

I Want to Eat Your Brains: Engaging Students with Brain-based Strategies when Zombies have Taken over your Classroom

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Can you imagine your students engaged with their information literacy classes? How do we capture and then maintain students' attention while teaching them essential information literacy skills?

Educational neuroscience, also called Mind, Brain, and Education Science, is an emerging discipline that brings together research in neuroscience, psychology and education. This research can lead librarians to effective brain-based teaching strategies, which are particularly valuable in our information literacy classrooms by helping us create engaging and active interactions with our students.

As I began to familiarize myself with the field of educational neuroscience, it deeply resonated with my experiences of students and our interactions in the classroom. I have always been interested in making my instructional experiences more engaging and the strategies from brain-based research in education gave me rich ideas to use. My first experiences with these techniques began in 2009 and have been repeated in 2010 and 2011. I've utilized strategies ranging from creating a positive learning environment, having students use multiple senses, recognizing pattern recognition to help students connect their new learning experiences to familiar knowledge, the importance of social learning, and capturing students' attention through novelty.

Students have reacted very positively to these educational experiences. Students have also provided useful feedback which has allowed me to make our interactions and assignments even more engaging and have benefited future students in my classes.

What is Educational Neuroscience?

Educational neuroscience is also called Mind, Brain, and Education (MBE) science. As Tokuhamas-Espinosa (2011) notes in her comprehensive book on the field, "MBE Science is concerned with studying how humans learn best in order to develop more effective teaching methods. Several experts define MBE science as the use of empirical scientific research to confirm best practices in pedagogy" (p. 14). MBE Science works around five concepts that are proven in neuroscience, psychology, and educational settings. Tokuhamas-Espinosa (2011) lists these five concepts as:

1. Human brains are as unique as faces.
2. All brains are not equal because context and ability influence learning.
3. The brain is changed by experience.
4. The brain is highly plastic.
5. The brain connects new information to old. (p. 32-34)

These five concepts can then be used in curriculum design, classroom methodology design, and basic pedagogy. Through

this MBE approach, we can gain insights into how the brain works, and how students actually learn, which then enables teachers to create their own solutions to the classroom challenges they face. For librarian educators, we can use this information to improve our teaching interactions with our students through brain-based teaching principles that lead to effective teaching strategies.

Brain-based Teaching Strategies

The research in MBE science can help us to teach better by using brain-based teaching principles that are based on "universals of the brain and learning, which are similar for all people" (Tokuhamas-Espinosa, 2011, p. 205). These principles can lead to better ways to teach. The list of principles is quite extensive. At this time, I have explored five brain-based teaching principles and strategies.

Strategy 1: Creating a Positive Learning Environment (Learning is Enhanced by Challenge and Inhibited by Stress)

Neuroimaging research reveals significant disturbances in the brain's learning circuits and chemical messengers in students in stressful learning environments. "The amygdala becomes overstimulated by stress, and in that hyper metabolic state, information cannot pass from sensory awareness into the memory connection and storage regions of the brain" (Willis, 2006, p.58). Willis then states, "A state of anxiety occurs when students feel alienated from their academic experiences or anxious about their lack of understanding. This stressed state happens when a lesson is tedious, not relevant to their lives, confusing, or anxiety-provoking" (2006, p. 60). Willis also notes that what might seem like boredom or acting out is actually a response to the stress of confusion (2006). In order to alleviate this stress and confusion, it is essential to engage students' interests with stimulating and challenging material that is presented in an engaging manner. It is important to make the lesson personally interesting, relevant, and motivating. This can be generated by creating human interest and personal connections around the subject matter.

Strategy 2: Using Multiple Senses in the Classroom

In our learning environments, it is essential that multiple senses are used including visualizing, feeling, drawing, verbally communicating and writing. This engagement of many senses stimulates multiple brain pathways and more brain connections so that students are more likely to remember the material being covered and retain it for future use. "The more ways something is learned, the more memory pathways are built" (Willis, 2006, p. 3). "When students build their working memories through a variety of activities, they are stimulating multiple sensory intake sensors in their brains. Their brains develop multiple pathways leading to the same memory storage destination" (Willis, 2006, p. 10).

