Beautiful Utility: Visual Tools Make Teaching More Effective and Fun!

By Michael E. Skyer

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Visual tools are everywhere in deaf education. Research demonstrates their utility and effectiveness. However, many educators lack formal—and needed—training opportunities.

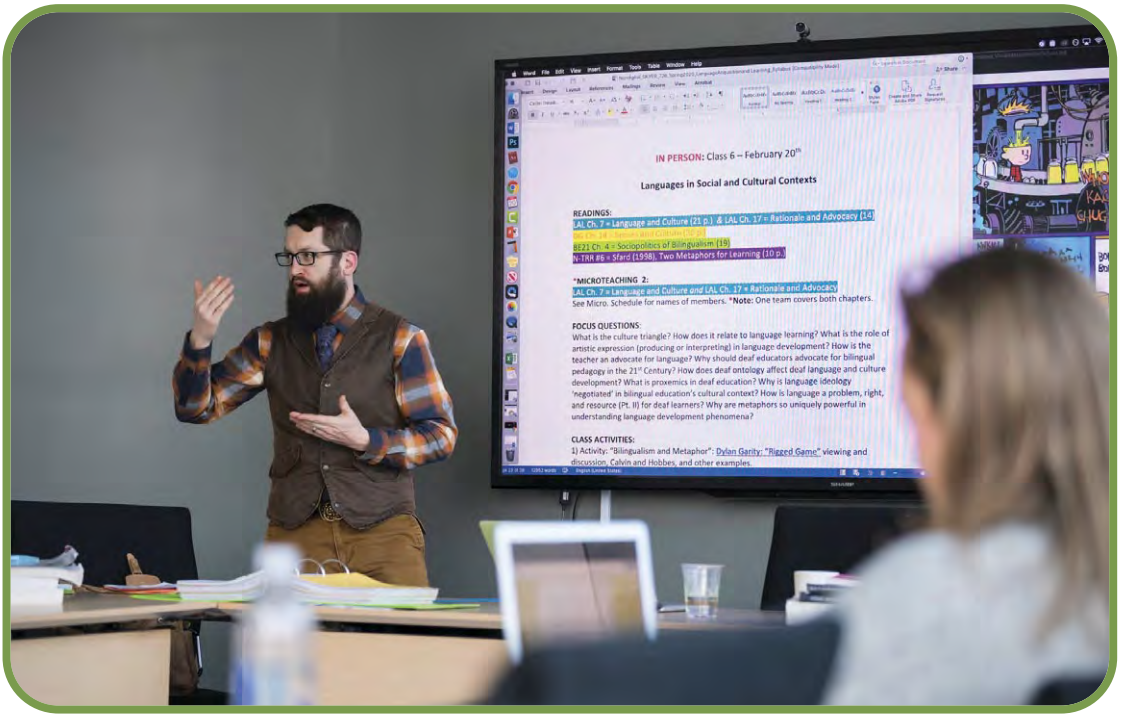
What Is a Visual Tool?

Visual tools—maps, diagrams, graphic organizers, and illustrations (Wilmot, 1999)—link two or more ideas together in a conceptual manner. In their landmark study of visual tools in deaf education, Easterbrooks and Stoner (2006) included the following examples: visual organizers, cognitive maps, information networks, concept maps, visual-spatial displays, semantic maps, and semantic webs. While describing maps, Farrauto (2016) defined visual tools as "artifacts [that] visually organize data and information [to make it] comprehensible and usable." As Kress (2010) explains, visual tools are nearly always multimodal. While some visual tools use only forms of images, others use only forms of language. Still others connect languages—text, fonts, or handwriting—alongside images—line, shape, and color. Recent digital innovations, including infographics, slide decks, and sketch notes (Caviglioli, 2019), result in increasingly multimodal visual tools for educators.

Visual tools simplify the complexities of our often chaotic and confusing reality (Farrauto, 2016). They eliminate background noise and focus our attention on key information. By doing this, they make our thoughts accessible for others (Kress, 2010).

All visual tools rely on abstraction (Lupi, 2016), but well-designed visual tools clearly connect abstraction with concrete reality (Cox, 2016). They allow people to externalize implicit knowledge and to share it with others quickly (Kress, 2010). While visual tools may be especially important for students who are deaf or hard of hearing, they are useful for everyone—as they have been throughout history.

Photos courtesy of Michael E. Skyer



Left: Dr. Skyer instructs graduate students on the use of visual metaphors in the context of deaf students' language learning.

Throughout History

Archeological records show that visual tools are nearly as old as humanity and have played a decisive role in education (Kress, 2010). While now we are more likely to encounter digital tablets, 5,000 years ago tablets were made of clay and the imprinting was done with a stylus.

