

Prompt

Wake is interested in learning more about students who graduate with a STEM major: Why do they choose those majors? What academic coursework and experiences help them choose those majors? Complete those majors? Are students who choose STEM majors deeply interested in them, or are they choosing those majors for some other reason such as believing those majors will lead to high-paying jobs?

Knowing more about the characteristics of students who choose STEM majors can help us predict how many students will choose those majors and support the students in those majors. Please use a combination of the provided (1) student records and (2) survey data to develop a predictive model for choosing a STEM major. The student record data are for students who have graduated. There are 4 cohorts in the data set: students who entered Wake in the years of 2012, 2013, 2014, and 2015. The survey data were gathered from students during the spring (second semester) of their first year. Although the average size of the incoming first-year class is about 1300 students, only 400-600 complete the survey every year; the data set only includes data from students who completed the survey.

The data set we have provided is synthetic. Some of the data closely resemble real data, and some do not. Because this data is synthetic, findings from this data set do not generalize to Wake's students or any students, and some of the outcomes may not be what you expect. However, it includes many types of variables and data structures you are likely to work with in this position.

For your 30-minute job talk, you are welcome to use any modeling method you choose. Your presentation should be accessible to an educated lay audience who are not statisticians. Your talk should include at least the following elements:

1. Your interpretation of the prompt: Why are we doing this work? Why is it important? What problems does it solve or what help does it provide?
2. What modeling method you chose. Explain what the model is and why you chose that approach.
3. Your results. Provide your results in a lay-accessible format. Use at least one visualization.
4. Extra credit: Create a model that predicts all majors, not just STEM majors.

After your 30-minute job talk, your audience will have 15 minutes to ask you questions about your work. The audience may ask clarification questions during your job talk, but they will save most of their substantive comments for after the job talk.

Code Book

Student records

1. STUID: a random, unique, 6-digit string
2. YEAR: year of matriculation (i.e., starting college); values range from 2012 - 2015
3. GENDER
 - Female
 - Male
4. RACETHN
 1. American Indian or Alaska Native
 2. Asian
 3. Black or African American, not Hispanic
 4. Hispanic/Latino
 5. Native Hawaiian or Other Pacific Islander, not Hispanic
 6. White, not Hispanic
 7. Two or more races
5. MAJOR upon graduation
 1. Independent
 2. Arts: art, art history, music, theater
 3. Humanities: history, religion, philosophy, languages
 4. Social Science: sociology, anthropology, psychology, women & gender studies, education
 5. Business: business, management, finance, accounting
 6. Math & science [*these are the STEM majors of primary interest*]: math, physics, computer science, biology, chemistry
6. DISTANCE from home in miles
 1. 5 or less
 2. 6 - 10
 3. 11- 50
 4. 51 - 100
 5. 101 - 500
 6. Over 500

7. HS_GPA

1. D or lower
2. C
3. C+
4. B-
5. B
6. B+
7. A-
8. A or A+

8. COLLEGE_GPA

1. D or lower
2. C
3. C+
4. B-
5. B
6. B+
7. A-
8. A or A+

9. FIRST_GEN: First generation student?

1. No
2. Yes

Survey data

In the past year, how often did you:

		1	2	3		
ACT01	Perform volunteer work	Not at all	Occasionally	Frequently		
ACT02	Vote in a student election	Not at all	Occasionally	Frequently		
ACT03	Discuss politics	Not at all	Occasionally	Frequently		
ACT04	Skip school/class	Not at all	Occasionally	Frequently		
ACT05	Fall asleep in class	Not at all	Occasionally	Frequently		
ACT06	Ask a teacher for advice after class	Not at all	Occasionally	Frequently		
ACT07	Tutor another student	Not at all	Occasionally	Frequently		
ACT08	Seek alternative solutions to a problem	Not at all	Occasionally	Frequently		
ACT09	Look up scientific research articles and resources	Not at all	Occasionally	Frequently		
ACT10	Explore topics on your own, even though it was not required for a class	Not at all	Occasionally	Frequently		
ACT11	Accept mistakes as part of the learning process	Not at all	Occasionally	Frequently		
ACT12	Seek solutions to problems and explain them to others	Not at all	Occasionally	Frequently		
ACT13	Write computer code	Not at all	Occasionally	Frequently		

How would you rate yourself in the following areas:

		1	2	3	4	5
RATE1	Tolerance of others with different beliefs	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE2	Openness to having my own views challenged	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE3	Ability to work cooperatively with diverse people	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE4	Critical thinking skills	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE5	Mathematical ability	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE6	Academic ability	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength
RATE7	Writing ability	A major weakness	Somewhat weak	Average	Somewhat strong	A major strength

Please rate the extent to which you agree or disagree with the following items:

		1	2	3	4	5	6
AGREE_01	I have a strong sense of belonging to a community of scientists	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_02	I think of myself as a scientist	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_03	I feel like I belong in the field of science	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_04	Being very well off financially is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_05	Becoming successful in my own business is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_06	Developing a meaningful philosophy of life is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_07	Becoming a community leader is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_08	Making a theoretical contribution to science is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
AGREE_09	Influencing social values is important to me	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree