P1.32 IDENTIFYING STUDENTS' ALTERNATE CONCEPTIONS IN METEOROLOGY

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1. INTRODUCTION

A student's ability to learn and understand natural processes that occur in the world is based on preexisting knowledge. Research suggests that if the preexisting ideas are incorrect or faulty, they may hinder a students learning; the preconceived ideas set up barriers to learning new concepts. In the atmospheric sciences a single misconception can cause a major problem because of the vast interconnection of concepts and processes. Students that have alternative conceptions about a single process may have trouble truly understanding any of the many other processes that contain that involve that process.

Our own research suggests that students enter into a science class with their own views about the physical world and how the atmosphere operates. Our goal is to identify the misconceptions that students may have about meteorological processes. By knowing the viewpoints students retain about meteorology, a teacher can design a curriculum that challenges their alternative conceptions - without knowing what alternative conceptions students have, creating such a lesson is impossible

2. IDENTIFYING ALTERNATIVE CONCEPTION

We used three tools to identify student alternate conceptions. The first of the tools is a survey questionnaire containing forty-two multiple-choice types of questions, and 7 short answer questions. The multiple-choice questions had distracters that were based on anecdotally identified misconceptions. The short answer questions were designed to have the test subjects give a more detailed response to some of the same topics that were in the multiple choice section. We did this to get a more detailed picture of how deep the misconceptions may be in the test subjects.

To help identify the difference between the subject's alternative conceptions about a topic and true ignorance toward it, a confidence scale was used for each question. The scale allowed the researchers to hopefully separate guesses from true misconceptions.

The second tool used was a concept-mapping tool where each test subject was given one of three lists of ten concepts that were relevant to a given process. Students constructed the maps by connecting terms together and defining the connection. We examined the reasoning behind the connections in order to identify more misconceptions.

The third tool was a set of individual interviews with the test subjects. Not all of the survey respondents were interviewed. The subjects were picked by availability. They were questioned about some of their responses in to get a more detailed picture of their misconceptions.

3. TEST SUBJECTS

We tested approximately 100 high school freshman prior to a unit in meteorology. A second subject group contained approximately 50 high school seniors that were three years removed from an Earth Science class. All of the students came from the same high school, a fairly typical suburban school district whose students come from a range of economic backgrounds. All the test subjects' parents or guardians gave written permission for participation in the survey.

4. CONCLUSION

Teaching atmospheric science to high school students can be a difficult task. If those students enter into the classroom with alternative conception, getting new concepts across to them can be almost impossible. By identifying the misconceptions they hold, we take the first step toward building an effective curriculum. Our analysis of these surveys will give the earth science teacher the advantage of knowing some of the incorrect ideas that his or her students may have when they enter the classroom. By confronting these misconceptions, students will be able to reorganize their ideas and better understand the atmosphere.

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