In the 1500s, Leonardo da Vinci and Galileo Galilei became prolific, well-known producers of visual tools. While da Vinci filled hundreds of notebooks with detailed anatomical and engineering illustrations, Galileo famously devised the first scientifically accurate lunar maps using watercolor paints.

Until recently, teachers in the United States fashioned visual tools from chalk markings on a blackboard; however, increasingly they use digital materials, including charts and tables, embedded in computer documents (Caviglioli, 2019; Nae, 2019).

Today's students use visual tools to document their learning and illustrate their interests (Kress, 2010). In pre-school, this may occur by drawing pictures from enjoyable stories. In elementary school, students may diagram parts of speech in written sentences or construct elaborate dioramas of their favorite animals in their natural environments. In high school, they may use visual tools to identify the parts of a cell, atom, or frog (Wells, 2000).

Teachers often guide students in their use of visual tools, and they also use visual tools to guide and assess student learning (Kress, 2010) as well as for their own learning and for other professional purposes. Most often, teachers use visual tools to assist in instruction. For example, secondary art teachers might use visuals to show students the parts of color theory or to illustrate a timeline showing the changing styles of architecture in ancient Greece; likewise, social studies teachers might have students analyze visual tools that take the form of maps or political cartoons (Armento, 2008).

Teachers like graphics, images, pictures, and videos because they show how ideas relate to one another (Armento, 2008). Visual tools can assist educators as they map out the sequence of events in a specific lesson or across a unit of study (Caviglioli, 2019). For these reasons, visual tools can make curriculum design transparent, logical, and sequential. High school teachers may use visual tools, such as rubrics, to organize and communicate feedback to students; language arts teachers may use color coding to streamline feedback about grammatical errors in compositions (Skyer, 2023a).

Visual Tools and Deaf Learners

Visual tools improve the quantity and quality of learning in language, science, and mathematics across all ages and all groups of deaf and hard of hearing students, including elementary, secondary, and college-age students as well as those with and without additional disabilities (Behm et al.,

2015; Dye, Hauser, & Bavelier, 2008; Kane, 2010; Skyer, 2023b). This research on visual tools includes mainstream and special settings among other points of diversity.

Easterbrooks and Stoner (2006) show that visual tools positively affect deaf students' literacy in areas such as vocabulary acquisition and use. Smith (2010) also demonstrates that visual tools are useful in science classes in secondary deaf education, in which students and teachers need to interrelate complex and voluminous data.

In higher education for deaf and hard of hearing students, Bauman and Murray (2014) suggest that visual tools clarify and extend sign language instruction. Based on this theoretical stance, Raike, Plyvänen, and Rainò (2014) demonstrate that visual tools not only enhance learning and teaching, but they also make learning more enjoyable, even beautiful, for deaf and hard of hearing learners.

I used the research noted above to frame my doctoral dissertation (Skyer, 2021). The new data I collected similarly suggests that when college educators who are deaf themselves increase their focus on the aesthetic aspects of visual tool design, they also become more attentive to the ethics of their teaching practices. I also found evidence that there were many subtypes of visual tools. Among them: biochemistry notation, freehand drawings, pedagogical body movements in physical spaces, Google search images, infographics, and American Sign Language vlogs.

Visual tools allow information to be presented directly to the eye, which is a major asset for deaf learners who can perceive and make use of visual information in a way that is more efficient, more ethical, and more effective than information delivered through modes like speech, which may not be fully accessible.