Strategy 3:***The Importance of Pattern Recognition***

As the brain receives new information it is constantly being compared to what it already knows (Tokuhama-Espinosa, 2011). We can utilize students' brains' need to form pattern recognition by using patterns in our teaching such as analogies, metaphors and similes. Pointing out the similar patterns to what students already know allows them to make these connections more quickly. Various strategies to accomplish this include having students create graphic organizers for new concepts covered in class, drawing Venn diagrams to look for logical relations between sets of ideas, and having students generate mental images around a topic.

Strategy 4:***Importance of Social Learning***

"Humans are social creatures and, as such, learning cannot be isolated from social contexts" (Tokuhama-Espinosa, 2011, p. 215). Students' ideas are connected to their past experiences or interactions with others who shared their thoughts. Support and intellectual challenge from others also makes students engage with their ideas more fully. There are many ways to tap into the power of social learning ranging from group work, to interviewing partners, partner discussions, and think-pair-share as just a few examples.

Strategy 5:***Capturing Students' Attention through Novelty***

Tokuhama-Espinosa notes "Human brains seek, and often quickly detect novelty" (2011, p. 212). Students' brains are structured to remember novel events as it ties into their survival instinct, and their need to sense a cause and predict an effect. This novelty can realize itself through varying classroom activities and routines and by approaching common class content in new and engaging ways such as having an unanticipated demonstration, playing a song, or having something new or unusual in the classroom.

Using Brain-based Strategies in our Information Literacy Classrooms

I have tried a variety of brain-based teaching principles and strategies in my information literacy classroom. Often I use a combination of strategies. Examples of my instructional experiences include:

Example 1:***Introduction Activity in Library Instruction Focused on Creating a Positive Learning Environment***

A typical library instruction classroom, especially a one-shot environment, is inherently a stressful situation for students. We often ask students to come to our library instruction classrooms, thus they are in a physical state of discomfort. They are often being taught by someone they do not know. Students are uncertain of who the librarian is and why they are teaching the class. They also might feel that their time spent with us is wasted time due to their overconfidence in their own research skills. Thus, they are inclined to seem bored or disengaged before we even open our mouths. How do we address this emotionally stressful environment?

The importance of creating a positive learning environment by being genuinely warm, accessible, interested in students, and having an engaging manner cannot be overemphasized. Even the smallest and simplest of acts can help alleviate student stress and preconceptions. Genuinely greeting students as they enter the room is a simple and easy strategy to begin with. Engaging in light conversation with the students about the day, the weather, and then moving this conversation into what they are expecting out of the class session can be incredibly valuable. Gently pick the minds of the early arrivers for how prepared they are for this session, and you can then build on this information once class begins.

Beginning a library instruction session with simple introductions is an amazingly simple way to engage students immediately in the classroom. Char Booth shares a valuable suggestion in her 2011 book, *Reflective Teaching, Effective Learning: Instructional Literacy for Library Educators*. I use Booth's suggestion of having each student introduce themselves, mention an observation or frustration about research, and then sharing something practical they want to get out of the instruction session. This immediately causes students to invest personal relevance in the learning environment. It also gives the librarian a moment to connect with each student as a person. I take notes on a white board on the practical things students want to get out of the session and their observations and frustrations. I note when common themes come up ("overwhelmed by too much information," "no idea how to search for a book" "I wish I could search better and faster") and then I use the most common themes to guide the session. Students will be more keyed in and responsive as they know I am addressing their concerns and the concerns of their fellow students. They are also more understanding and patient when I am covering something they already know because they know their peers need help with it thus touching on the strategy of social learning.

Example 2:***Introduction Activity in an Information Literacy Course***

An introductory assignment I have developed which utilizes several brain-based teaching strategies is an icebreaker activity in a credit-bearing, semester long information literacy class. I want students to get to know each other and to express concerns and frustrations about research in a low stress environment. I want to give them a first chance to try group work and take advantage of the social nature of learning by discovering they are not alone in their concerns about research. I also want them to do something fun and unexpected and thus capture their attention through novelty.

