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Introducing the History of Science through Games at a Religious University

Michael Weismeyer

Having attended religious schools for most of my education and now teaching at one, I have experienced first hand both sides of the classroom for the teaching of science and the history of science in religious institutions. Now as a professor at a Seventh-day Adventist university, I seek to respect and uphold the religious tradition and philosophy of the institution while also providing my students with the best academic experience. In this talk, I am going to highlight the way I use historical games as a pedagogical practice, and the benefits these role playing games provide for students in general as well as a unique benefit at a religious institution.

For some context, the Seventh-day Adventist Church operates one of the largest educational systems in the world, with K-12 schools and a number of colleges and universities throughout North America as well as in many other countries. Throughout its history, the Seventh-day Adventist Church has been engaged in issues of science and religion. In my own research, I have seen how in the 1860s early in the Seventh-day Adventist Church's history, articles were published in the church's official magazine speaking out against the new theory of evolution. In the 1880s, issues surrounding evolution were mentioned as a reason for the founding of one of the church's first colleges. As Ron Numbers showed in *The Creationists*, Seventh-day Adventists played an important role in the creation science movement. Today, while many Adventists adhere to young earth creationism, others believe in some sort of theistic evolution. Thus, the students that I teach come from a wide variety of backgrounds with many never having thought seriously about these issues or why they believe what they believe. Many of my students in history of science classes are science majors, and most are taking these classes for their general education requirement. In my history of science classes, it is not my point to try to

change the beliefs of my students or to teach them science in general, but to help them think more critically and better understand the historical backgrounds of science.

Currently, I teach a general history of science class and this year began to teach an honors class in the history of technology. I have structured the classes to provide an overview of the subject with coverage from the ancient world to the present and focusing especially from the 1400s to the early 1900s. While much of my class is based around lectures and textbook readings, I have incorporated historical game playing into the classes as a way of helping students better understand the complexity and contingency of history as well as get them more engaged in the material. In doing so, I have not shied away from topics related to science and religion, and in fact have used games that explicitly address those issues.

In my general history of science class I use three games and one game in my history of technology class. The games are published through the Reacting to the Past Consortium. While not all the games specifically involve religion and science, all the games get students to think more critically about science, history, and their approach to examining the world.

A couple of weeks ago, my history of technology class finished playing the game “Rage Against the Machine, 1817: Technology, Rebellion, and the Industrial Revolution.” This game is set in Manchester, England, in 1817, and involves use of technology in the Industrial Revolution. Students play roles deriving from different classes, including the aristocracy, merchants, craftsmen, weavers, and spinsters, as well as newspaper editors and clergy. Some roles are secretly Luddites, while others are strong proponents of the newest technology. Through the game, students work to raise their social status and gain wealth by navigating what to do with the new technology of machines for the textile industry and the role of factories in society. In individual meetings and class discussions throughout and after the game, students expressed how

the game deepened their understanding of the role technology has in society and related the differing views of factory machines from the early 1800s to how society is thinking about technology today. Several students brought up connections to artificial intelligence, and how the game prompted them to think differently about the use of AI, and also the fears and promise that surround the use of AI.

In my general history of science class, I include three games—one short game and two longer games. The shorter game deals with a cholera epidemic and the longer games are on the trial of Galileo and whether Darwin should receive the Copley Medal. The short game is “London 1854: Cesspits, Cholera, and Conflict over the Broad Street Pump,” set in London in 1854 during the cholera epidemic in which John Snow got the handle of the Broad Street pump removed to stop the spread of the disease. Students take on the role of different members of the local council and debate issues related to the epidemic and the best way for handling the situation, including whether the pump handle should be removed. Coming in the wake of the Covid-19 pandemic, the game has particular relevance. Students are faced with making decisions without the current scientific understanding of cholera. Teaching in a part of the country where Covid-19 mitigation measures were more hotly debated, students can gain more empathy to the public health officials who were trying to determine a course of action with incomplete knowledge while still protecting the public.

