable behaviors to measure progress. Educators using this methodology make anecdotal notes accompanying the tally marks to complement the quantitative data with qualitative or descriptive information. Student work samples might also be collected and analyzed, depending on the goal. Quarterly, at a minimum, the educator reviews the data and writes a progress note describing the current state of evidence that has been gathered along with how the student is progressing toward the goal. However, with the advent of 21st century schools moving toward paperless classrooms and the expectation for increasing amounts of student work to move from paper to digital formats, data collection has evolved as well. Today's educator has the means to use software programs and other digital tools that collect student responses for analysis by the educational team or through the software capabilities. What has not evolved consistently, however, is educators' and administrators' understanding of the ways that technology can be used to collect and analyze data in order to track student progress with greater efficiency and increased consistency.

This article examines ways that special and general education professionals can track student progress toward the standard as a means of collecting information to make decisions regarding instructional practices and methodologies, including the use of assistive and instructional technology. The student is the source producing endless amounts of data. Multiple means are used to capture and gather those individual elements of data (see Figure 1).

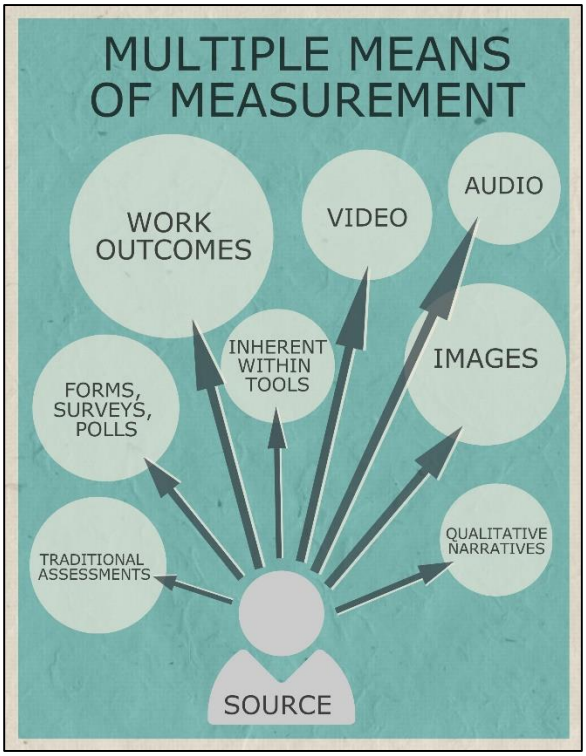


Figure 1. The student is the source producing endless amounts of data

Target Audience

This article is intended to aid educators, including special and general education teachers, therapists, assistive technologists and administrators, in examining methods used

currently to collect data, and in reflecting on ways that would improve this process. Educators who value quality of data, as well as being able to collect it in an efficient and effective manner, will find a host of tools and strategies to apply to their individual needs throughout the article.

Why Digital?

For many educators, development and maintenance of an accurate data collection system is a complex, arduous task. In contemporary education, rarely does a single educator work on a single goal with a single student. Typically, educators are working with multiple students who are working on multiple goals which necessitates multiple data sheets. Multiple educators collecting data on the same goals for a student can be problematic as methodologies differ among educators. In some cases, the task of collecting unique data targeted to the goal may prove to be too difficult. In these cases, when the time comes to analyze the evidence, teams find themselves relying on test scores and work samples alone rather than a robust, multimodal, comprehensive conglomeration of data. Using only this small set of inputs makes it difficult to develop accurate decisions about future instructional practices based on real, purposeful evidence. In the absence of robust evidence, there is a possibility of teams making decisions based on intuition and perceptions alone.

Gathering evidence through digital means has multiple benefits (Zimmerman, 2008). Adoption of a digital means of data collection supports a more consistent and streamlined process for the educators working with an individual. When every educator working with a student uses the same tool, such as a form or survey, the information being collected is more uniform from the onset and then can be more easily analyzed. Generation of a digital system also helps the educational team provide an opportunity for more immediate and interspersed analysis of the evidence. Data collected in a central, digital repository accessible to multiple parties allows any member of the educational team an opportunity to examine the breadth of evidence whenever necessary, as opposed to being limited to quarterly reviews. Administrators also can review the evidence collected to make inquiries about the frequency, amount, location, and duration of events related to the collection of data. Finally, digitally collected evidence provides more immediate feedback for students, who can reflect on their own work through the feedback shared by teachers. This increased access to real-time, on-demand data helps to increase the fidelity and transparency of the educational impact of instruction for a student. Digital collection methodologies also make it easier to use data visualization tools and resources to aid in the consumption, analysis, and understanding of the evidence. Quantitative and qualitative forms of digital media can be combined to formulate comprehensive, yet comprehensible, reports which more accurately represent the progress of a student.

