PURPOSE
This is a preliminary report of an investigation into factors which may act as a barrier to success among undergraduate atmospheric science students. Degree completion rates among undergraduate students majoring in the geosciences have, in the past, significantly lagged behind completion rates of all STEM undergraduates. Due to the predicted shortage of geoscientists in the workforce, coupled with recent calls for broadened participation in the geosciences in terms of race and gender, addressing the issue of degree completion is prudent. Further, because there are marked differences in atmospheric science curriculum and career prospects, it is important to understand what unique challenges, if any, are experienced by undergraduates in the atmospheric sciences. This study aims to heighten awareness for the issue of degree completion among the atmospheric sciences and related disciplines, aid the understanding of barriers to student success in the geosciences by focusing on atmospheric science, and to inform future decision making on methods to improve student success in the geosciences. This preliminary report will focus on initial results while allowing time for feedback from session participants.

BACKGROUND


Degree Completion Rates and the Price of Oil

Multicontextuality: calls for attention to individual student identities and personal pathways by acknowledging “the effect of complex, interwoven identities of under-represented students as they learn in and interact with STEM fields, and the explicit importance of institutional attention and action to identify and lower barriers to success while providing necessary support”

Macrosystems Model: interactions between individual-centric elements and the broader system that shape the individual and system while influencing the direction and persistence of both.

FUTURE METHODS
1. Instrument Development – Electronic Survey (e.g., Qualtrics) using Likert Scales
2. National and Local Student Recruitment
4. Instrument Development – Face-to-Face Interview
5. Interview Analysis/Thematic Coding using themes from electronic survey.

RESEARCH AIMS
1. Compare and contrast enabling structures and recurring barriers to degree completion in atmospheric science with those of other STEM disciplines. This aim seeks to inform geoscience educators and practitioners on factors contributing to/inhibiting the success of atmospheric science undergraduates, which may begin to shed light on the dichotomy between completion rates among geoscience undergraduates and all STEM undergraduates.
2. Report on any differences in the way women and students of color in the atmospheric sciences identify factors that they perceive to influence degree completion. This aim seeks to understand whether an increase in prevalence of and/or an amplifying effect on enabling structures and/or recurring barriers exists when paired with an underrepresented demographic.

LITERATURE REVIEW


EXHIBIT: SURVEY INSTRUMENT

Instructions: Below is a list of statements related to your undergraduate enrollment. Please indicate your response for each statement.

Responses: Strongly Agree, Agree, Disagree, Strongly Disagree
1. My professor(s) understand my needs as a student.
2. My department offers extracurricular activities related to my major.
3. I have means of seeking extra help with my coursework.
4. I know what I can expect to earn with my degree.
5. I know which industries may hire a student like me upon graduation.

Responses: Significant Barrier, Barrier, Support, Significant Support
1. The quantitative skills courses I need to graduate.
2. The undergraduate research opportunities available to me.
3. The active learning modes of instruction used by my professors.
4. The responsiveness of my professor(s).
5. The general education requirements needed for my major (arts, English, etc.)

DISCUSSION

Recognizing and supporting under-represented students’ identities in the geosciences will require the implementation of research-based approaches that account for the individual. The results of this research will lead to improved structures for supporting the diversity of the geosciences workforce, which has the potential to increase the workforce’s ability to communicate information to the public. To have immediate impact, the aggregated and deidentified survey and interview analysis will be given directly to the programs of participating students. These analyses will include recommendations of how the program can immediately help their students. Recruiting students alone isn’t enough. Structures to support students’ degree completion must be in place while also lowering potential barriers to student success.

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