The first of the two longer games I used in the history of science class is “The Trial of Galileo: Aristotelianism, the New Cosmology, and the Catholic Church, 1616-1633.” This game forces students to address issues of authority, meanings of the Bible, and whether to accept new scientific ideas, all issues that resonate today and particularly at a religious college. Some students take on roles that are hostile to the ideas of Galileo and Copernicus, while others are

defenders of the new cosmology. Still others are open to be persuaded as to which view is correct. Students read portions from several of Galileo's most important work. Playing a game that centers around the incident often cited as a prime basis for the conflict thesis, and is still used today ahistorically by proponents on either side of that debate, helps students understand to a far greater degree the complexity of the Galileo affair and why the simplistic understanding often portrayed leaves much of the complicated history out.

The final game I am using for my history of science class is "Charles Darwin, the Copley Medal, and the Rise of Naturalism, 1861-1864." The central question in this game is whether Darwin should receive the Royal Society's most prestigious award, the Copley Medal. Students play members of the Royal Society, and debated are issues of natural versus teleological views of the world and the meaning of inductive science as well as the implications of Darwin's ideas on the role of women, race, and society at large. While the trial of Galileo may be an oft-cited example of the conflict thesis, no other event in the history of science provokes more controversy in terms of religion versus science than Darwin and evolution. Thus, this is a topic that my students will be more familiar with and may come to the class with the most preconceived ideas. As I am not teaching a science class, I do not try to address the scientific merits of Darwinian evolution but instead work to have students think about why Darwin's ideas may have been controversial at the time and what effect his ideas had and still have on society. Although many of my students will have studied evolution to some degree in a science class, few if any will have ever read Darwin himself. This game, like the others, relies heavily on primary sources for the basis of the game, and significant excerpts of *On the Origin of Species* by Darwin as well as works by William Paley and Samuel Wilberforce. When I first played the game, I was not sure how my students might react. In comments made by some of them, I could tell that some were

definite believers in a recent creation while others were skeptical of that or embraced evolution. It was not my intention to try to change the beliefs of my students regarding evolution and creation, but I did hope that students would think critically as to why they believed what they did and would be able to defend that. In the game, some students had to make arguments for ideas that they did not personally subscribe to, just as in the Galileo game some students had to defend a geocentric universe. Following the game when students were asked to state how it had affected their personal beliefs, one student said it had helped him strengthen his faith as he examined the issues more closely for the first time.

Reflecting overall on the use of games in history of science classes, I see several distinct advantages. First, the students find the role playing fun and engaging and are more apt to take the reading seriously. As they are having to make speeches and defend positions in front of their classmates on the basis of the primary and secondary readings, they are more likely to read and study them than their normal textbooks where other students will not know how they did on a quiz or exam. Along with that comes greater analysis of primary sources. In my history classes, I conduct one-on-one office hour visits with students in which we discuss a primary source. I find that students playing the games generally have a deeper understanding and analysis of the reading than often students do in my other history classes. Students also get a better sense of the complexity of historical events than can be conveyed through a textbook or lecture. The interactions within the games force students to engage in sometimes complex decision making as they seek to convince other students of their ideas. Additionally, the games help students see that the history of science and history in general is not inevitable as sometimes seems to be the case from the way it is depicted in science textbooks or in society. Based on students' decisions, sometimes the game ends with outcomes other than what happened in history. There is always a

debrief day where I go over what actually did happen, but having events turn out differently than the historical record shows students that things did not have to be the way they ended up. Finally, and perhaps most importantly in the context of a religious university, the games allow the class to engage in issues that might otherwise be sensitive or perhaps difficult to discuss. Having a class discussion about the authority of the church with Galileo or the historical basis of evolution could potentially provoke some uncomfortable feelings for some students and may make it more difficult to evaluate the issues as critically. Using the games allows many of the same issues to be addressed but does so in an easier way for students to engage without being defensive based on prior beliefs. While playing these games can have great pedagogical benefit at any school, I find that using them in a history of science class at a religious university has unique benefits. These benefits can enable students to better understand history and the world around them. No matter where they end up on their personal journey, hopefully the use of this pedagogical method will help students be more critical thinkers and learners and more deeply appreciate the basis for their own beliefs.