IDEAS TAKING ROOT
Deepening Learning Through Biological Storytelling with Grade 11 Boys
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RESEARCH QUESTION: How might the storied nature of scientific knowledge deepen curricular connections in Biology for Grade 11 boys?

INTRODUCTION
Despite many interventions and modifications, my Biology 11 students struggled with academic success in our unit on plants. I believed that if they could appreciate that Science was its own valid and compelling story, they might find it easier to learn the material and forge deeper curricular connections. I did not want to make the content anthropomorphic, as senior students can find it patronizing (Rowcliffe, 2004). I wanted to develop a storytelling framework where plant content was structured using the elements of a short story so that evolutionary cause and effect could be linked (Wilrich, 2012). The goal of this project was to determine how changing my teaching style would impact student learning.

RESEARCH CONTEXT AND PARTICIPANTS
St. George's School, founded in 1930, has 1,850 students from Grades 1-12. Of these, 110 are boarders in Grades 8-12 and come from over 20 countries worldwide. Nine students were selected from my Biology 11 course. The research window ran from early September through early December, encompassing 28 classes of 70 minutes each.

THE RESEARCH ACTION
The entire unit was redesigned so that it was within a storytelling framework. Content was reorganized so that each plant phyla became its own chapter in the story of plants. Key facts of plants were presented as story components: setting (habitat), strengths and weakness of the hero (key phyla characteristics), family members (specific characteristics of subphyla), conflict (competition and limiting factors), growth and development (plant life), and romantic interests (sexual reproduction). Each class began with a review of the previous “chapter” and seeing where the story had ended before presenting new content as the next “chapter”. “Story” days generally alternated with lab skill days.

DATA COLLECTION
During the action research, I kept my own journal. I collected responses from student lab activities, an end of unit essay, and reflections from the boy’s personal research projects. Pre- and post-unit, I assessed content knowledge and attitudinal changes through:
- Multiple choice content assessment
- Open-ended questionnaire responses
- Personal reflection videos
- Mind maps

DATA ANALYSIS
The data were sifted through my research question framework to generate 4 themes,

- Content Acquisition
  - The summary essay, mind maps, multiple choices tests, and personal responses all showed a dramatic increase and retention of course content

- Active Engagement
  - Students were on-task during direct instructional times and during lab activities. Little off-topic conversation and almost no cellphone use

- Increased complexity of thought
  - Mind map and essay responses showed the students forming coherent, well-developed arguments and demonstrating enhanced critical thinking skills

- Embraced the “story of Science”
  - Students shifted from “Stories don’t really have a role in Science” to “Stories are just another way of looking at Science”

KEY FINDINGS AND DISCUSSION

- “Stories can help communicate scientific findings, scientific information, and... link it to why we care.”
- “We can use past stories to do new, different experiments and scientific research.”
- “Science can be viewed as a collection of stories... each transformation can be viewed as a new story.”
- “Science itself can be spoken through and determined with story. Except for maybe Physics!”

DATA TYPES
- Questionnaires
  - Phrases transcribed into tables
- Mind maps
  - Coded for word usage, number of connections, and complexity of thought
- Videos
  - Transcribed for content
- Facial expressions, body language, tone of voice also coded
- Multiple choice test
  - A paired t-test analysis conducted on scores
- Summary Essay
  - PEE chains coded for completion and complexity

CONCLUSION
Using a storied framework increased my Biology 11 boys’ ability to make connections. The boys demonstrated a much deeper understanding of the material, as shown in their essays, labs, and video responses.

I hoped for increased content acquisition and critical thinking skills. I was not expecting increased engagement during class. The framework’s impact was huge for my classes.

This approach worked well with a senior group of students and could translate well to other Biology courses (AP Environmental Science). I would be interested to see how this approach might work in junior Science classes (grade 8 and 9).

Biggest impact: Two months later in another unit, I switched back to my old methods. My students asked if we could use the storytelling framework because “I miss it and found it really helpful.” I am reformatting this unit and adapting the rest of this course to utilize this framework.

KEY READINGS