Tools and Methods for Digital Evidence Collection

Recording Evidence

<u>Screen Capture</u>

Most electronic devices contain a methodology for capturing an image of the screen. On Windows-based computers, a user presses the PrntScr button to copy whatever is on the screen to the computer's clipboard. The user can then paste that screenshot into a document or file. Student work samples can be taken using screenshots to create an archive of accomplishments. For example, if using an online tool, students might take a screenshot of a final score and save that image in an ongoing journal or portfolio. These screenshots can

then be analyzed over time for patterns, trends, discrepancies, and/or improvements. Other static screen capture tools include the Windows Snipping Tool, pressing both the Home and Power buttons on iOS devices, and using the Command + Shift + 4 keyboard shortcut on a Macintosh computer.

Short video samples of a student's onscreen work also can be collected as data. The methodology for creating and collecting videos depends on the tool used by the student to complete the task. If a student uses a computer with Internet capabilities, an online tool such as http://www.screencast-o-matic.com/ can be employed. If a student uses a tablet (e.g., an iPad), apps such as Educreations and Explain Everything allow for the creation and sharing of video recordings. More robust video editing tools are available if larger samples have been collected. Editing video is useful for maintaining the length of a sample to isolate information pertinent to the educational goal. Examples of video editing tools include Windows Movie Maker, iMovie, and Camtasia.

Audio Samples/Sound Recorders

Samples of audio are also useful as data. Moments of oral reading, collected speech and/or language samples, and demonstration of understanding of a learned concept are all examples of methods for using audio recordings as data. Audio samples can be recorded from online tools such as http://recordmp3online.com/ and http://Vocaroo.com, software such as Garageband and Audacity, and applications on mobile technology with voice memo features such as Recordium and Evernote.

Evidence within the Tools

Many of the digital tools used in classrooms today have data collection as an integral feature of the technology. In general, there are two types of data available within digital tools: automated analysis of information input by students or teachers collecting observable data, and data that can be extrapolated and interpreted from student work.

In automated tools, data is collected within the tool and analyzed by the tool. Frequently, the tool generates graphic representations of a student's progress which can be tracked over time or compared to a larger group of students. There are hosts of subscription and retail apps and programs which provide instruction and interventions that track and analyze progress. Teachers also can build their own data collection resources within surveys and other online form generators.

Instructional and Intervention Tools with Built-in Data Collection

Software and app developers are publishing an ever-increasing number of tools that track the results of student work against IEP goals or educational standards. The tools mentioned here are by no means inclusive of all the tools available. Boardmaker Online and the Boardmaker Instructional Solutions line, including Boardmaker Expedition Education and Boardmaker Book Bridge, provide an online repository of standards-based curriculum activities, and also provide tracking of student progress toward curriculum standards and/or IEP goals. The information provides formative data to educators to tailor and adapt instruction to meet individualized learning needs. Conceptua Math at www.conceptuamath.com provides individual and classroom based progress toward mathematics indicators with color coding to indicate who is meeting standard, who is near standard but needs more practice, and who is in need of additional support in order to make progress. Charting of individual student scores and duration of time spent in the software is also available for teachers to view (see Figure 2).

