To Master or Not to Master? That is the Question.

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Abstract:

Career advising for undergraduate meteorology students reflects the interests of students and expertise of department electives, as well as the demands of the job market. While meteorology departments prepare students in the foundational knowledge of atmospheric science, they are ever conscience of the ultimate outcome for the individual students. Career paths are individual, yet somewhat general: broadcasting, private industry, National Weather Service, military service, teaching, and graduate school. As at most institutions, at Valparaiso University we try not to pigeonhole our students into one path, but provide options for exploration of the profession; a variety of electives, internships, REU opportunities, research options, and minors in key fields, such as geography, GIS, math, and communications.

Increasingly we feel we face a dilemma in advising our students on the graduate school option. Funding pressures have made for more competitive assistantships, while National Weather Service and private industry seem to preferentially hire students with an advanced degree. Has the graduate school climate changed from the discussion of Nielsen-Gammon, Avilés and Joseph (2009)? Should more students seek an advanced degree? Are GPA and/or GRE the key to a successful master's student? What does an advanced degree provide: a research skill, a focused knowledge base, a better prepared employee? What is the answer?

This interactive poster will pose these questions and request responses from the conference attendees. Through the use of written comments and sticker votes, we plan to compile a consensus and report back on the results through our extended abstract.

Poster and Results:

Each year undergraduate faculty advise their students on the next career step. Operations, broadcasting, private industry, government positions, graduate school, teaching, etc. Increasingly a Meteorology/Atmospheric Science BS seems to not be enough. Yet funding for graduate students is getting tighter and tighter.

In 2009 Nielsen-Gammon, Avilés, and Joseph, reported on the admissions' profiles of 29 surveyed atmospheric science programs. Research was the key theme of their report. Students needed to be prepared for not only graduate classes, good GPA (grade point average) in science and math and strong GRE (Graduate Record Exam) scores, but also ready and willing to enter into graduate research.

We posed three categories of questions: Should students earn a BS or MS for listed career choices, should students earn an MS in order to learn listed skills, and should students consider graduate work given listed circumstances. Poster session attendees responded to the questions by placing colored dot stickers on their answers. Dots were color coded based on whether the attendee was a student, faculty, or everyone else. We manually counted up the dots in each category for these results.

Not all questions were answered by everyone. The largest number of responses was 84 and the smallest was 51. The fewest responses were for a question on instrumentation. The most responses were for research and the career choice questions.

In the first question, we asked whether an MS or BS should be earned for a career in several broad categories. Nearly 80% of the responses chose an MS for a career in the National Weather Service. Government or government contractor careers had a 60% lean toward an MS, with a fairly even split in the responses from everyone else. Private industry careers were favored for the BS track by almost 75% of the responses. Forensic meteorology had the highest MS choice percentage response.

In the second question, we asked if different skills were important reasons for a student to pursue a graduate career. Exploring a research problem had the highest number responses with an equally high percentage agreement of 86%. Learning how to teach in the classroom and understanding the theory behind science were also positive reasons to pursue a graduate degree. Using instrumentation and becoming accomplished programmers were not noted as reasons for pursuing a graduate degree; though a comment on strong communication skills was noted.

In the third question, we asked whether a student should consider graduate work for a variety of circumstances and types of degrees. A low GRE and a low GPA (sub 3.3 GPA) were overwhelmingly not reasons to dissuade students from graduate school. The low GPA question invoked written responses: graduate degree holders attested to their success despite low GPAs, a graduate advisor noted great success with several advisees in the low GPA category, and one responder questioned whether students with low GPA would be successful at obtaining funding. No funding, the non-thesis option, and online degrees were considered to be slightly negative factors for graduate work, though the negative responses averaged around 55%.

Differences in results based on the responder category were somewhat interesting. More students noted that becoming an accomplished computer programmer was a reason to earn an MS, while faculty and everyone else were markedly in the negative on this question. Faculty and students felt that learning classroom teaching skills was a positive reason to pursue a graduate degree, while everyone else was evenly divided on this question. The no thesis option was a negative factor for more faculty and students, while everyone else leaned toward the positive. Students were evenly split in their responses toward an online graduate degree option, while faculty and everyone else looked at this option with much less favor. On the question of whether or not funding should determine whether a student should pursue a graduate degree, faculty were evenly split for and against this question. While everyone else leaned against pursuing a degree without funding, and students were overwhelmingly (80%) against it.

The very informal survey of AMS Poster session attendees garnered some interesting results. The conclusions of Nielsen-Gammon, Avilés, and Joseph (2009) on research being a key component of graduate work was affirmed by our responses. In our undergraduate advising experience, we have increasingly noted the need for a graduate degree for a career in the National Weather Service and the results confirmed our suspicions. We were somewhat surprised by the forensic meteorology votes for a graduate degree, though the level of a meteorologist's degree would certainly be a positive factor toward their level of expertise.

We have to admit to surprise on the GRE and GPA questions. As we advise our students we find ourselves debating the pros and cons of retaking a somewhat expensive exam. Low verbal scores on the exam have become endemic, even among strong students at a liberal arts university. We certainly advise that a strong GPA, research project, and even a summer internship or REU will count in the student's favor. The sub 3.3 GPA responses shocked us. As undergraduate advisors, we try to play gate-keepers for graduate admission and, more importantly, student's hopes. We advise our students that a sub 3.3 GPA is a danger zone for graduate admissions. Though, we do advise that an upward trend in course grades as they enter their senior year can offset the lower GPA and that our letters of recommendation can provide insight into why we think a student is deserving of consideration.

This interactive poster provided the Valparaiso University meteorology faculty insight on the questions we pose about graduate school options for our students. Input from other faculty, atmospheric science colleagues and students provided thought provoking results. The interactive nature of the poster was a departure from the usual poster style of reading, presentation and questions. Good conversations were invoked by the poster. In addition, the presenters and AMS attendees enjoyed the participatory nature of the poster.

Nielsen-Gammon, J. W., L. B. Avilés, and E. Joseph, 2009: What does it take to get into graduate school? A survey of atmospheric science programs. *Bull. Amer. Meteor. Soc.*, 90, 1698-1705.