# STATISTICS TEACHING INVENTORY

## Report of Data Collected in 2013

*e-ATLAS* (Evaluation and Assessment of Teaching and Learning About Statistics;
A project funded by the National Science Foundation (DUE 1044812 & 1043141).

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## Overview

This report provides results from the *Statistics Teaching Inventory*, a survey developed as a part of the NSF-funded project *e-ATLAS* (Evaluation and Assessment of Teaching and Learning About Statistics; DUE 1044812 & 1043141). The purpose of this project is to set up resources to evaluate the effect of past and on-going efforts to reform the teaching of statistics.

The *Statistics Teaching Inventory* (*STI*) was developed to assess the teaching practices and beliefs of introductory statistics instructors across different disciplines and institutions. The *STI* was administered to a sample of $N = 492$ total instructors between July 2013 and January 2014. Separate forms were designed for administration to instructors of four different types of courses:

Form 1 ($n = 338$): Instructors of **face-to-face** courses
Form 2 ($n = 40$): Instructors of a course that separated into a lecture section and recitation/lab section (**lecture/recitation**)
Form 3 ($n = 83$): Instructors of 100% **online** courses
Form 4 ($n = 31$): Instructors of **hybrid** courses (mixture of face-to-face and online)

## Sampling Method

Using the database of higher education institutions from the *Carnegie Foundation for the Advancement of Teaching* (http://www.carnegiefoundation.org/), a national stratified random sample of 133 collegiate institutions was selected. The four strata included: (1) Doctorate granting universities ($n = 19$), (2) Master's colleges or universities ($n = 29$), (3) Baccalaureate colleges ($n = 27$), and (4) Associate's colleges ($n = 58$).

The sampling frame included courses taught in a variety of departments, such as mathematics, science, psychology and business. Two or three courses (and their corresponding instructors) of introductory statistics courses were randomly selected from each institution. (More than one course/instructor from each institution was selected in preparation for potential nonresponse.) The selected instructors from each institution were then randomly ranked as "Instructor #1," "Instructor #2," and, if applicable, "Instructor #3." If the Instructor #1 did not

respond within three weeks, the second instructor was contacted. If neither of the first two instructors responded, Instructor #3 was contacted.

E-mail invitations to take the *Statistics Teaching Inventory* online were sent in multiple rounds starting in May 2013 and ending in July 2013. Instructors from 50 institutions were initially invited to participate. Because the response rate was only around 10%, an incentive (a drawing for a $100 Amazon gift card) was added. In the second round, instructors from 43 additional institutions were contacted. The final round of invitations included the remaining 40 institutions. In sum, 400 instructors were invited to take the *STI* and of these, 98 responded. The overall response rate was 24.5%. Of the 98 instructors who responded, 83 reported their institution on the survey. These 83 instructors represented a total of 73 different institutions across the United States.

Depending on their answers to a set of branching items at the beginning of the STI, instructors were directed to one of the four forms. Of the 98 total instructors in the sample, 63 completed the *face-to-face* form, 19 completed the *online* form, 10 completed the *lecture/recitation* form, and 6 completed the *hybrid* form.

A second round of invitations was sent to people on the *CAUSE eNEWS* email list with ".edu" addresses ($N = 1670$). (While this removed high school teachers and vendors who have taken part in CAUSE activities, it also may have omitted instructors who signed up for the list using an e-mail client such as Gmail.) A total of 400 responses were collected, a response rate of 24.0%. It is important to note that there was no way of knowing whether the CAUSE instructors had taught a non-calculus introductory statistics course in the past year. Therefore, some people who were contacted were not eligible to participate, and were told to ignore the invitation if they did not meet this requirement.

*Note:* There were six instructors who were included in both samples and completed the STI twice. For analyses that combined responses from both samples, only one set of responses (the most recent) for these six participants was used. However, in analyses that compared the two samples, responses from these six instructors were included in both samples. This is why there were 400 instructors in the CAUSE sample and 98 instructors in the random sample, but only 492 total instructors when the data was combined.

Results are reported separately for each of the four forms. A final section of this report provides data comparing the two samples of instructors who responded

to the survey. A table comparing responses for the CAUSEweb and random samples is included in this report. However, results were combined when examining results for each instructional format. In addition, one report was generated across all formats for the common questions.

