The importance of explanation as a means of providing evidence of understanding is heavily emphasized in education. An explanation is a reasoned justification that can be applied to a concept or idea and a good explanation can teach another individual the same concept, to the same or to a similar extent of understanding. By explaining a concept to another person, an understanding of the material is demonstrated. The extent to which an explanation can be considered "good" is dependent on the previously existing personal knowledge of both the person who is explaining and the person who must comprehend the knowledge. If the person who is comprehending the knowledge has a vast background in the concept or topic being explained, then they are more qualified to judge whether or not the explanation provided is accurate. The extent to which an explanation is factually and conceptually accurate is what makes the explanation true. As a result, good explanations do not necessarily have to be true. If an explanation is conceptually accurate, but lacks factual consistency, it still has the potential to be valuable to someone with a limited background on a topic, especially if the goal is to gain a basic understanding of the concept.

This is especially evident in the natural and human sciences. Many of the techniques used to study very factually based areas of knowledge, such as the hard sciences, include explanations that are not necessarily true. For example, in order to understand the concept of enzymes and how they function, my biology teacher had us do an activity where we cut up construction paper into random shapes to model the site specificity of enzymes. Only the pieces of construction paper that fit perfectly together could cause a chemical reaction, while the others were unable to activate the enzyme. This use of interactive modeling was a good explanation because it helped to explain a complex biological concept to ninth graders in a manner that allowed for a visual understanding of enzyme function. However, this explanation is not necessarily true. While the concept is factually correct, enzymes are not made of construction paper, nor are they shaped by scissors. Additionally, from a professional biologist's perspective, this is a major over simplification of the biological significance of enzymes. Despite this, the activity remains a good explanation because it instilled a basic understanding of enzymes that could be built upon in later classes.

The use of modeling as a means of explanation is actually very common in the hard sciences, but is especially important in health sciences. Doctors and Nurses use model dummies that behave like humans to practice skills such as drawing blood or taking blood pressure. These dummies have human like skin, veins, and breathing patterns. While these models can resemble a human and share many physical attributes as one, they can never truly mimic the unpredictability of human nature, or the emotional aspect of a human. Despite this inconsistency of dummy versus genuine human, the dummies are a good way to explain and practice medical techniques, without the repercussions of harming a life. Simulations done with the dummies adequately convey the conceptual knowledge of the challenges that a medical professional may face when working with a real patient and are useful for understanding the human body. As a result, these models demonstrate value as an explanation of the how the human body works, despite being technically untrue.

In addition to conceptual models, predictive models are also widely used in science. Common areas that use predictive modeling are whether forecasting and climatology. These areas use preexisting knowledge of the climate and processes, such as the carbon cycle, to predict future climate. The model is designed to predict climate based on the knowledge of how individual processes work, and how these process will interact with each other (Scientific Modeling). These predictions are good explanations because they do, to a certain extent, use factually based knowledge to come to a conclusive model. It is also important to consider that while climate models can predict general patterns, it is a common misconception to consider a prediction as certain, when in fact it is not. Similarly, to any other model, climate or whether models can never be absolute, despite coming close. Therefore, when considering the uncertainty of a climate model, it can still offer a good generalization or explanation for climate change.

The extent to which good explanations may not be true is not limited to hard sciences. In fact, there are many examples of good historical explanations reflected through art. For example, the classic movie *The Titanic* exemplifies how an untrue narrative may convey true ideas. While the love story between Jack and Rose, from the 1997 film may not be factually accurate, other aspects of the film convey true events. This is evident in the sinking of the Titanic. While the ship may not have been an exact replica, and many aspects of the film were modernized or overexaggerated for dramatic effect, the baseline of the historical event is conveyed. An individual who did not have any knowledge of the true Titanic sinking may be able to gain a basic understanding of the event. This demonstrates that the film serves as a good explanation despite the factual historical inconsistencies.

Another use of art as a good explanation is through music. Songs such as the ABC's and the parts of the skeleton song are effective methods of conveying basic skills and knowledge. The ABC's are a common song used to teach adolescents the alphabet and are good explanations because of their factual and conceptual accuracy. However, in a real life application of the alphabet, the order in which the letters are placed depends on the word and not on the song. Never the less, the song continues to be a good explanation of the alphabet for kids. Similarly, the skeletal bones song gives a basic idea of the main bones that comprise the skeletal structure, but lacks the factual accuracy for every bone. In many instances previously existing songs can be altered with factual information. These are known as parodies. Parodies are a good way for auditory learners to memorize or understand a concept. Additionally, they can be altered to be factually and conceptually accurate, as well as reasonably to convey a good explanation, as long the integrity of the concept is maintained.

The depiction of politics through political cartoons are another artful method of explanation. In a political cartoon, the artist may use many techniques to explain their point of view. For example, exaggerating facial features or enlarged body parts may mock the character portrayed. Other aspects, such as the props or the colors used in the work also contribute to the artists' explanation of their perspective. Similarly, to political cartoons, art in the form of paintings uses the same method of explanation. By examining a piece as a whole, the viewer is able to interpret the artists' perspective, and may even be able to distinguish the reason for this perspective. However, the subjective aspect of art weakens the value of the explanation. Since any one work can have a variety of meanings to different people, the art cannot be judged on the criteria of what is factually or conceptually correct. However, art can still prove to be a form of good explanation, when some factual information, is included, such as a painting of a landscape. The landscape, if based on a true location, helps the viewer to gain a visual understanding of the landscape, despite not being there.

Overall, good explanations do not have to be true. As seen through models, and various art forms, both in a hard science setting and in an art setting, if a work is able to convey a basic understanding of the idea behind it, then it is a good explanation. This applies even if not all aspects of the object being used to explain a concept are factually true.

Not all good explanations must be true

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TOK 12
2/19/19
Word Count: 1325

Works Cited

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