

Demographics and Perceptions of Introductory Soil Science Students at a Mid-Size Comprehensive Public University in Texas

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Abstract: Students studying soil science today are different than students from years ago. Many have careers and families while attending school. Furthermore, self-advising, web registration and on-line courses have substantially altered the path many students take to the classroom. Responses to this anonymous 50-question survey assess the demographics, background, study habits and perceptions of students in a soil science class in Texas. Both positive and negative facts were identified in the study. Examples: 1) 35.8% of respondents represented the first generation in their family to attend a college/university; 2) 19.7% did not purchase the required textbook-of the 80.3% who did purchase it, only 52.8% actually read it; 3) 55.7% indicated that they plan to go to graduate school yet only 34.6% had a GPA of 3.0 or better to meet graduate school entrance requirements; 3) 27.7% feel as though a GPA of 2.0-3.0 is competitive in today's job market; 4) 39.7% came from urban/suburban backgrounds and 5) 77.9% study soil science 1-4 h per week. By understanding these facts, faculty gain a better understanding of the students they teach. Classroom activities and teaching strategies can then be altered to more effectively reach students interested in soil science.

Key words: Demographics, perception, soil science, comprehensive, public

INTRODUCTION

The study was conducted at Tarleton State University (TSU), a mid-size comprehensive public university in north central Texas. Of the 7,853 undergraduate student population, 1,205 students pursue studies in agriculture, making TSU the second largest undergraduate agricultural school in Texas (American Association of State Colleges of Agriculture and Renewable Resources, 2006). The COAHS is comprised of four departments: 1) Animal Sciences, 2) Agricultural Services and Development (ASD), 3) Agribusiness, Agronomy, Horticulture and Range Management (AAHRM) and 4) Human Sciences. Students in ASD and AAHRM represent the large majority of students who take courses in soil science.

The survey was administered in Soil Science (AGRN 301), a junior level course consisting of 3 h of lecture and 2 h of laboratory per week. Catalog-stated prerequisites for the class are junior classification and completion of Inorganic Chemistry I (CHEM 105). The TSU catalog description of the course is as follows: Designed to acquaint the student with the field of soil science. Basic principles of the physical, chemical and biological properties of the soil and their general applications. This course serves as the prerequisite for all other soils coursework at TSU. The required textbook (as stated on the syllabus) for the course is *Elements of the Nature and Properties of Soils* (Brady and Weil, 2003).

The accompanying lab manual has been specifically designed to expand on principles and theory given in lecture (Weindorf, 2003). Students were asked to identify which survey response matched their perception of the level of difficulty of AGRN 301. Of those surveyed, 30.9% selected 'the hardest course I've had at TSU' (30.9%) while 62.9% selected 'very challenging'.

While the course has enjoyed robust enrollment historically, numbers have been steadily declining recently due to changing workforce and bachelor degree requirements. In the last six years, Tarleton State University's Department of Agricultural Services and Development has dropped soil science as a requirement (Tarleton State University, 2000; Tarleton State University, 2006). This is reflective of the fact that Texas Cooperative Extension (TCE) and many other agencies who hire ASD graduates no longer require employees to have an agriculture degree, much less soil science credit. The TCE general requirements are a "master's degree in agriculture, family and consumer science, education, science/technology, or other field relevant to the mission of Extension" (Texas Cooperative Extension, 2006). While the requirement of soil science coursework for Texas high school agriculture teachers was weakened from 2000 to 2004, a new set of competency requirements released in 2005 has strengthened the required soil science competency of new graduates; requiring educators to master additional soil concepts such as texture, pH, etc. (Texas Examinations of Educators Standards, 2005).

MATERIALS AND METHODS

The survey was administered to 179 students from 2002 to 2005 and consisted of 50 questions grouped into four main areas: Demographics and background, lifestyles, study habits/grades/course performance and perceptions of the course and institution (Appendix A). The survey was completed anonymously. Points of discussion and conclusions set forth by the author are based not only on the survey results, but also private discussions with students from AGRN 301 over the study period. Responses to the most pressing questions and a discussion of their implications follow.

APPENDIX A

Introductory soil science survey: The purpose of this survey is to provide the instructor with detailed information concerning the students enrolled in Soils (AGRN 3014). To assure complete confidentiality, please DO NOT put your name or other identifying marks on this paper. Please answer each question honestly so that the instructor may make improvements to the class in future semesters based upon your answers. Thank you for your participation.

Demographics

What is your current classification?

- Freshman
- Sophomore
- Junior
- Senior
- Graduate

What is your gender?

- Male
- Female

What is your major?

