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MediaMatters: Examining the Nature of Science in Children's Animated Movies

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Abstract

Young people engage with multimedia sources that impact their understanding of what science is, what scientists do, and who scientists are. The purpose of this research is to explore if, and how, Nature of Science principles appear within four children's animated movies that feature a scientist or engineer. Utilizing the Nature of Science principles outlined in Next Generation Science Standards, we found that children's movies can provide opportunities to highlight and discuss what science is and what scientists do. This research seeks to encourage the use of science animated movies that support classroom discussions around scientific practices and concepts.

Aim

Using a summative content analysis (Hsieh, & Shannon, 2005), this research project quantifies scientific language, visuals, and interactions within children's animated movies where a scientist or engineer is the main character. Foregrounding the notion that media plays an integral part in informing children's conceptions about the world around them, children's animated movies were conceptualized as potentially important texts to initiate conversations about the Nature of Science.

Problem

When conducting a Google search on the word "scientist," I found that search results were of mostly white men, people wearing lab coats/glasses/goggles, and in a lab setting. Additionally, only three photos depicted two or more people working together, thus, reinforcing a notion that scientists are loners (Good, Woodzicka, & Wingfield, 2010). According to this Google search, the media points toward a specific nature of science. This anecdotal finding is supported by similar findings in literature from scholars utilizing the "draw-a-scientists test" (Chambers, 1983; Finson, 2002), where children often depict similar images of scientists within their drawings. I argue that these depictions of science and scientists may be even more harmful for young people from historically marginalized communities, as young people as early as seven years of age have racialized and gendered concepts of science and scientists that is partially informed by the media they consume (Walls, 2012).

In 2013, new federal standards, Next Generation Science Standards (NGSS) were introduced and required a strong focus on student inquiry specifically in science and engineering (NGSS Lead States, 2013). Each NGSS statement has a grade-appropriate science and engineering practice (SEP), disciplinary core idea (DCI), and cross cutting concept (CC) (NGSS Lead States, 2013). The NGSS framework was accompanied with Appendix H that listed Nature of Science (NoS) principles. These principles expanded on SEPs as a means to bridge them DCIs through tactics and strategies that reflect use of evidence, ability of interpretation, and construction of explanations.

Combining the need for media representation and the practicality of NoS principles led to the emergence of the research question for this study: *How are the Nature of Science principles expressed in science focused-animated films?*

Findings

Unpacking the cognitive theory of multimedia learning (Mayer, Heiser, & Lonn, 2001) as the framework for this research, the three assumptions proposed are the separate channels (audio and visual) for the uptake of media, a maximum capacity for each channel, and learning is a process of filtering, selecting, and organizing. The four science focused-animated films selected for coding were *Rio*, *Cloudy with a Chance of Meatballs*, *Meet the Robinsons*, and *Big Hero 6*. The movies were identified using three criteria: scientist as a primary character, explicitly identified as a scientist, scientist depicted as a human character. The codebook were the NoS principles as found in Appendix H of NGSS (NGSS Lead States, 2013).

The coders coded the movies separately including the language, visuals, and interactions within the movies using NoS principles as the codebook. Any discrepancies that arose between the coders were resolved through reviewing movie footage. The NoS principles that were most frequent among the four movies were the principle related to scientific models, laws, mechanisms, the principle related to theories explain natural phenomena, and the principle related to science is a human endeavour. The movie that expressed the most NoS principles was *Big Hero 6*. The movie that expressed the least amount of NoS principles was *Rio*.

Discussion/Conclusion

Children's animated movies do express Nature of Science principles in language, visuals, and interactions. Science educators could use *Big Hero 6* to provide the most relevant examples of how to bridge NGSS practices and concepts to students. This type of research can be used to inform media used in science education and influence the types of media made for science education.

Implications

Using media literacy as a method of teaching, science educators can engage with children's animated movies as a curricular resource. Media chosen to be used in the classroom should not only be expressive of NGSS NoS principles, but also be critically analyzed. The media should be analyzed with the understanding of three main concepts: 1) media messages have been created within economic, social, political, historical, and aesthetic contexts; 2) media interpretation relies on the interaction of media, culture, and person; 3) media representations play a role in people's understanding of social reality (Aufderheide, 1993). With this media analysis in mind, future research opportunities include exploring the representations of black boys and men and the positionality of women as scientists within science focused-animated films.

Biography:

Rasheda Likely received her Bachelors of Science and Masters of Science in Biology from the University of North Florida. After working as a medical scientist with the Florida

Department of Health, she moved to Philadelphia to pursue a doctorate in STEM Education from Drexel University. As a third year student, she has been a Physiology teacher assistant, research assistant to Drs. Chris Wright, Aroutis Foster, and Nancy Songer, and a member of the Critical Conversations in Urban Education Committee. She has developed and implemented an after-school science enrichment curriculum called “Everyday Science” with elementary and middle school students throughout Philadelphia. Her research focuses on curriculum development incorporating culturally sustaining pedagogies, Next Generation Science Standards, and the nature of science principles.

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