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Using *How to Train Your Dragon* to teach about endangered species, the scientific method, and popularization of science

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How to Train Your Dragon (2010) is one of DreamWorks' most famous movies and is set on the fictional Berk, a place where fighting between Vikings and dragons is pretty common. The movie focuses on Hiccup, a teenage Viking, who despite being rather clumsy, is willing to defeat his first dragon. He ends up eventually capturing one of the most powerful dragons known: a Night Fury (nicknamed Toothless during the plot).

Movie poster. Image extracted from IMDb.

After capturing the dragon – and not feeling right about it – Hiccup chooses to free it and a friendship between the two is formed. Hiccup then finds himself in a dilemma: to face a dragon and make the other Vikings (including his father, Stoick the Vast, leader of the village of Berk) proud or to convince them that dragons are not as dangerous as they think and that it is possible to live in harmony with them.

Well, as it is not my intention to give bigger spoilers, I think it is better to go for what really matters: how the movie can help people understand the need to protect endangered species, how the scientific method works, and the importance of popularization of science. Each of these topics will now be discussed in more detail.

PROTECTING ENDANGERED SPECIES

If dragons were classified according to their extinction risk (just as real species are classified by the International Union for Conservation of Nature, IUCN, for example), Night Furies would surely be classified as 'Threatened'. Widely hunted in the past, Toothless is one of the few remaining individuals of the species.

Even though behavioral comparisons between Toothless and cats are common on the Internet, a large part of the franchise's fan-

base believes Night Furies were inspired, at least partially, by axolotls, *Ambystoma mexicanum*. Those are salamanders (amphibians) known for not undergoing full metamorphosis process and for their capacity for regeneration. Axolotls are classified as 'Critically Endangered' (the highest level of threat) by IUCN mainly because they suffer from invasive species and diseases and their habitat is seriously degraded by residential development, tourism activities and pollution (IUCN SSC Amphibian Specialist Group, 2020).

An axolotl. Image extracted from Wikimedia Commons (Faldrian, 2013).

Some of the main similarities between Toothless and axolotls are the physical form, and the presence of certain structures close to the head (equivalent to the axolotl gills). The coloring, in turn, also deserves to be highlighted. While Toothless has an entirely black body, a female of the species introduced in the third movie of the franchise is completely white. The colors of axolotls, however, are quite variable, although black and white are common. Unfortunately, Toothless does not have the regenerating power of axolotls (but, to compensate, it does have scales and can fly). Perhaps we can all learn from Hiccup about protecting endangered species, as one of the things he is concerned throughout the movie is protecting his new friend from the other Vikings.

It is also worth mentioning that DreamWorks has already participated in conservation campaigns of the World Wildlife Fund for Nature (WWF) and WildAid using some of its characters (for an example, see WildAid, 2019). Using characters that are popular among the public not only increases the visibility of those campaigns, but also makes the target species better known to the society. So why not use Toothless to draw attention to the conservation of axolotls? Even if Toothless was not really inspired by axolotls, since the public already made the association, there would be no reason not to help the conservation of that species.

THE SCIENTIFIC METHOD

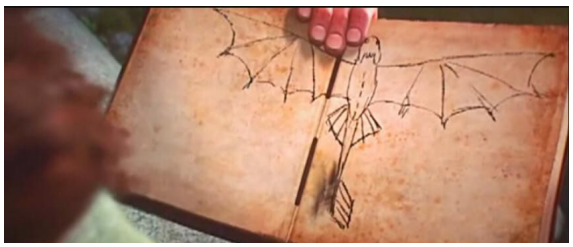
The rational and objective methodology used by scientists to acquire knowledge is what is called the scientific method. Its main steps are the observation (of certain fact), the proposal of a question (related to the problem), the formulation of a hypothesis (a proposed explanation), the experiment to test the hypothesis, and the conclusion/result signaling whether the hypothesis is objectively true or not (Popper, 1959). But what does this have to do with the movie?

Well, Hiccup, in addition to being an endangered species protector, seems to be a scientist using the scientific method to learn more about the biology, ecology, and behavior of dragons. It is exactly by watching his friend Toothless and testing some hypotheses with other dragons that Hiccup learns, among other things, that dragons do not like eels and love some types of grass. The movie provides, thus, an excellent visualization of how the scientific methods works, something that can be difficult to explain theoretically, functioning as a teaching tool that could be useful for teachers and researchers when communicating science.

THE IMPORTANCE OF POPULARIZING SCIENCE

Popularization of science can be understood as bringing the science to the public, that is, the dissemination of scientific knowledge. In a world where conflicts be-

tween Vikings and dragons are frequent, Hiccup believes that if he shows what he has discovered (or, in other words, if he popularizes science), he may end up saving the dragons. Nonetheless, convincing his friends will be infinitely easier than convincing his father that dragons are kind but misunderstood creatures.



Hiccup's sketch of the Night Fury. Screen capture from the movie; © DreamWorks.

Science communication is becoming increasingly important, since scientists from all over the world have understood that knowledge should not only remain in academic circles but permeate throughout society (Feliú-Mójer, 2015). The movie, in this way, can act as an inspiration for such professionals.

CONCLUSIONS

How to Train Your Dragon proves to be an excellent learning opportunity from which everyone can benefit. Helping to understand the need to protect endangered species, how the scientific method works, and the importance of popularizing science is just a part of its potential, which could also include, for example, historical aspects regarding Vikings and cultural aspects concerning mythological creatures.

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About the author

Matheus Drago is an environmental scientist whose research focuses on the conservation of endangered species. He is extremely interested in science popularization and *How to Train Your Dragon* is one of his favorite animated movies.