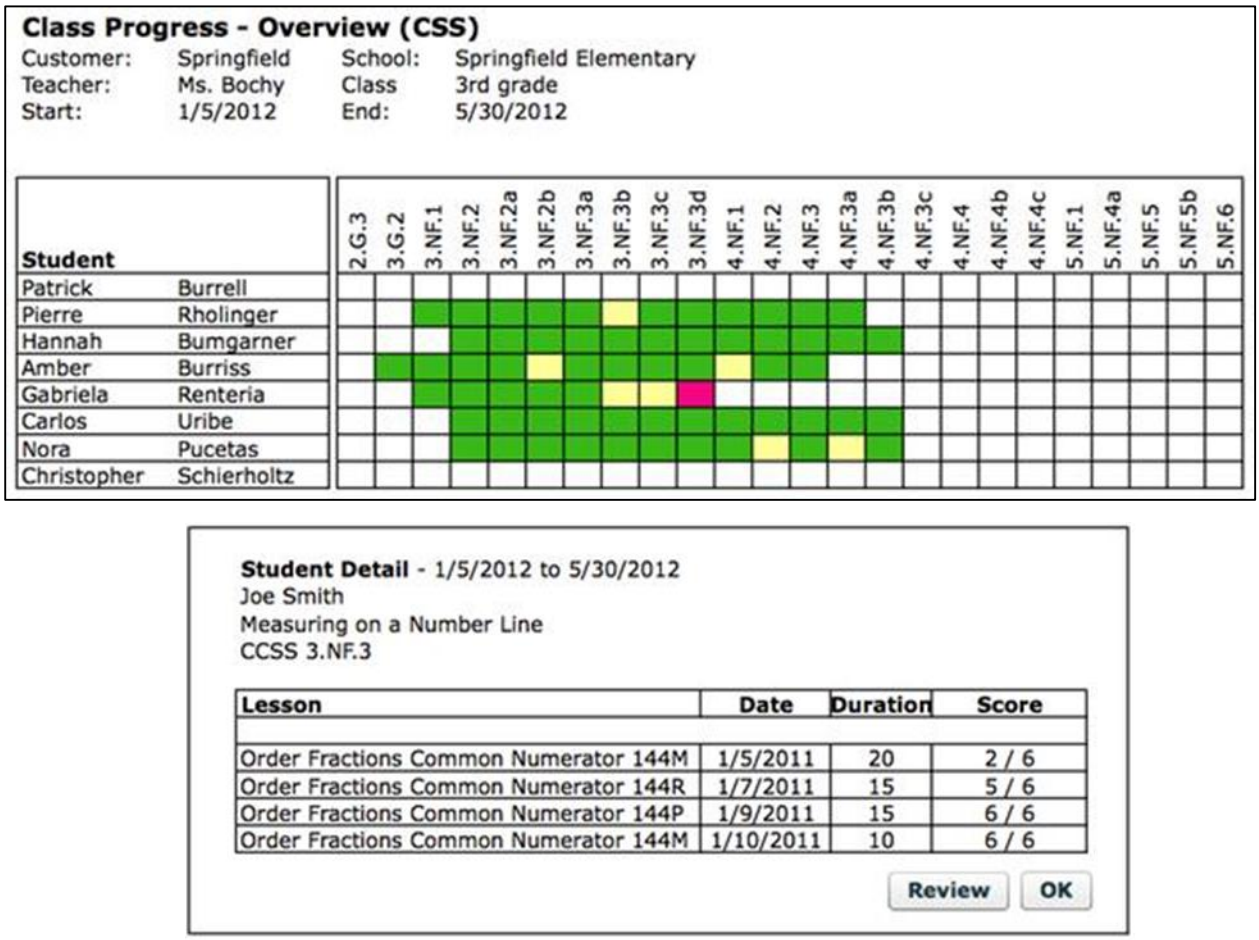


Figure 2. Class and student data generated by Conceptua Math

Lexia Reading Core and Lexia Strategies provide reading interventions with norm-referenced performance data and analysis in the context of an embedded assessment system that allows for real time data at the student, class, school and district level, with data provided on how much time students spend in the program, how frequently students log in, and monthly changes in reading levels to assist educators in monitoring growth.

Snap & Read from Don Johnston Inc., which provides text to speech support, collects data on the readability level of a text, the number of words read, and the time spent reading.

The Language Activity Monitor (LAM) built into augmentative/alternative communication devices, such as the Accent series from Prentke Romich Company, provides practitioners with a means of analyzing the frequency, type, and combination of utterances produced by a user. LAM maintains a running log of every item pressed on the screen of the communication device. Educators, family members, and users themselves can review the collected language samples to find patterns, target areas and times of concern, and chart progress. Uploading the LAM data to http://realizelanguage.com with a subscription allows for the creation of charts, graphs, and other visualization tools helpful in making decisions about instructional practices involving language development. A person's use of language can be very intimate and personal. Access to and analysis of a person's use of language should be accompanied with permission. The privacy of the individual should be respected and honored.

These are just a few examples of the hundreds of technology-based instructional and intervention tools that are available for educators to use to analyze evidence of attainment of proficiency toward a standard or IEP goal from within the tool itself.

Online Forms, Polls, and Surveys

One methodology for establishing a consistent, digital means of data collection is the transference of individual student goals from an IEP to an online form. Google Forms is one example of an online form generator. The central question surrounding a goal can be rewritten and placed in an online form. Writing specific yet comprehensive goals helps in the process of online form generation. Every member of the student's education team can use one specific hyperlink to access the same form, thereby eliminating the need for a paper-based method for collection. Educators then use any Internet-capable device to access the hyperlink and complete the form. Online forms populate a backend database that can be shared among the educational team (including the family), which can be analyzed and visualized, in some cases, nearly instantaneously. For instance, Google Forms maintains the functionality for users to see both individual or a summary of responses. The Summary feature aggregates the data and displays it in comprehensible visualizations such as diagrams and charts (see Figure 3).

Polls and surveys provide another method for collecting information which can be analyzed either by the individual responder or entire group. Educators use polls and surveys formatively to make in the moment decisions to adjust instructional methodologies. Polling or surveying students provides the educator with an opportunity to gather information about what specific information students are understanding, target individual or groups of students when they are not understanding a concept, and alter instructional strategies that have proven ineffective for some students.