# STI Descriptive Statistics

## Group 1: Instructors of face-to-face courses

$N = 338$

**Part 1: What type of class do you teach?**

1. Do you teach a class that is entirely (100%) online?
   - Yes → **Go to STI Online version**
   - No → **Proceed to #2**

| Yes | No |
|---|---|
| 0 | 338 |

2. Do you teach a class that is entirely (100%) face to face?
   - Yes → **Go to question 2a)**
   - No → **Go to STI Hybrid version**

| Yes | No |
|---|---|
| 338 | 0 |

2a. If yes, does your class use recitations or lab sessions led by someone else (e.g. a teaching assistant)?
   - Yes → **Go to STI Lecture/Recitation version**
   - No → **Go to STI Face-to-face version**

| Yes | No |
|---|---|
| 0 | 338 |

## Part 2: Pedagogy

**Consider the total amount of time that you meet face-to-face with your students. Approximately what percentage of this time is spent on each of the following? (Note: The percentages below should add up to 100%)**

*Note: for the face-to-face version, 39 of the respondents' sliders did not work properly for this section, and did not add up to 100%. Therefore, their intended percentages were reconstructed by taking each response and dividing by the total, so that the new percentages add up to 100%.*

1. Students meeting together as a whole class (not in small groups) for lecture, discussion, or demonstration:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 50 | 64.0 | 75 | 100 | 61.4 | 20.4 |

2. Students working in groups:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 15 | 25 | 88 | 18.7 | 17.9 |

3. Students working individually on an activity:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 3 | 10 | 15 | 100 | 10.5 | 11.0 |

4. Students taking an assessment:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 10 | 11.4 | 35 | 9.4 | 6.1 |

5. Consider a student who was fully engaged in your course. To what extent do you think that **student** would agree or disagree with the following statements about this course?

*Counts are given below, along with valid percentages.*

| | N | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| a) The content was presented mostly through the instructor's lectures. | 335 | 14 (4.2%) | 43 (12.8%) | 167 (49.9%) | 111 (33.1%) | | 278 (83%) |
| b) The instructor asked challenging questions that made me think. | 332 | 0 (0.0%) | 16 (4.8%) | 226 (68.1%) | 90 (27.1%) | | 316 (95.2%) |
| c) The course frequently required students to work together. | 334 | 20 (6%) | 114 (34.1%) | 132 (39.5%) | 68 (20.4%) | | 200 (59.9%) |
| d) The content was presented mostly through activities. | 332 | 28 (8.4%) | 188 (56.6%) | 88 (26.5%) | 28 (8.4%) | | 116 (34.9%) |
| e) This course encouraged students to discover ideas on their own. | 332 | 13 (3.9%) | 141 (42.5%) | 155 (46.7%) | 23 (6.9%) | | 178 (53.6%) |
| f) This course often used technology (e.g. web applets, statistical software) to help students understand concepts. | 334 | 9 (2.7%) | 47 (14.1%) | 144 (43.1%) | 134 (40.1%) | | 278 (83.2%) |

## Part 3: Curricular Emphasis

**The following items will ask you about your curricular emphasis. Consider the entirety of your course as you complete this section.**

**To what extent are the following addressed in your course?**

| | N | Seldom or not at all | A few times | Repeatedly |
|---|---|---|---|---|
| 1. The need to base decisions on evidence (data) | 337 | 3 (0.9%) | 55 (16.3%) | 279 (82.8%) |
| 2. Difficulties involved in getting good quality data | 338 | 32 (9.5%) | 180 (53.3%) | 126 (37.3%) |
| 3. The study of variability is at the core of statistics | 337 | 6 (1.8%) | 76 (22.6%) | 255 (75.7%) |
| 4. The need to select an appropriate model for making a statistical inference | 337 | 14 (4.2%) | 125 (37.1%) | 198 (58.8%) |
| 5. The process of selecting an appropriate model for making a statistical inference | 332 | 29 (8.7%) | 120 (36.1%) | 183 (55.1%) |