- ASD (any option)
- Agronomy/range mgt.
- Horticulture
- Animal science
- Other

Where do you currently live?

- With parents
- Dorms

- Renting apartment/house
- Homeowner

What is your marital status?

- Married
- Single
- Widowed
- Divorced

Do you have children?

- Yes
- No

What is your current age?

- 18
- 19
- 20
- 21
- 22+

Are you the first generation in your family to go to a college/university?

- Yes
- No

How many nights per week do you "party"?

- None
- 1
- 2
- 3
- 4+

How many alcoholic beverages do you typically consume per week?

- None
- 1-5
- 5-10
- 10-20
- 20+

Do you feel as though your social life has negatively impacted your study habits?

- Yes
- No

Background

What type of high school did you attend?

- Urban
- Suburban
- Rural

What was the size of your graduating class?

- 1-20
- 21-50
- 51-100
- 101-200
- 201-300+

Did you take agriculture classes in high school?

- Yes
- No

Did you participate in FFA or 4-H activities in high school?

- Yes
- No-Leave Question 16 and 17 blank

If yes in question 15, did you visit Tarleton?

- Yes
- No-Leave question 17 blank

If yes in question 16, did the visit influence your decision to attend Tarleton?

- Yes-it made a positive impression
- Yes-it made a negative impression
- No influence

Other commitments

Do you work while attending school?

- Yes
- No

If yes on question 18, how many hours per week do you work?

- 1-10
- 11-20
- 21-30
- 31-40
- 41+

Do you participate in any extracurricular groups or activities?

- Yes
- No

Are you a member of a professional society such as the soil science society of america or the society for range management?

- Yes
- No

Academics

What grade do you expect to make in soils?

- A
- B
- C
- D
- F

What is your current overall GPA?

- 0.00-1.00
- 1.01-2.00
- 2.01-3.00
- 3.01-4.00

What do you consider to be a competitive GPA that would be favorably viewed by potential employers?

- 0.00-1.00
- 1.01-2.00
- 2.01-3.00
- 3.01-4.00

Soils (AGRN 3014)

What has been the hardest part of soils?

- Exams
- Weekly quizzes
- Written assignments
- Laboratory

How would you rate the overall quality of Dr. Weindorf's instruction?

- Exemplary
- Above average
- Average
- Below average
- Deplorable

How would you rate Soils in relation to other courses at Tarleton?

- The hardest class I have ever had
- A very challenging class
- Only moderately difficult
- Easy

Did you take CHEM 1054 prior to enrolling in soils?

- Yes
- No-Leave question 29 blank

If yes in question 28, what grade did you make in CHEM 1054?

- A
- B
- C
- D
- F

How many times did you personally interact with Dr. Weindorf?

- 0
- 1-5
- 5-10
- 10-15
- 15-20

What was your most common method of personal interaction with Dr. Weindorf?

- Lunch
- E-mail
- Phone calls
- Office visits
- Talk after class

What type of lecture do you prefer?

- PowerPoint
- Chalkboard
- Overhead transparencies
- Audio lecture

How would you characterize Dr. Weindorf's commitment/dedication to teaching as compared to other professors you have had at Tarleton?

- The most dedicated professor I have had
- More committed than other professors

- Commitment equal to that of other professors
- Less committed than other professors
- Not committed at all

Did you make use of Dr. Weindorf's website for study materials, help, or checking your grades?

- Yes
- No

Study skills

How often did you study the material given in Soils class?

- Daily
- Weekly
- Only before quizzes
- Only before exams
- Never

How many hours per week do you devote to studying soils material?

- None
- 1-2
- 3-4
- 5-6
- 7-8+

What type of study do you personally find to be most valuable?

- Study groups
- Writing note cards/typing notes
- Receiving tutoring
- Reading notes
- Reading textbook

Did you purchase the required textbook (nature and property of soils)?

- Yes-leave question 39 blank, answer question 40 instead
- No

If no to question 38, why did you not purchase the book?

- Too expensive
- Not stocked at bookstore
- Not interesting
- Not enough time to read
- Lazy

If yes to question 38, did you read relevant portions of the book?

- Yes
- No

Performance

If your performance in the class is substandard, why do you find yourself struggling?

- Not interested
- Did not meet the prerequisites
- Notes given in class were unclear
- Did not adequately study/prepare

Did you feel as though the exams and quizzes were fairly constructed and graded?

- Yes
- No

What is your general opinion of challenging classes?

- Greatly appreciate the challenge
- Take such courses only to fulfill degree requirements
- Substitute easier courses when possible
- Avoid them at all costs

After taking soils, do you plan to take additional soils courses?

- Absolutely
- Probably
- Possibly
- Never

Other than soils (AGRN 3014) what other soils courses interest you?