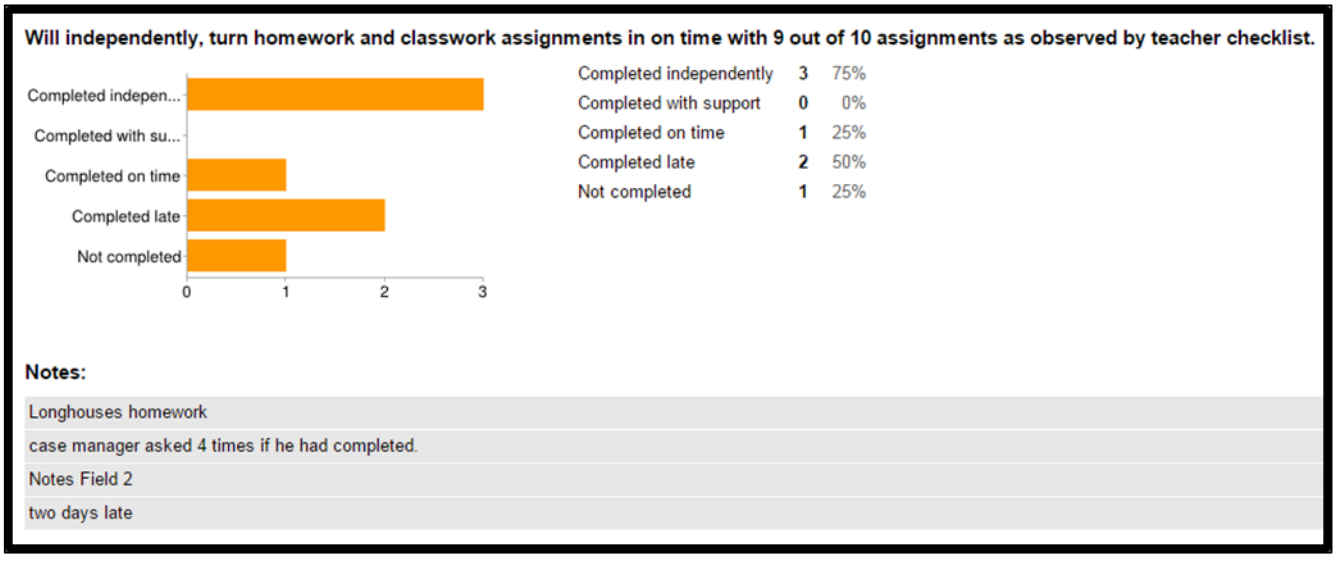


Figure 3. Show Summary of Responses of data collected using a Google Form

Tools useful for creating and disseminating polls and surveys include online tools such as Google Forms, Survey Monkey (http://Surveymonkey.com), Poll Everywhere (http://Polleverywhere.com), and Polldaddy (http://polldaddy.com), as well as mobile applications such as Plickers.

Data via Collected Annotations and Highlights

The reading and writing standards from the Common Core, as well as other non Common Core State Standards (CCSS), emphasize the need for students to be able to annotate text in order to "draw evidence from literary or informational texts to support analysis, reflection, and research" (CCSS.ELA-LITERACY.CCRA.W.9, National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010). Viewing a student's text annotations, including highlighted text and notes, allows educators to gather evidence of a student's understanding of the relevance of text in relationship to their analysis, reflection and research. With the emphasis and ever increasing availability of online digital text, more and more student reading and research is accessed online. To complement this, there are a variety of free and for-fee tools that allow students to highlight and annotate text images, and even video, from online sources.

Read&Write for Google Chrome, from TextHelp, is a multifaceted text reader that also collects highlighted text. Working within a collaborative online Google Doc, teachers can see what text a student has highlighted to help determine if the student is finding the main idea and relevant details in text in the document.

Diigo is a free web curation tool that also provides annotation features, such as highlighting and the ability to add notes within any website. Websites can then be shared collaboratively with a teacher, and the highlights and notes as annotations in the webpage can be viewed and collected as data (see Figure 4).

Beyond simply creating highlights and annotations of text, the use of the Sticky Notes feature of Diigo also allows educators to post questions for students to answer within the body of the online text, allowing them to then view the student's response in real time.

