P2.2 AN UNDERGRADUATE PERSPECTIVES COURSE ON THE HISTORY OF METEOROLOGY

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1. INTRODUCTION

The field of meteorology has progressed both as a basic and applied science and has played a leading role in the development of electronic computing, remote sensing, aviation technologies, and computational modeling, among others. Information about weather and climate is now used in nearly every sector of our society. An understanding of the progress in any science, and especially in atmospheric sciences, is essential to the understanding of the scientific method, the path of scientific discovery, and the processes by which science and technology are integrated into mainstream society. Several studies such as Abd-El-Khalick and Lederman (2000) have shown that students with coursework in the history of science may not necessarily exhibit enhanced views on the nature of science, but that it can affect their views on nature of science if the history course is taken prior to a science course. Furthermore, other studies (e.g., Akerson et al. 2000) have shown that history of science courses may help pre-service teachers develop more adequate and enriched views of the nature of science.

2. COURSE DESCRIPTION

An undergraduate course on the *History of Meteorology* was developed as a Perspectives course. Perspective courses are defined as courses that are interdisciplinary and/or multicultural in content, and require a high level of educational maturity, knowledge and thinking. Perspectives courses have prerequisites of English Composition and 24 hours of general education coursework. Every student at Millersville University is required to take at least one Perspectives course as part of the university General Education Liberal Arts Core requirements, typically during the student's junior or senior years.

The *History of Meteorology* course is considered a perspectives course since it is designed to provide the students with a unique perspective on the processes of scientific discovery, method, progress, and vision. This course provides an understanding with which to calibrate where we are, where we have been, and the direction we are moving as a critical field of science. The innovations and advances in the field are discussed in the context of major historical events and breakthroughs of the 20th Century. The course follows a chronology starting with the pre-World War I era, followed by the growth of meteorology as an academic discipline, the Bergen school through World War II, the development of observational tools, and the integration of meteorology into the computer era in the later 20th Century.

In this course, an emphasis is placed on the importance of societal needs and the influence of societal needs and demands on the developments in the field of meteorology. From the early beginnings to the current demands for advanced knowledge to deal with issues such as global warming, climate change, and policy making, the need for better prediction has influenced developments in the field of meteorology. The cross-disciplinary nature of this course makes it a ideal course, not only for students in the sciences, but also for students of history, sociology, science education, or any student interested in the historical context of scientific advancements and technological developments.

The objectives of this course are to 1) examine the critical historical events in the evolution of meteorology, 2) critically analyze historical papers and understand the thought processes of key scientists that led to significant advancements in meteorology, 3) identify fundamental research initiatives that led to significant progress in the field, 4) analyze the current progress in the field by looking into the history of early as well as present developments in response to societal needs, and 5) analyze meteorological developments in the context of key societal issues and events.

As part of the course students are required to select a book related to some aspect of the history of meteorology. They make frequent short presentations on their readings and are asked to put their readings within the main theme of the course dealing with the relationship between the scientific developments and progress, and society. Furthermore, students are asked to analyze historical events in conjunction with scientific developments from a historical and a sociological perspective. Students learn to discern relationships between generalizations derived from the historical narrative and the nature of current scientific knowledge and practice. In addition, students are allowed to find their own solution frames concerning the nature of the science, based on their exposure to historical narratives, but are guided so that their preconceived misconceptions from previous experiences do not interfere with a realistic and more informed view of meteorology. This practice as suggested by Abd-El-Khalick and Lederman (2000) is an attempt to empower the students to further pursue and make sense of the workings of a rich and interesting intellectual endeavor.

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3. ASSESSMENT

This course was first taught in the Fall 2002. Further assessment is needed to explore whether taking a history of meteorology course influences the students' views of meteorology as a science.

Several techniques are used throughout the course to assess the objectives stated earlier in this paper. Student learning is assessed through:

1. Knowledge probe: Why should we study a science from a historical and sociological perspective?
2. Minute paper: What are the significant issues?
3. Approximate analogies: How can we connect the key relationships to something that we already know and understand?
4. Invented dialogues: Can we synthesize the knowledge of issues, personalities, historical events and periods into a structured conversation?

4. REFERENCES

Abd-El-Khalick, F., and N. G. Lederman, 2000: The influence of history of science courses on student's views of nature of science. *Journal of Research in Science Teaching*, **37**, 1057-1095.

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