



How Technology is Changing Students' Brains and What it Means for Teaching

ERIC M CARBAUGH, PHD – CARBAUEM@JMU.EDU

ASSOCIATE PROFESSOR, JAMES MADISON UNIVERSITY



@emc7x



Four Corners Quick Chat

What do you think is different about the way students think today vs. when you were in school or when you first started teaching?

Keep in mind, students today aren't THAT different, so be nice! 😊

Birthdays Jan-Mar

Birthdays Apr-June

Birthdays Jul-Sep

Birthdays Oct-Dec

The Impact of Technology: Students' Brains are Being Rewired

- The availability and use of technology has impacted student ***attention, working memory, and thinking.***
- Technology can be used to promote a more flexible, student-centered approach to learning. However, care must be taken to ensure that these learning experiences capitalize on how students take in and process knowledge and skills..



Technology as a Distraction?

In a similar experiment with college students, those involved in active texting scored 27 percent lower on the quiz (Froese et al., 2012).

Two studies found that simply having a cell phone present was distracting enough to cause a decline in performance on attentional and cognitive tasks (Thornton, Faires, Robbine, & Rollins, 2014).

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What are some implications of research regarding student attention?

Implications Regarding Student Attention



- There are increased demands on students' attention, so teachers need novel ways of introducing learning objectives or content to students to wrestle their attention away from these competing forces.
- Finding relevance in a task can result in greater attention, focus, and motivation on the part of the student.
- Making predictions can increase the release of the neurotransmitter dopamine which increases feelings of pleasure or satisfaction (Willis, 2010)
- Technology provides various avenues for this. For example, using the flipped model of instruction, rather than a traditional homework assignment, have students watch a short, engaging video and make predictions about what they are going to be learning the next day.

Alerting, Orienting, and Deciding

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You've got their attention...now what?

1. Humans attend quickly to things that threaten or interest them
2. If there are options, humans pick the one that gives them the most benefit at that moment.
3. There are WAY more distractions now than there used to be.

Sousa, 2016

Read the Brief Article on Hooks

How do you typically hook students? What might you be able to do to grab their attention more consistently?



On Working Memory

- New research is showing a decrease of items that can be stored in our working memory.
- One theory behind this change is that students learn it is easier to simply look up the information rather than go through the process of trying to remember it.

Sousa, 2016



Implications Regarding Working Memory

- Social processing and active engagement are effective tools to help students deeply process content.
- Ongoing, formative assessment in a variety of forms is important to monitor student learning.
- For both ongoing assessment and social processing, consider how these might be embedded in a flipped lesson plan.



Formative Assessment

- ❑ We need to be *proactive* in discovering students' learning needs and in planning to address those needs.
- ❑ This is where the typical approach to the flipped classroom model may fall short; flipped classrooms often operate on a strictly reactionary basis, which can lead many teachers to feel thinly spread.
- ❑ There are many digital tools that can help us gather and organize formative assessment data!

Formative Assessment Tools

- www.socrative.com
- www.polleverywhere.com
- Kahoot.it
- Plickers.com
- **GoFormative.com**
- **Padlet.com**
- [Swivl Recap](#)
- **flipgrid.com**
- Google Forms, Blogs, backchannels (see “Interaction Tools” slide)

Use these tools – and others like them – to check for understanding during and after a lesson – traditional or flipped. Even while “at home,” students can alert their teachers to their misconceptions and questions.

3 Minute Pause

- With a partner or in a small group, record some ideas about new ideas regarding student attention and working memory, as well as how these might impact your teaching.
- Record a few brief thoughts to our Flipgrid topic:
<https://flipgrid.com/d44380>



Flipgrid Allows Students to View Each Other's Recordings

Elevator Speech: In the world of advertising, there is often a limited amount of time to make a strong sales pitch—perhaps the length of an elevator ride. The Elevator Speech format models this reality for students by asking them to synthesize the most important information from a lesson and present it in a brief amount of time (about 30 seconds). After students write down key points from the lesson in the form of a speech, the teacher asks them to turn to their elbow partner and “sell” the lesson. Once done, the partner then delivers his or her own brief speech. Students then have 30 additional seconds to add any new ideas to their speeches before turning them in or posting them online via any of the forums discussed in Appendix A (e.g., Periscope). This allows the teacher to determine what ideas were gleaned from the lesson and also provides students with opportunities to practice their speaking skills.

