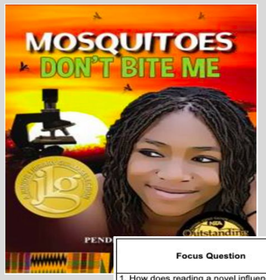
Reading a Novel in Middle School Science: The Impact of Socioscientific Issues

Susie Dobkins, Eileen Johnson Middle School, Billings, MT

Background

This study was conducted at Eileen Johnson Middle School, a 6-8 public middle school with about 400 students located in Billings, Montana. Since the No Child Left Behind Act in 2002, schools have been under increased scrutiny to raise their student test scores in reading and math. Many schools have begun taking away students science, social studies, and elective courses if they are testing below average in reading and/or math and placing them in an additional reading and/or math intervention course. Due to this emphasis on reading, core content teachers are given professional development that focuses on content-specific and disciplinary literacy strategies. Simultaneously, there is a huge push to teach students social and emotional skills and to obtain 21st century skills. This study aimed to see if incorporating a novel in a seventh grade life science class could have a positive impact on students enjoyment of reading, science content understanding, build 21st century skills such as perspective-taking and global-mindedness, as well as increase students understanding of socioscientific issues. Socioscientific issues (SSIs) are situations between society, open to multiple perspectives, and are generally complex that allow students to take what they are learning conceptually in class and apply that knowledge to real-world contexts (Sadler & Zeidler 2004; Zeidler & Khan 2014).

Methodology



- This study was conducted with a total of 99 seventh grade life science students.
- Forty-six of these students were the treatment group and read the book Mosquitoes Don't Bite Me by Pendred Noyce and 53 of them were the control group and did not read the book.
- The book was a novel about a seventh grade girl who is recruited by a large medical company to help with medical research that studies the compounds in her skin that make her resistant to mosquitoes. The book also shows how malaria affects other countries, healthy disparities that are faced globally, and who owns biological information.

Focus Question	Data Collection Methods	
	Pre-Reading Survey	Post-Reading Survey
1. How does reading a novel influence student understanding of socioscientific issues?	X	X
2. Is there a relationship between socioscientific understanding and students' perceptions of their global-mindedness and perspective-taking?	X	X
3. Does reading a book about socioscientific issues have an impact on science content understanding?	X	X
4. Does reading a novel in science class increase students' enjoyment of reading?	X	X

- Students were given a pre and post survey before beginning their Traits and Reproduction Unit. Students read between five to eight pages of the book per day at the beginning of class. The class then discussed what had occurred during that section and the discussion flowed wherever students wanted it to.

Data & Analysis

- Students in the treatment group showed a medium normalized gain in science content understanding whereas students in the control group showed a low normalized gain
- Students showed a 75% increase in the answer reponse that showed an understanding of socioscientific issues, empathy, and a desire to be the scientist who cures malaria (Figure 1)
- Students showed an overall increase in responses that related to socioscientific issues such as who owns scientific information (Figure 2)
- Students who read the book had a large increase in seeing reading as useful in science (Figure 3)

Table 1: Normalized gains for average amount of answers correct on the pre and post survey for the treatment group (N=46) vs. the control group (N=53)

	All Science Content Questions (Questions 20, 23, 24, 25, and 27)
Normalized Gain (Gain of Averages)	
Treatment Group	0.4390243903
Control Group	0.2664874922

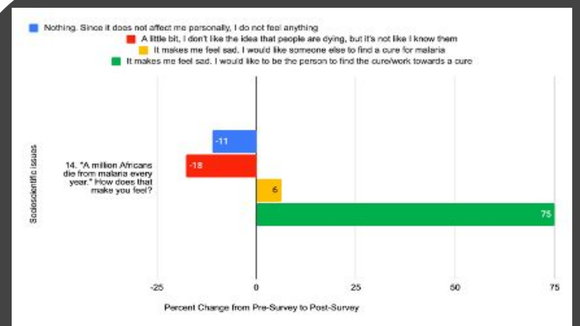


Figure 1. Treatment group responses to question fourteen (N=46).

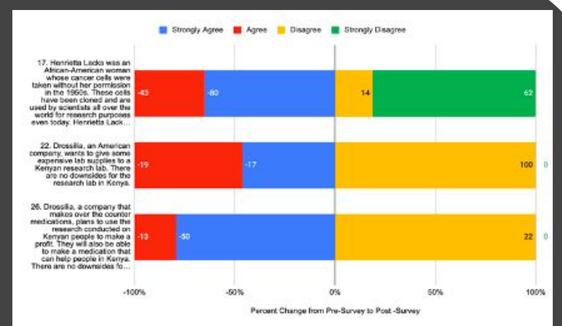


Figure 2. Treatment group results for questions seventeen, twenty-two, twenty-six on percent change from pre to post survey. (N=46).

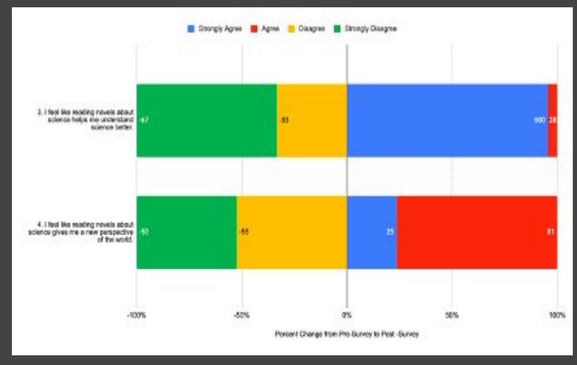


Figure 3. Treatment group percent change results from pre-survey to post-survey on questions three and four regarding reading in science (N=46).

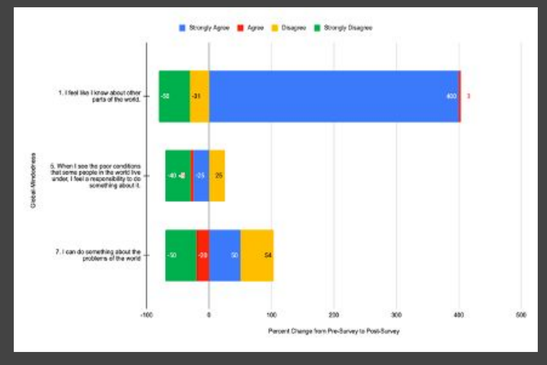


Figure 4. Treatment group four-part Likert responses on Global-Mindedness (N=46).

Conclusion

This study shows that there was an increase in science content scores of the treatment group that showed medium normalized gains and low normalized gains for the control group meaning reading a book on socioscientific issues could have helped students understand science content information. It also showed an increase in students understanding of socioscientific issues and global-mindedness. There was not a noticeable change in perspective-taking understanding. In addition, students who read the book had an overwhelming increase in ability to see reading in science as useful in building their knowledge about the world and understanding of science content. In the future, finding books like Mosquitoes Don't Bite Me by Pendred Noyce that could be incorporated across disciplines to incorporate reading and content-specific learning could have a large educational impact.

References

Sadler, Troy, & Zeidler, Dana L. (2004). The morality of socioscientific issues: Construal and resolution of genetic engineering dilemmas. Science Education (Salem, Mass.), 88(1), 4-27.
Zeidler, D. L., & Kahn, S. (2014). *It's debatable!: Using socioscientific issues to develop scientific literacy K-12*. NSTA press.
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