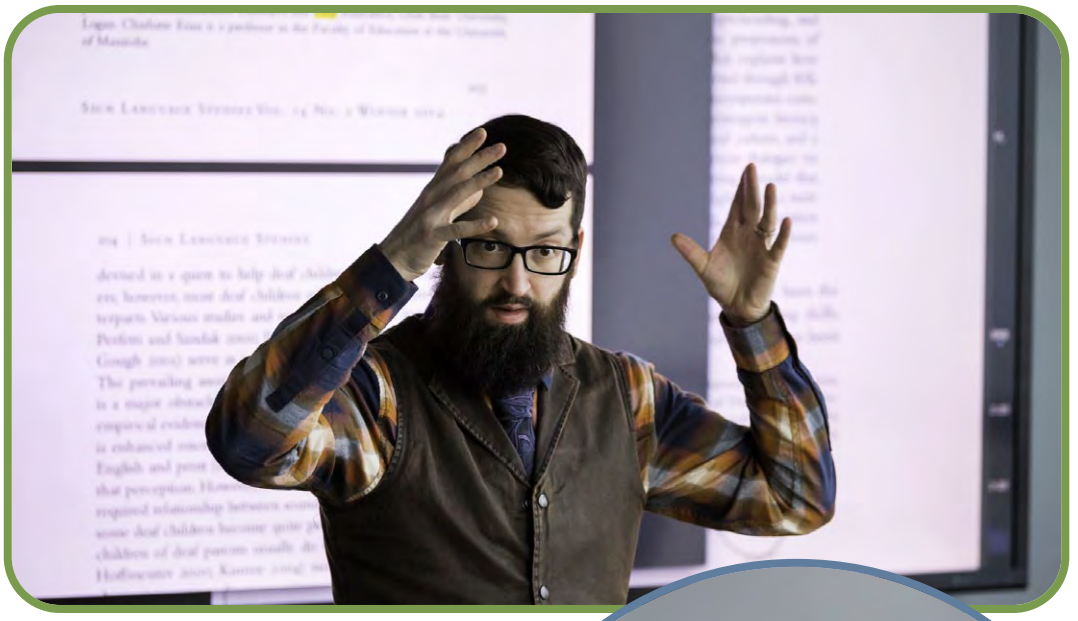
~Skyer & Cochell, 2020

Participants in my study used visual tools for four major purposes:

1. **Analysis**—Breaking down complex concepts into subcomponents
2. **Evaluation**—Assisting the students in making judgements or decisions
3. **Demonstration**—Showing multi-stage processes over a period of time
4. **Synthesis**—Capturing the core idea or essence of complex information

Visuality is a vital dimension of deaf pedagogy (Skyer, 2021). Visual tools allow information to be presented directly to the eye, which is a major asset for deaf learners who can perceive and make use of visual information in a way that is more efficient, more ethical, and more effective than information delivered through modes like speech, which may not be fully accessible (Skyer & Cochell, 2020). Using visual tools allows deaf educators to circumvent a dependency on spoken language; in

Below: During lectures, a variety of media formats and modalities, including comic books and cartoon illustrations, can be helpful in making information accessible.



Above and right: Visual tools and sign languages can be combined to enhance learning and teaching as well as to make learning more enjoyable for deaf and hard of hearing learners.

fact, it can allow them to sidestep language entirely (Skyer, 2023b).

Visual tools can support deaf students' critical thinking, creativity, and curiosity. However, a lack of knowledge or inadequate training can create problems for teachers who use visual tools with their deaf students. Research suggests that when visual tools are misused, they can become a drawback that slows down student learning (Yuknis, Santini, & Appanah, 2017). Smith (2010) highlights the possible problem of using too many visuals at the same time and notes the confusion that may occur if a teacher presents a visual tool but does not allow the deaf student sufficient time to examine it. If there are too many visual tools or if visual tools compete with other forms of knowledge delivery, such as a signing teacher or interpreter, deaf and hard of hearing students may not be able to effectively process the information.

Deaf and hard of hearing students must be given time to visually deconstruct tools, and they must know where to look. If too many visual stimuli are presented, their gaze breaks up and information processing is reduced (Skyer, 2023b). Deaf and hard of hearing students can benefit from explicit instruction to reduce dilemmas such as these.

Making Visual Tools

The first visual tool I remember constructing as a student-teacher was a simple line drawing of a book that was shown sitting next to a human brain. The sketch was made in black Bic pen on lined notebook paper. One part of the illustration showed a book with a large arrow pointing downward at its pages. Another part showed the brain surrounded by several arrows radiating outward. I drew it to show the difference between a word's "denotation" (the arrow pointing at the book) and its "connotations" (the many arrows moving away from the brain). This visual tool, I reasoned, helped students to understand the abstract idea that words have many meanings. This abstraction was grasped more easily through images alongside language modes than through just words or signs alone.

Since that first sketch, I've built hundreds and used thousands of visual tools in my teaching. These visual tools include those built by my students and those created by other teachers and designers. For about 20 years, my use of visual tools has involved deaf and disabled students and their educators in all kinds of diverse settings, from preschool to graduate studies, in formal schools and in community-facing education.

I even built my dissertation research—six case studies of deaf teachers who taught in higher education—around a desire to understand my observations about the use and importance of visual tools in deaf education. As a studio artist in several media, I explore and leverage my formal training to construct visual tools (Schif, 2010). However, what directs my use of visual tools overall is my insatiable desire to communicate ideas well and to effectively teach deaf students. What I experienced as a deaf educator has been confirmed by my research into the

teaching habits of others.

In deaf education, visual tools can be used to focus curiosity, to encourage our students to be critical thinkers, and to spark cognitive processes. When used well, visual tools encourage deaf and hard of hearing students' perception and attention to ideas, and they also promote genuine interactions with knowledge, understanding, and reasoning. Visual tools are both educational and communicational (Nae, 2019). In the hands of trained teachers, visual tools can make teaching deaf and hard of hearing students not only more effective but also more enjoyable.

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