To begin with, students are individually given a generic research paper assignment. The assignment directs them to select their own topic, to find five scholarly current discipline-specific sources, and to document their references using MLA style. The generic research paper assignment is an amalgam of many such assignments I've seen as a librarian and thus is an accurate example of a research paper assignment that students could see in their educational experiences. I then ask them to reflect on this assignment by individually responding in writing to several questions about the assignment including, "How would you begin? Describe what you need to do for this assign-

ment. Are there terms or concepts you do not understand in this assignment? If so, what are they? If you needed assistance, who would you ask to help you? Why would you go to this person for help? How would you feel if you were given this assignment?" The questions cause the students to examine what they already know about research in order to prime them for pattern recognition in relation to the work we'll be doing the rest of the semester.

We then move into the fun part of the assignment where I break students into small groups to use social learning. I have the groups share their individual reflections, then come to a group consensus, and make brief comic strips showing an overview of their collective feelings and reactions to research papers. We use a variety of free web based comic strip creators to create the comic strips including ArtisanCam Super Action Comic Maker (<http://www.artisancam.org.uk/flashapps/superactioncomicmaker/comicmaker.php>), Pixton (<http://www.pixton.com/>), and Make Beliefs Comix (<http://www.makebeliefscomix.com/>). Comic strips are due to me by the end of the class session, and we review them as a class in our next meeting. By asking them to create something after thinking and writing about it, I am able to engage multiple senses in the classroom. The comic strips are always amusing and honest and are a fun and novel way to bring the class together around their shared experiences with research.

Students' Responses to Brain-based Strategies

Since employing various brain-based strategies in my classrooms, student feedback has been very positive. Students appreciate the positive classroom environment and enjoy the variety of activities used to vary their learning. Classroom evaluation comments have included:

- "I love this class very much. This class is different where we don't get bored and interesting. It's just amazing to be a part of this class."
- "I like when we make the comics, they're always fun to see what everyone did!"

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signed or reconfigured between 2008 and 2011. Through telephone and in-person interviews, a site visit, and a review of both library and higher education literature, Vance and West identified trends in the areas of room configuration, technology, and flexibility.

For room configuration, Vance and West used floor plans and photographs of teaching spaces, as well as direct advice about the planning process gained during interviews, to explore trends such as a re-orientation of the classroom to remove an established, fixed front of the room, allowing the librarian to have greater flexibility in teaching beyond the traditional demonstration or lecture. However, this conflicted somewhat with the fact most classrooms still featured desktops, as opposed to more flexible laptops or tablets, due to many reasons (e.g., cost,

- "The instructor is very engaging, keeping the students attention and motivated. Jennifer is easy to understand and has patience with her students."
- "I like the energy in the room from both the professor and other students; it makes class fun."
- "Very interactive and involves constant participation in order to make sure students are learning and evolving with the material."
- "I liked learning all the different ways of researching and doing all the little group projects"
- "I liked the information I learned and the way Jennifer presented new material to the class. Class was always entertaining and mentally stimulating."

Conclusion

Through brain-based teaching strategies, I have been able to engage my students in my information literacy classrooms and thus am able to teach them essential information literacy skills. I plan to continue to explore other brain-based teaching strategies in the future as they are rewarding for my students' educational experiences and for me as a teacher.

References

- Booth, C. (2011). *Reflective teaching, effective learning: Instructional literacy for library educators*. Chicago, IL: American Library Association.
- Tokuhama-Espinosa, T. (2011). *Mind, brain, and education science: A comprehensive guide to the new brain-based learning*. New York, NY: W. W. Norton.
- Willis, J. (2006). *Research-based strategies to ignite student learning: Insights from a neurologist and classroom teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.

security, screen size). This choice of technology worked well overall, but did create occasional line of sight issues where certain students could not easily see the instructor. They also found that some past technology trends, such as whiteboards, SMART boards, and screen sharing software, continue. The need to accommodate various learning styles with mobile furniture than can be easily configured based on the purpose or size of the class was also discussed. These are spaces, moreover, that need to host non-teaching functions or be open to serve as a lab when not being used for instruction.

For more information about the conference, and the PowerPoints and handouts for many of the sessions, including from all the sessions listed in this article, visit the website at <http://www.loexconference.org/2012/sessions.html>