- Soil Fertility
- Soil Morphology and Classification
- Soil Physical Properties
- Environmental Soil Science
- None

Tarleton state university

How would characterize the education you receive at tarleton in comparison to other state institutions?

- Superior
- Slightly superior

- Equivalent
- Slightly substandard
- Substandard

What do you consider to be the greatest strength of Tarleton?

- Small classes
- Close interaction with faculty
- Academic integrity
- Research opportunities
- Financial value

What most motivates you when taking a class?

- Grade received
- Learning the material
- Satisfying degree requirement
- Intellectual development

Do you see yourself going on to graduate school?

- Yes
- No

Have you ever cheated on an exam or homework assignment?

- Yes
- No

RESULTS AND DISCUSSION

Background and demographics: The vast majority of students (94.3%) waited until their junior year to take AGRN 301, in accordance with the published prerequisite. This was deemed important in that students taking the course should have well established study skills and demonstrated writing ability by their junior year. Twenty nine percent of students in AGRN 301 were female. Most students taking the course (70.4%) had majors of ASD, Horticulture, or Agronomy and Range Management. The U.S. Department of Education (1996) found that the number of students age 25 or older has increased from 28 to 44% since 1970. In line with this growing number of “non-traditional students”, 20.2% of students reported being homeowners, 10.7% were married and 8.4% had children. These responses indicate that many students now have to balance time spent studying with the demands of producing income and caring for family.

Roughly 35.8% of students in AGRN 301 represented the first generation in their family to attend a college or university. This is important because these students often lack appropriate study skills and in some cases, discipline to focus on studies (Hicks, 2003). In summarizing contemporary research (Tinto, 1975) stated “it appears as though college persisters are more likely to come from families whose parents are more educated, more urbane and more affluent.”

Because TSU is in a rural community of only 15,000 people, university administrators and faculty have thought the draw of students to our agriculture program would largely come from rural areas. While this is true, 39.7% of students report attending a high school in urban or suburban areas. Of the 60.3% that attended rural high schools, most were small schools, with 45.3% of students having fewer than 100 students in their high school graduating class. Survey respondents who attended such small schools often reported that they were drawn to a smaller university, rather than larger state universities. Yet even on a smaller campus, many report a sense of isolation, lacking a clearly defined peer group as they find new students in each class. An unexpected 23.6% did not take agriculture classes in high school; 28.5% did not participate in FFA or 4-H activities as part of their high school experience. These facts are important to the extent that faculty can no longer assume students in agriculture classes have had agricultural experiences. Thus, faculty need to exercise caution in providing questions or examples that draw too heavily on the farm experience. Some students simply have never driven a tractor, fed farm animals, harvested crops and other farm-related activities.

Lifestyles: Faculty often assume they know about the lives students lead. Yet no survey instrument of this kind has been previously administered in soils courses at TSU. Consider ‘partying’: 44.1% of students in AGRN 301 did not party at all, 33.3% partied one night per week, while 22.6% partied two or more times each week. Roughly 19% of students consumed 10 or more alcoholic beverages per week, but 34.1% consumed no alcohol. The majority of students (63.5%), were involved with at least one extracurricular group or activity. Given the number of students that party or consume alcohol, it was no surprise that 23.5% of students freely admitted that their social life had negatively impacted their study habits. Finally, even though extra credit is given to students in AGRN 301 who join a professional society such as Soil Science Society of America, American Society of

Agronomy, or Society for Range Management, only 30.7% of students became members. Cost of membership, though modest for students and simple apathy were commonly given as reasons for not joining.

Study habits, grades and course performance: While study time requirements are unique for each individual, most academics would endorse studying as a means of improving comprehension. However, this survey pointed out that 85.3% of students work while attending school; some as much as 40 h per week. While 85.2% of students reported studying AGRN 301 materials either daily or weekly, 77.9% indicated that the time spent studying AGRN 301 materials was only 1-4 h per week. Furthermore, methods of studying have changed. Gusentine and Keim (1996) identified clear generational differences in learning such that older (non-traditional) students benefited from active experimentation while younger (traditional) students retained more information by reflective observation. Prior to advent of the personal computer, students consulted textbooks or lecture notes for information. These are still used today; but instant messaging, website browsing and other on-line resources are gaining in popularity and support the concept of observation over experimentation. While 80.3% of students purchased the required textbook, 66.9% made no use of it at all (either not purchasing the book or not reading it once purchased). This was quite surprising given the fact that figures, diagrams and problems from the book are frequently presented in lecture. The reasons for not using the textbook as a resource were varied. Some were not interested, some felt the book was too expensive, others admitted to just being lazy. Popular forms of study included: reading notes (52.6%), rewriting or typing notes (33.7%) and participating in study groups (10.9%).