On Student Thinking

- Because problems can be easily solved by looking up existing answers on the Internet, students are spending less time thinking critically about how to solve these problems.
- Essentially, someone has already done the cognitive heavy lifting. If the problem has already been solved, why would they need to think critically?

Sousa, 2016



When Being Asked to Solve a Problem or Think Critically:

- Ask students to think first, start with their own ideas.
- Use the internet later as a resource to support explanations, not for the explanations themselves.
- Teach them patience when it comes to using online resources.



Implications for Thinking

- Use open-ended questioning where answers aren't readily available on the Internet.
- Students can engage with these questions initially at home after processing some content (perhaps a video), and then at school they can build off these ideas through small group interaction.
- Finally, students could present their ideas via a Padlet post which could then lead to a whole class discussion.
- In this way, students aren't simply looking up answers but rather grappling with ideas to which there are no immediate answers.

Essential Questions...

1. Are important to real people in the real world.
2. Raise additional questions.
3. Are worthy of discussion.
4. Are provocative and debatable.
5. Suggest more than one answer.
6. Aren't Googleable (that's a word!)

Based on the work of Wiggins & McTighe (2005)

Examples and Non-Examples

- **Essential question:** “How do the arts shape, as well as reflect, culture?”
- **Nonessential question:** “What common artistic symbols were used by the _____ culture?”
- **Essential question:** “Is there ever a ‘just’ conflict?”
- **Nonessential question:** What key event sparked World War I?”
- **Essential question:** “Is there a ‘best’ way to problem solve?”
- **Nonessential question:** “What method did you use to count the objects?”

Examples and Non-Examples

- **Essential Question:** How does culture shape our interactions?
- **Nonessential Question:** How do we say hello to friends vs. coworkers in _____ country?
- **Essential Question:** How does literature reveal an author's purpose?
- **Nonessential Question:** What was Vonnegut's purpose to writing *Slaughterhouse V*?
- **Essential Question:** How can systems be both independent and interdependent?
- **Nonessential Question:** How does the Moon's orbit impact the Earth?

Based on These Examples and Non-Examples, What Are Some Characteristics of Essential Questions?

Examples

How do an object's properties affect how it will move?

Why are rules important?

How does your environment affect how you act?

What is a relationship?

How do your experiences affect your choices?

How does asking questions help people understand the world?

How do location, technology, and transportation affect what we produce and consume?

Why is government necessary?

Why is ethical decision-making important in business?

Is “hacking” ever OK?

More Examples

How do physical and mental well-being relate?

How can fractions, ratios, and percents express the same relationships?

What do good readers do when you're struggling with a text?

Is there a right way to count?

Why is it important to engage in physical activity?

Does your behavior now impact your future?

How do you symbolize sound?

Is it better to be a bystander or upstander?

How does geography impact culture?