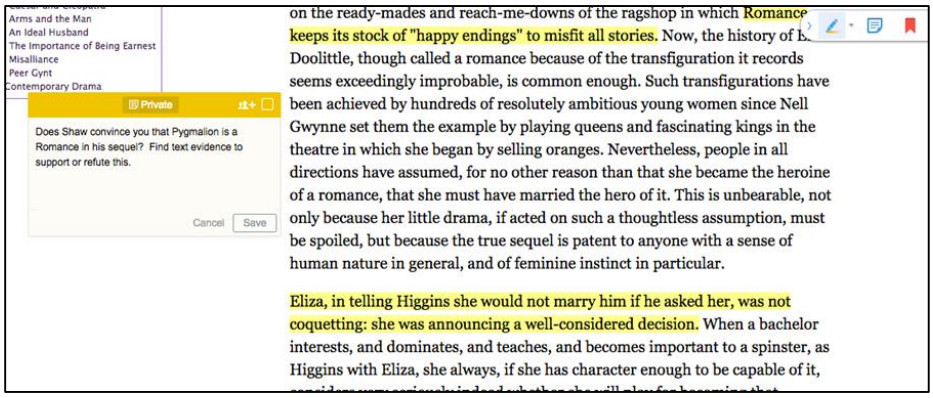
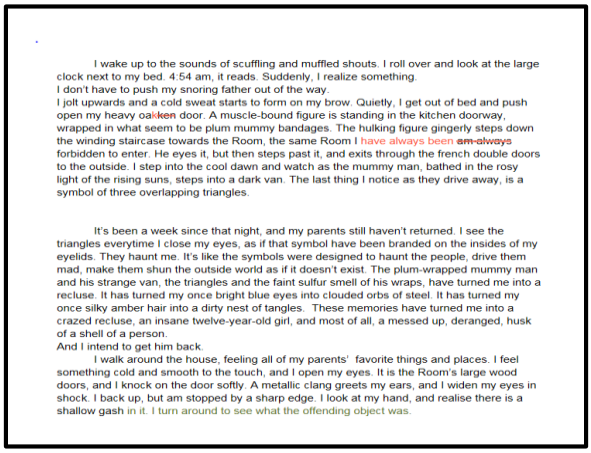


Figure 4. Screenshot from The Sequel to Pygmalion with annotations including highlighting and notes via Diigo. (Shaw, 1916)

Finding Data through Revision History and Track Changes

Typically with pencil and paper writing tasks, students begin with a graphic organizer, create a draft, and then submit a polished, edited writing piece. Their teachers may see each element, but with many different pieces of work and paper to juggle, they may not get a clear picture of the drafting, composing, revising, and editing process, and how the interventions being used to support writing are working for the student. The use of digital tools that provide a means of tracking the changes in a document can bring all of these elements together and allow a clearer picture of the evidence needed to make decisions regarding the efficacy of interventions.

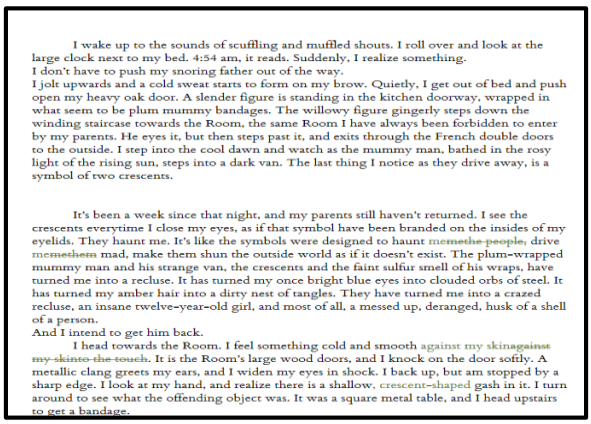
Many online word processors such as Google Docs, along with Google Slides and Google Sheets, allow any collaborator to see the revision history from the file menu. Revision history typically shows every change in a document, with the ability to compare earlier with later versions and see the evolution of the document from beginning to end. Comparing earlier and later versions of the document allows teachers or students to view the changes made, including editing suggestions (see Figures 5 and 6).



I wake up to the sounds of scuffling and muffled shouts. I roll over and look at the large clock next to my bed. 4:54 am, it reads. Suddenly, I realize something.
I don't have to push my snoring father out of the way.
I jolt upwards and a cold sweat starts to form on my brow. Quietly, I get out of bed and push open my heavy oakken door. A muscle-bound figure is standing in the kitchen doorway, wrapped in what seem to be plum mummy bandages. The hulking figure gingerly steps down the winding staircase towards the Room, the same Room I have always been ~~am always~~ forbidden to enter. He eyes it, but then steps past it, and exits through the french double doors to the outside. I step into the cool dawn and watch as the mummy man, bathed in the rosy light of the rising suns, steps into a dark van. The last thing I notice as they drive away, is a symbol of three overlapping triangles.

It's been a week since that night, and my parents still haven't returned. I see the triangles everytime I close my eyes, as if that symbol have been branded on the insides of my eyelids. They haunt me. It's like the symbols were designed to haunt the people, drive them mad, make them shun the outside world as if it doesn't exist. The plum-wrapped mummy man and his strange van, the triangles and the faint sulfur smell of his wraps, have turned me into a recluse. It has turned my once bright blue eyes into clouded orbs of steel. It has turned my once silky amber hair into a dirty nest of tangles. These memories have turned me into a crazed recluse, an insane twelve-year-old girl, and most of all, a messed up, deranged, husk of a shell of a person.
And I intend to get him back.
I walk around the house, feeling all of my parents' favorite things and places. I feel something cold and smooth to the touch, and I open my eyes. It is the Room's large wood doors, and I knock on the door softly. A metallic clang greets my ears, and I widen my eyes in shock. I back up, but am stopped by a sharp edge. I look at my hand, and realise there is a shallow gash in it. I turn around to see what the offending object was.

