Reading Aloud in College Biology Classes

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What do students hate to do the most?

READING!!!

- They will do almost anything to avoid it.
- Don’t really know why this is. Common speculation:
  - Reduced attention span (perhaps as a result of videophilia)
  - Poor preparation in earlier education
  - Laziness
  - In STEM disciplines, some scientific jargon is simply hard to read for anyone
- Reading comprehension has of course a huge, possibly primary impact on students’ comprehension and their success in school and life.

Other factors that led me to try this experiment:
Free Textbook

- I had decided to use a free text
  - Developed by Rice University
  - Funded by several major philanthropic foundations
- However, the book made little attempt to reduce scientific jargon or simplify language, and was fairly densely written.
Other factors that led me to try this experiment: “Sage on the Stage”

- I was tired of the standard “sage on the stage” format of a professor lecturing using PowerPoint
- Thought students might be a little tired as well
- Also, when I began the 1st class no prepared slide presentations were offered by the publisher

Theoretical Support for the Read Aloud-Think Aloud Approach

- Vygotsky’s Developmental Theory
  - Zone of Proximal Development
  - Scaffolding

Theoretical Support for the Read Aloud-Think Aloud Approach

- Goals of Scaffolding in Science Education
  - Content understanding
  - Procedural skills
  - Metacognition

Theoretical Support for the Read Aloud-Think Aloud Approach

- Three Key Elements of Scaffolding
  - Social Interaction
  - Visual Representations
  - Written or Spoken Prompts

Reading Aloud

- I decided that we would read all of the text assigned for the class aloud in class, taking turns.
  - My thinking was that this would force the students to actually read the text.
  - The classroom would resemble a study group, with my role as essentially a high-powered study group leader.
  - I would be included among the readers.
  - Each of us would read 1-2 paragraphs at a time.
  - I would elaborate upon the readings whenever there was an actual question by a student, and whenever I thought the material needed explaining.
  - I would use videos, props, other texts, etc. to elaborate & explain.

Classes

- Three classes were involved in this project:
  - Biology 122 (Organismal Biology II) taught Fall 2015 (N = 8 students)
  - Biology 119 (Environmental Biology) taught Spring 2016 (N = 14 students)
  - Biology 122 (Organismal Biology II) taught Fall 2016 (N = 12 students)
- There were a total of 34 students in these 3 classes.

Best with small classes

- I also tried using the technique with one of my sections of Intro Bio non-major classes, Bio 114.
- The class had 32 students, rather than the 8-14 in the major classes.
- This proved to be too many; it took too long to go through one turn for the class, and I lost student focus and attention.
- My own experience was that the technique worked better with class size <15.

Student Buy-In

- At the beginning of each class, I explained what I wanted to do.
- Student objections were basically 2 themes:
  - Reading aloud in class is baby stuff.
  - Reading aloud is not my learning style.
- It was put to a vote, & all 3 classes voted to give it a 2-week trial.
- After 2 weeks all 3 classes voted to keep going.
Let's Give It A Try!

• We’ll now point to two handouts:
  • A somewhat difficult peer-reviewed scientific article on rapid evolution
  • We’ll read the first page or two using RA-TA
  • [click HERE for paper]
  • The original RA-TA paper for later reference
  • [click HERE for paper]

Survey

Please rate the following on a 1-5 scale, with 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neither Disagree nor Agree, 4 = Somewhat Agree and 5 = Strongly Agree.

1. It made me read the text more than I would have otherwise.
2. It made me understand the text more than I would have otherwise.
3. Dr. Pergams elaborating on the text was useful to me.
4. In general, I learned how to read difficult texts with greater comprehension.
5. I prefer a class conducted this way over a class with lecture and powerpoints.

The survey sheets were proctored by a student while Dr. Pergams was out of the room.

Results

Student Comments

• No longer thought reading aloud was “baby stuff”
• However, those who thought reading aloud was not their learning style did not change their minds
• Concerning [5. I prefer a class conducted this way over a class with lecture and powerpoints, 3.35, P = 0.04]
  – Students preferred STEM classes taught using reading aloud, but not other classes
  – This makes sense, considering STEM classes have much more jargon
Conclusions

- Students very strongly thought that reading aloud in biology class helped them:
  - Read the text more
  - Understand the text more
  - Thought the instructor elaborating was useful
  - Understand other texts more
- And to a lesser extent:
  - Thought other classes should be conducted this way, but only STEM classes
- This technique works better with smaller classes, < about 15

Application in the Online Setting

- Especially suited to remote teaching
- Difficult to assess student engagement with remote lecture material (or even whether students are actually present)
- Students have to stick around and engage so they don’t miss their turn reading

If you would like to try this technique we’d be happy to help!

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The authors would also like to thank the 34 brave students!