Technology in the classroom (streaming audio/video, interactive student polling, wireless connectivity, etc.) has profoundly impacted student engagement, with 90.4% of students indicating they prefer PowerPoint based lectures. Chalkboard and overhead transparency lectures came in a distant second and third at 6.2 and 2.3%, respectively. Also, 85.5% of students made use of the professor’s website (www.tarleton.edu/~dweindorf) for checking grades, downloading figures/tables, checking quiz answers and following links to other websites of additional information.

However, the argument can be made that the advancement of technology has also led less student-professor interaction. Web-registration is now the norm for the vast majority of students across campus. Many

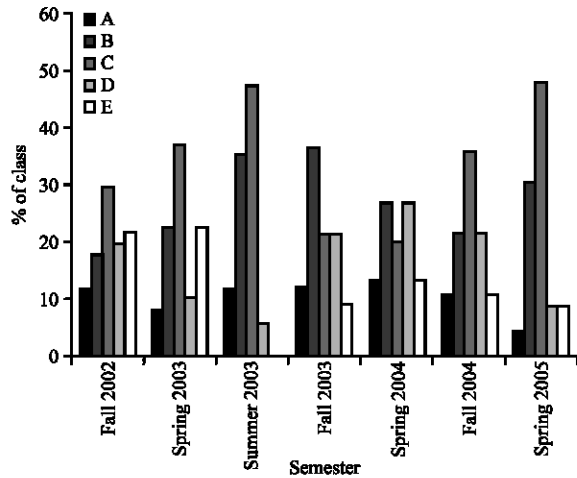


Fig. 1: Distribution of grades in AGRN 301 (Soil Science) at Tarleton State University from 2002 to 2005

choose to “self advise” and select courses they want to take with little or no input from a faculty advisor. To that end, 30.7% of students in AGRN 301 had not taken Inorganic Chemistry I (a catalog-stated prerequisite) prior to enrolling in the course. This left these students at a disadvantage from the start. A closer analysis of 99 students’ grades across three semesters supports this conclusion. The course average of those having had CHEM 105 to those who had not had CHEM 105 was 76.0 versus 71.2, respectively.

On a 4.0 scale, the 62.6% of student self-reported a Grade Point Average (GPA) between 2.0-3.0 and 34.6% between 3.0-4.0. Twenty eight percent thought that a cumulative GPA of 2.0-3.0 was competitive in today’s job market. Another interesting observation was that 55.7% of students indicated that they intend to continue their education in graduate school, yet only 34.6% had a GPA of >3.0, a common entrance requirement for graduate schools. This may indicate poor academic advising where students are not being told of the requirements of graduate school acceptance, or students’ inability to honestly assess their future options. Grade distributions over seven semesters indicate a classic bell shaped curve, with the majority of students receiving C’s, then diminishing numbers of B’s and D’s, A’s and F’s, respectively (Fig. 1). Each semester, the AGRN 301 class average consistently resides between 70.0 and 75.0.

Student perceptions of the course and institution: A large majority of students (78.7%) felt as though the exams and quizzes were fairly constructed and graded. Although the

course is widely regarded as very academically demanding, students held the professor in high regard with 79.3% of students characterizing the professor’s instruction as ‘exemplary’ or ‘above average’. After having an introductory soils class in AGRN 301, student interest in other soils coursework was distributed as follows: Soil fertility (33.5%), environmental soil science (19.2%), soil morphology and classification (7.7%) and soil physical properties (7.1%). Students were asked what most motivates them when taking a class. Responses were as follows: ‘learning the material’ (32.9%), ‘intellectual development’ (22.5%), ‘grade received’ (30.6%) and ‘satisfying degree requirements’ (13.9%).

CONCLUSION

Students taking Soil Science at Tarleton State University were surveyed regarding their perceptions and priorities. Responses indicated that a surprising number of students in come from urban or suburban backgrounds and have not grown up on farms or ranches. Today, many students work to support themselves while in school, self-advise and use web registration. While these strategies put more control in the hands of students, a substantial number enroll in soil science without having met the stated prerequisites and their grades suffer accordingly. Some attend school while also balancing the demands of a spouse, children and/or social activities (partying, drinking, etc.). Such factors, while important in the student’s life, may detract from available study time. Many students reported very limited time being devoted to studying soils material. Use of the required course textbook was very low. Faculty need to take these factors into consideration when developing a course in soil science. By understanding the behavior and perceptions of contemporary soil science students, faculty can construct a course to meet student needs in the most effective manner.

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