Nature of Science and Math: Analyzing the Presence in Everyday Communication

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Abstract

The article, “How Exercise Affects Our Memory” by Gretchen Reynolds was recently published in the New York Times. This article can be found at the following link: https://www.nytimes.com/2019/05/01/well/move/how-exercise-affects-our-memory.html It describes a scientific study in which scientists at the University of Maryland explored how a single workout might change the way the brain processed semantic memories (Reynolds, 2019). This paper will identify three tenets of the Nature of Science and three Common Core Mathematics Practices identified in the article. Tenets and practices that the article did not meet will also be discussed.

Part A: Tenets of the Nature of Science

1) Scientific Knowledge is Based on Empirical Evidence

Science helps to develop the ability to ask well-formulated questions that can be investigated empirically (National Research Council, 2012). This study adds to growing evidence that exercise improves brain function. This article uses evidence to strengthen ideas (NGSS Lead States, 2013) and the results could lead to long-term improvements on memory.

2) Scientific Knowledge is Open to Revision in Light of New Evidence

Change results from new observations and the reinterpretation of existing information (Schwartz, 2007). Until recently, scientists thought that by adulthood, human brains were fixed in their structure and function (Reynolds, 2019). Scientific knowledge is subject to change based on new evidence (NGSS Lead States, 2013). Scientists draw from established theories and propose extensions (National Research Council, 2012).

3) Science is a Way of Knowing

Science is a body of knowledge, but also a process that adds new knowledge (NGSS Lead States, 2013). There is significant amount of knowledge emphasizing the long-term impact of exercise. Scientists gained knowledge and found evidence that showed there was a spike in brain activity even after the first exercise session (Reynolds, 2019).

Part B: Common Core Mathematics Practices

1) Construct Viable Arguments and Critique the Reasoning of Others

In this study, the scientists analyzed previous studies that focused on long-term effects of exercise and memory. They broke them into cases, such as the 26 healthy men and women from ages 55-85 who participated in this study (Reynolds, 2019).

2) Use Appropriate Tools Strategically

The scientists in this study did not necessarily use typical mathematical tools, yet they used tools to investigate brain activity and exercise's impact on memory. Researchers used technological tools by having volunteers lay inside an MRI brain scanner and watch names flash across a computer screen overhead (Reynolds, 2019). The researchers tracked their brain activity over all, as well as in the portions involving memory processing (Reynolds, 2019).

3) Look for and Express Regularity in Repeated Reasoning

The scientists who did the research for this study are interested in examining issues regarding exercise and memory in future studies. They hope to narrow down their research to examine the best types and amounts of exercise to help people maintain memories. This is similar to how mathematicians continually evaluate the reasonableness of their intermediate results (Common Core State Standards Initiative K-12 Standards Development Teams, 2019).

Part C: Tenets and Practices That the Article Did Not Meet

1) Model with Mathematics

There were probably many mathematical calculations in this study. It would have been beneficial to see some of these calculations described. It also would have been helpful for the author of this article to include some of the results and statistics displayed in graphs and tables.

2) Attend to Precision

Scientists were probably very precise with formulas they used and calculations completed, but there was no evidence of this in the article. It would have been appropriate to see formulated explanations and more details specifying units of measure and calculations.

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References

Common Core State Standards Initiative K-12 Standards Development Teams. Retrieved June 2, 2019, from: http://www.corestandards.org/Math/Practice/

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