Figure 5. Draft of document being written in Google Docs



I wake up to the sounds of scuffling and muffled shouts. I roll over and look at the large clock next to my bed. 4:54 am, it reads. Suddenly, I realize something.
I don't have to push my snoring father out of the way.
I jolt upwards and a cold sweat starts to form on my brow. Quietly, I get out of bed and push open my heavy oak door. A slender figure is standing in the kitchen doorway, wrapped in what seem to be plum mummy bandages. The willowy figure gingerly steps down the winding staircase towards the Room, the same Room I have always been forbidden to enter by my parents. He eyes it, but then steps past it, and exits through the French double doors to the outside. I step into the cool dawn and watch as the mummy man, bathed in the rosy light of the rising sun, steps into a dark van. The last thing I notice as they drive away, is a symbol of two crescents.

It's been a week since that night, and my parents still haven't returned. I see the crescents everytime I close my eyes, as if that symbol have been branded on the insides of my eyelids. They haunt me. It's like the symbols were designed to haunt ~~me~~the people, drive ~~me~~them mad, make them shun the outside world as if it doesn't exist. The plum-wrapped mummy man and his strange van, the crescents and the faint sulfur smell of his wraps, have turned me into a recluse. It has turned my once bright blue eyes into clouded orbs of steel. It has turned my amber hair into a dirty nest of tangles. They have turned me into a crazed recluse, an insane twelve-year-old girl, and most of all, a messed up, deranged, husk of a shell of a person.
And I intend to get him back.
I head towards the Room. I feel something cold and smooth against my skin~~against my skin~~to the touch. It is the Room's large wood doors, and I knock on the door softly. A metallic clang greets my ears, and I widen my eyes in shock. I back up, but am stopped by a sharp edge. I look at my hand, and realize there is a shallow, crescent-shaped gash in it. I turn around to see what the offending object was. It was a square metal table, and I head upstairs to get a bandage.

Figure 6. Revision of earlier document

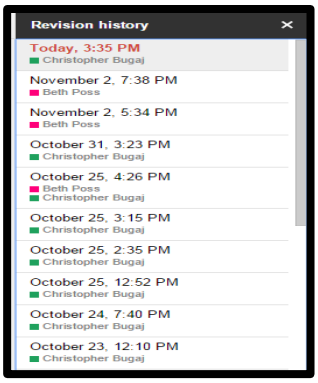


Figure 7. Google Drive Revision History

When used as part of a collaborative project, the Revision History also shows what each student (or teacher) wrote in which parts of a document, presentation, or spreadsheet. Grading collaborative work can be challenging MindMeister, which is available as an app, a Google Chrome extension, and a website (www.mindmeister.com), is a graphic organizer/mind mapping tool that also has a revision history feature and the ability to be worked on by multiple collaborators. In addition to showing the evolution of the mind map, it also provides explicit feedback to teachers by showing exactly who has added what to any mind map.

because it is not always clear who has done what in the final project, so this is valuable data that permits an educator to examine individual skills, abilities, and efforts (see Figure 7).

Microsoft Office, including Word, has Track Changes as a feature that allows a peer or adult editor to make suggestions to a piece of writing. As seen in Figure 8, the Track Changes feature allows the student to see suggestions made as comments and make changes, and then permits the teacher to see how the student acted on those suggestions.

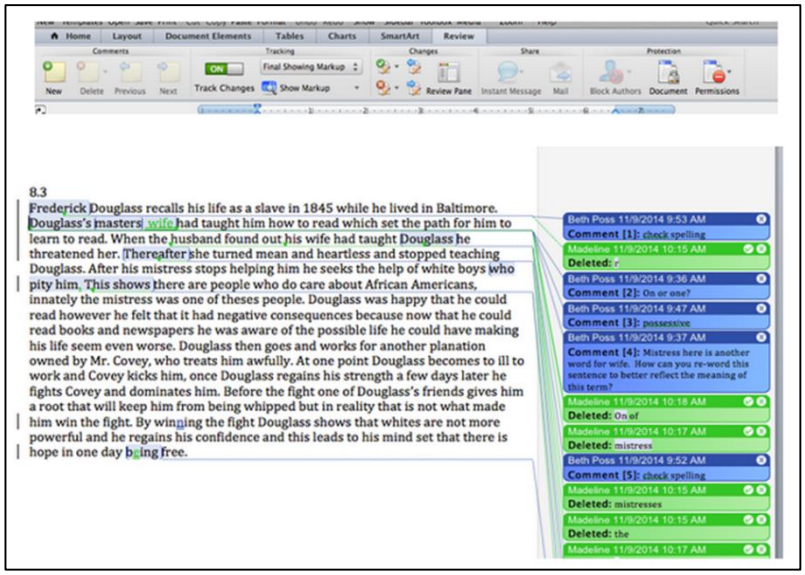


Figure 8. Student work with revisions in Word using Track Changes

Student Self-Reflection

It can be useful to collect information about student self-monitoring and the perceived usefulness of the tools used to accomplish the work. The ability of students to be meta-cognitive in monitoring their own progress has been documented as an effective strategy in increasing significant learning gains (Chappius, 2005). Self-monitoring as a critical part of formative or ongoing assessment allows students to understand how far they have come and how much further they need to go in order to achieve educational goals.

