

What to teach? What is learned? Astronomy as an amalgam of new and old



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What to teach? What is learned? Astronomy as an amalgam of new and old

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Abstract

The tension between contemporary astronomy and traditional topics as subjects for general astronomy courses or fundamental science courses is healthy, but one must worry if either type crowds out the other. Too often only topics understood hundreds of thousands of years ago (such as gravity, tides, phases, and seasons) take up such a large fraction of the astronomy content that few or none of the fascinating and important discoveries of recent centuries not to mention recent years or months are included. I discuss aspects of this problem. Including topics of contemporary interest often motivates students to concentrate their attention and study time on the entire range of topics in the course. Practitioners of the new field of Astronomy Education Research seem often to attack their subject in perpendicular fashion to the methods of practitioners of communicating astronomy to the public. I also discuss some of the content of our International Astronomical Union's Commission on Education and Development's special session from 2003 on *Effective Teaching and Learning of Astronomy*, and of the forthcoming volume of the same title to be published by Cambridge University Press. I further discuss the role of inspiring events, such as George Ellery Hale's inspiration from the 1882 transit of Venus and the potential from the widespread observation of the 2004 transit of Venus and of solar eclipses.

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ABSTRACT Astronomy is experiencing a rapid growth in data size and complexity. This change fosters the development of data-driven science as a useful companion to the common model-driven data analysis paradigm, where astronomers develop automatic tools to mine datasets and extract novel information from them. In recent years, machine learning algorithms have become increasingly popular among astronomers, and are now used for a wide variety of tasks. In light of these developments, and the promise and challenges associated with them, the IAC Winter School 2018 focused on big data in Astronomy, Astronomy and Mathematics. ARATUS ON THE POLES Sources Closely Related. Because the Romans learned astronomy from Aratus and Crates, whose works were practical and simplistic, they tended either to disregard, to misunderstand, or, at best, to depreciate the better Hellenistic astronomers, such as Aristarchus and Hipparchus. Heliocentric Universe. They even exaggerated his influence, as did the Elder Pliny, who thought that Hipparchus had swept the heavens clean of supernatural nonsense and left rationality in its place. Despite lavish. Posidonius taught that God manages the universe through reason and there were three causes: matter, the soul (prime active power), and reason (the principle or directive of activity). Astronomy education or astronomy education research (AER) refers both to the methods currently used to teach the science of astronomy and to an area of pedagogical research that seeks to improve those methods. Specifically, AER includes systematic techniques honed in science and physics education to understand what and how students learn about astronomy and determine how teachers can create more effective learning environments.