3.10 PROBLEM BASED LEARNING: METEOROLOGICAL INSTRUMENTATION

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1. INTRODUCTION

Upper division coursework meteorological instrumentation and/or remote sensing in atmospheric science is often limited to either a survey of multiple types and uses of weather equipment or to theoretical and mathematical considerations of equipment response. In addition, there is sometimes the lack of a laboratory component given the credit loads of both the college core and major curricular requirements at many institutions.

In order to include basic elements of both the equipment and the theory, and to relate course content to real situations, the problem based learning (PBL) approach was employed in several aspects of an instrumentation course (including a class term project) during the spring 2005 term in the Kean University Department of Geology and Meteorology. The course included a laboratory component and was intended to provide an overview of the types of instrumentation used in atmospheric science (and related fields), the theory and application of the measurement as well as the design principles of instrumentation, and the opportunity to apply these to new or unusual circumstances in real settings.

The course includes traditional lecture, laboratory exercises, and "Geo-Weather Team" briefings in which students relate the characteristics and behaviors of the natural environment, as measured by various observational platforms, to atmospheric processes that produce the synoptic weather conditions.

2. DATA, METHODOLOGY, & ANALYSIS

The class term project required the students to be responsible for determining, assessing, and implementing the proper observational, instrumental, and network criteria for weather observations to be made within the campus setting. The term project was presented in the context of a consulting company or group that must examine, review, assess, and determine the appropriate course-of-action to properly observe weather conditions on campus. During the process, students were expected to make use of course content and the principles of instrumentation as applied to the equipment available through the Department's Meteorology Program.

Therefore, students selected from a variety of "work divisions" in order to perform tasks that would achieve end goals of making recommendations (e.g., siting, observations, and equipment), delivery of a technical report (including appropriate documentation), and presentation of their results to an outside review team and the general public. Tasks included obtaining data and reference information, application of statistical analysis techniques learned in the course, and decision-making.

Each of these provided professional development experiences as related to job skills and demanded students to approach the project as a job rather than simply a course assignment to be completed. Results were positive, particularly in that students created and developed items that could be included in their own portfolios and that would also help other students in the future when completing a similar project. Student performance, both in terms of their technical report and presentation, was demonstrated to their outside review team of subject matter experts. This provided a significant opportunity for their professional development and a chance to work in the field through a realistic experience.

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