Beyond monitoring their own progress, students' reflections on their own engagement in learning provide data to schools and educators that can provide insight into why a student is or is not making progress. Does the student enjoy the learning experiences? Do they want to use the technology provided? Why or why not? Technology used by educators, such as video or audio, online forms, surveys, and polls can also be utilized by students to provide feedback. Examples of video student testimonials on the use of TextHelp's Read&Write programs can be found at http://bit.ly/rwgstudenttestimonials.

Visualization Tools for Presentation

Maintaining a corpus of evidence is useless without thorough, thoughtful analysis. Sets of numbers, images, sounds, videos, and other media are a collection of observations that paint a picture of what has transpired. These individual pieces of data need to be interpreted to make deductions. Data alone, in its raw form, can be interpreted differently by different people. Synthesis of the evidence into a format that others can understand is necessary to help stakeholders make decisions. Historically, evidence reporting has been in the form of large blocks of text. Although accurate, information presented in this format may be confusing, confounding, frustrating, and even inaccessible to every individual expected to read it. Visualization tools can help every member of the education team comprehend the evidence in order to make informed instructional choices.

Contemporary reports can include charts, graphs, and informational graphics (infographics), and can be created and provided digitally to increase accessibility. Educators have been reported to feel more competent at finding information shown explicitly in a table or graph (United States Department of Education, 2011). Educators need not be constrained to representing information in text-only formats. Examples of tools that can be used to present visualizations of evidence include http://infogr.am, http://venngage.com, http://easel.ly, and http://trackthisfor.me, as can be seen in Figures 9 and 10.

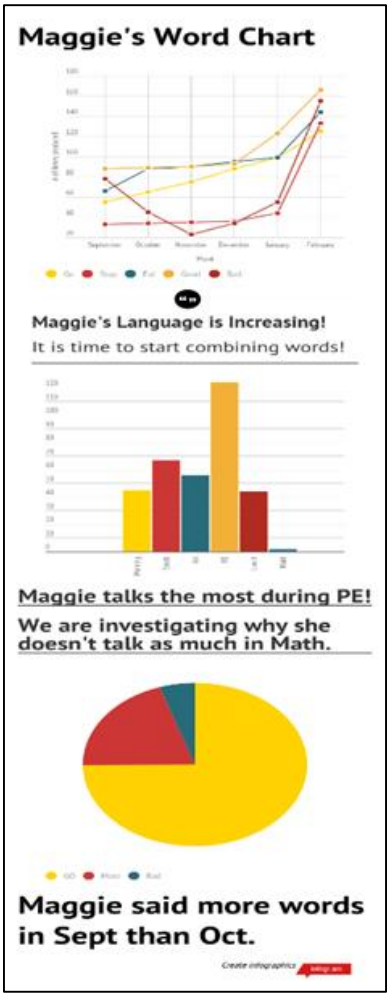


Figure 9. Example of visualization using http://infogr.am

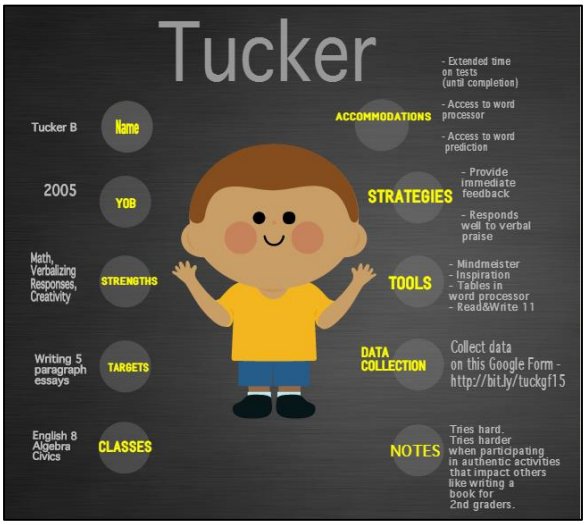


Figure 10. Sample image embedded in an educational report outlining a student profile created using http://easel.ly

Professional Goals and Teams

Transitioning to a digital collection methodology, either individually or as an entity, is not necessarily an easy adoption. Here are steps to be considered in order to maximize the probability of a positive outcome when attempting to convert a practice from paper-based to digital. Presume there will be challenges and that it will take some time will help to temper the expectations. Consider the development of a professional goal to measure progress. For instance, one strategy is to set up a storage system for digital artifacts. It could be a digital portfolio, such as a folder system using a network or Cloud based system such as Microsoft's OneDrive, Dropbox, or Google Drive. Another goal might be to collect data digitally using an online form for only one student before branching out to include other students or educators.

