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Teaching the History and Philosophy of Astronomy

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Abstract

A framework is presented for teaching the history and philosophy of astronomy in a way that engages students, and lets them work in small groups, and encourages them to develop writing and reasoning skills.

Keywords: Teaching, Astronomy, History, Philosophy, Course

1 Introduction

Astronomy is a subject with a rich and long history, and connections to the development of some of the most important ideas in the history of physics. The philosophical implications of the subject are often neglected in introductory courses. A new course on the history and philosophy of astronomy was created using pedagogy that emphasizes discussion and work in small groups, and lets students develop writing and reasoning skills (Impey, 2023). There is a corresponding MOOC or massive open online class (Coursera, 2023). The online tool VoiceThread was used for students to build weekly multimedia assignments and they got credit for commenting on each other's work (Erickson, 2020). The course assumes no prior astronomy knowledge and it has attracted a wide range of non-science majors in the three times it has been offered since 2020.

2 Learning Goals

The course divides into 13 weekly modules: Ancient Skies, Greek Science, Revolutions, Telescopes, Gravity, Evolution, Mapping,

Relativity, Quantum Theory, Stars and Atoms, Galaxies, Big Bang, and Life in the Universe. It is for non-science students who can benefit from an appreciation for our understanding of how the universe works. The learning goals are to:

- Appreciate the role of logic and the scientific method in advancing astronomy knowledge.
- Understand how different cultures have conceived of space and time throughout history.
- Describe how dramatically our view of the universe has changed in the past century.
- Convey aspects of astronomy to peers in a way that non-science majors would understand.
- Recognize the different roles of theory and observation in advancing our understanding.
- Describe the relationship of astronomy to other fields of science and to culture and religion.
- See how science strives for objectivity, but also how it operates as a human, cultural activity.
- Understand how philosophical thinking and pure logic can advance astronomical knowledge.
- Demonstrate comprehension of an astronomy topic and share it in a multimedia presentation.

References

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