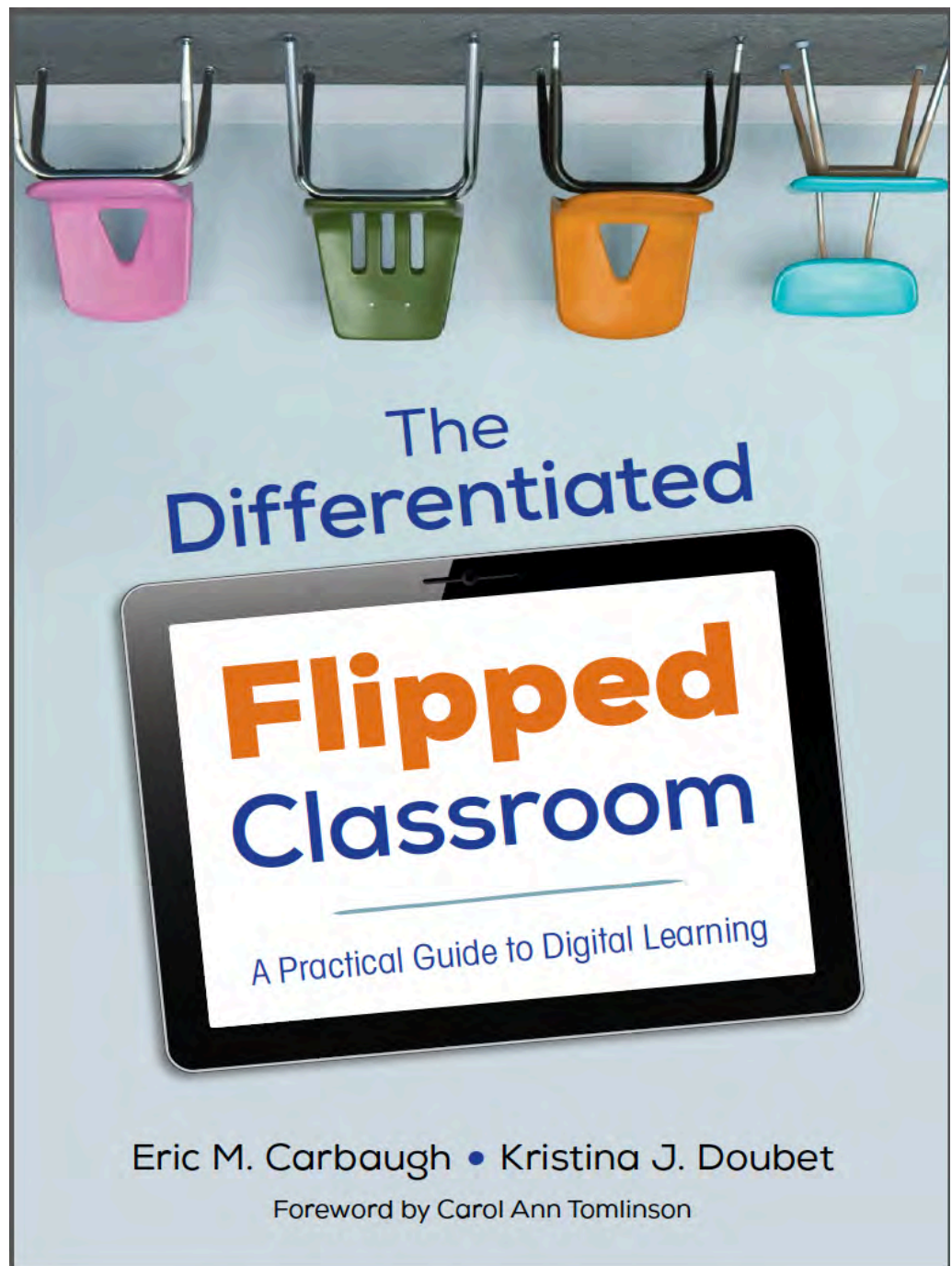
With a Neighbor, Brainstorm a
Potential Essential Question You
Could Use With Faculty or
Students



A Reflective/Active “To Do List” for You or Your Teachers:

- ✓ Consider your role in the classroom. How has it changed since you started teaching? How? Why? If you are a new teacher, consider how you might employ technology to improve learning for students (vs. just a “nice to have”).
- ✓ Consider how students’ brains are changing. What might this mean for creating a more student-centered approach to teaching?
- ✓ Create a Swivl Recap or Flipgrid post for your students to reflect on their learning. Listen to their reflections. What might this mean for your next instructional steps?
- ✓ Use Padlet to have students or group of students share ideas with each other.
- ✓ Use a backchannel chat to monitor small group interactions. Have one student act as a “recorder” for each group. Share the transcript with students. What can they learn from this?
- ✓ What are some ways you could look to foster community in your classroom-both online and face-to-face? Consider using structured question stems to model desired interactions.
- ✓ Use Essential Questions to frame deep discussions—focus on big ideas vs. minute details.

Presentation
based on ideas
and materials
from
*Differentiating
the Flipped
Classroom* by
Eric Carbaugh
and Kristina
Doubet



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