If attempting to make a systematic change for an entire entity, such as a department or school, consider the development of a Data/Evidence Collection Team that maintains the responsibility of helping others in the transition (Feldman and Tung, 2001). The team might help others create digital storage centers, utilize and demonstrate embedded functions in commonly used technologies, generate online forms, create visualizations, and answer questions that arise pertaining to data collection. The data/evidence collection team provides opportunities to become a professional learning community with meetings centered around data collection methodologies and practices, as well as reflection on the impact that this has on instruction. Establishing a team with shared responsibilities helps the entire organization achieve its targeted goals.

Student Privacy and Digital Data Collection

Of valid concern in the age of digital data collection is the potential impact on student privacy as guaranteed by the federal Family Educational Rights and Privacy Act (FERPA). FERPA is intended to protect student privacy, while still allowing education agencies to collect and use data to improve student achievement. Schools districts are tasked with maintaining confidentiality of student information, including names, addresses and identifiers such as student identification numbers or social security numbers. School districts develop safeguards for maintaining confidential information within their own networks, and educators must ensure that identifying student data is not used outside a protected school network. For school systems that have become Google Apps for Education (GAFE) districts or have adopted district-wide use of Microsoft OneDrive, student privacy is ensured through the use of a school domain for the GAFE or OneDrive account, both of which can be configured to maintain all data within a district's own network. For other digital tools that save data to the Internet, beyond the school network, educators and administrators should consider establishing protocols that minimize unauthorized access to protected information. Possibilities include the use of pseudonyms for students and teacher-created email accounts that are linked to the school or teacher rather than to a student. It is hoped that as more and more digital, web-based tools evolve for educational use, the options for protecting student information will evolve as well.

Outcomes and Benefits

The end result of using digital tools to collect and analyze data is that educators, including teachers, therapists, assistive technology specialists, and administrators, are provided with richer, more consistent evidence to

measure progress toward educational standards. When the digital tools used to collect data are inherent in the assistive and instructional technologies being used by the students, or the tools facilitate the synthesis of raw data into meaningful formats that can be analyzed to support students, the data collection also becomes more efficient and efficacious.

Moving from paper and pencil data collection to integrated, technology based digital data collection requires a paradigm shift, in much the same way that infusing technology into instruction requires a shift from traditional instructional practices. It will take training and practice. While over time the process of technology based data collection becomes more efficient, as with any new skill, it may take more time to develop new habits and proficiency with new tools. To aid in the shift from traditional to digital data collection, all of the resources mentioned in this article are available in a Diigo curated list at http://bit.ly/atobdata.

Declarations

The content is solely the responsibility of the authors and does not necessarily represent the official views of ATIA. The author Christopher Bugaj disclosed a past financial relationship with Prentke Romich Company in the form of a one time consultation and two presentations. Christopher Bugaj also disclosed a past relationship with Texthelp who has been a legacy sponsor of specific podcast episodes hosted by the author. The author Beth Poss reported no financial or non-financial relationships.

References

Chappius, J. (2005). Helping students understand assessment. *Educational Leadership, 63*(3), 39-43. Retrieved from http://www.ascd.org/publications/educational-leadership/nov05/vol63/num03/Helping-Students-Understand-Assessment.aspx

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). London: Routledge.

Feldman, J. & R. Tung. (2001). Using data based inquiry and decision-making to improve instruction. *ERS Spectrum,* 19(3): 10–19.

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC: Authors.

Shaw, G. B. (1916). Pygmalion. In The EServer Drama Collection. Retrieved from http://drama.eserver.org/plays/modern/pygmalion/sequel.html/document_view.

U.S. Department of Education, Office of Planning, Evaluation and Policy Development. (2011). Teachers' ability to use data to inform instruction: Challenges and supports. Washington, DC: SRI International.

Wakeman, S. (n.d.). Data collection: An introduction. Retrieved August 7, 2015, from http://mast.ecu.edu/modules/dc_intro/concept/.

Wakeman, S., & Henderson, K. (2011). Data-based decisions – A facilitator's guide for professional development. Modules Addressing Special Education and Teacher Education (MAST). Greenville, NC: East Carolina University.

Zimmerman, R. (2008). Digital data collection demonstration white paper. A comparison of two methodologies: Digital and paper-based. Retrieved from http://www.equip123.net/docs/e1-DigitalDataCollection.pdf