**To what extent do you emphasize each of the following approaches to <u>statistical inference</u> in your course?**

| | N | Not at all | To some extent | A major emphasis |
|---|---|---|---|---|
| 6. Parametric methods (e.g. *t*-test, *z*-test) | 335 | 12 (3.6%) | 44 (13.1%) | 279 (83.3%) |
| 7. Bayesian methods | 334 | 283 (84.7%) | 48 (14.4%) | 3 (0.9%) |
| 8. Simulation/resampling (e.g. randomization, bootstrap methods) | 336 | 142 (42.3%) | 150 (44.6%) | 44 (13.1%) |
| 9. Other (please describe) | 338 | "Not at all" or "NA": 309 (91.4%) | 18 (5.3%) | 11 (3.3%) |

**Common "Other" responses:**

- Non-parametric methods (27)
- Descriptive statistics and graphs (4)
- Exact inference (e.g. Fisher's exact test) (2)
- Regression (2)

10. Of all the data sets students see in this course, what portion of them are real data?

| N | None | A few | About half | Most of them | All of them |
|---|---|---|---|---|---|
| 338 | 6 (1.8%) | 46 (13.6%) | 66 (19.5%) | 160 (47.3%) | 60 (17.8%) |

## Part 4: Technology

**For this section, consider your entire course – time spent both in class and outside of class.**

1. Other than hand calculators, do students use technology tools during the course?

| N | Yes (skipped to question #3) | No (answered question #2 and then skipped to Part 5) |
|---|---|---|
| 338 | 307 (90.8%) | 31 (9.2%) |

*Note: For the first 3 instructors who reported not using technology, the "check all that apply" function did not work. The table in question #2 presents the number of instructors out of N = 28 who checked each response.*

2. What are your reasons for not using technology other than hand calculators in your course? (Select all that apply.)

| | |
|---|---|
| There is no computer technology available | 7 (25.0%) |
| There are departmental constraints on technology use | 8 (28.6%) |
| Students are already provided with statistical output | 4 (14.3%) |
| Students use hand calculators to compute statistics using formulas | 8 (28.6%) |
| Other | 14 (50.0%) |
| ***N*** | 28 |

**Common "Other" responses:**

- Limited access to computers/computer labs (4)
- Students need to understand the formulas and calculation (3)
- Course emphasizes reasoning and concepts, not calculation (3)
- Students use calculators with built-in statistical functions (3)
- Not enough time for students to learn technology (3)

*Note: For the first 35 instructors who reported using technology, the "check all that apply" function did not work. The table in question #3 presents the number of people out of N = 272 instructors who checked that response.*

3. In what settings do students work with each of these technology tools? (Select all that apply.)

| | N | Delivery of course content | Activities and assignments (e.g. homework, projects) | Assessments (e.g. quizzes, exams) |
|---|---|---|---|---|
| a) Statistical analysis package (e.g. Minitab, SPSS, JMP, StatCrunch…) | 272 | 144 (52.9%) | 210 (77.2%) | 113 (41.5%) |
| b) Graphing calculator with built-in statistical functions | 272 | 82 (30.1%) | 112 (41.2%) | 106 (39.0%) |
| c) Spreadsheet tools (e.g. Excel) | 272 | 60 (22.1%) | 104 (38.2%) | 36 (13.2%) |
| d) Web Applets | 272 | 155 (57.0%) | 105 (38.6%) | 25 (9.2%) |
| e) Conceptual software (e.g. TinkerPlots, Fathom) | 272 | 27 (9.9%) | 21 (7.7%) | 13 (4.8%) |
| f) Other | 272 | 19 (7.0%) | 19 (7.0%) | 12 (4.4%) |

**Common "Other" responses:**

- Online practice software (e.g. MyMathLab, MyStatLab, ActivStats, WebAssign) (7)
- R/RStudio (6)
- Hand calculators without statistical functions (3)
- Simulation software (3)
- Presentation software (e.g. PowerPoint, Prezi) (2)
- Clickers (2)

Questions 4 and 5 ask you to consider how students use technology. In answering these questions, consider the total amount of time that students use technology. (These responses do not need to add up to 100%.)

4. What percentage of time that students spend using technology is designed to be spent **analyzing data**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 307 | 0 | 50 | 70 | 80 | 100 | 61.9 | 25.2 |

5. What percentage of time that students spend using technology is designed to be spent **understanding statistical concepts**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 307 | 0 | 20 | 30 | 50 | 100 | 36.6 | 24.8 |

## Part 5: Assessment

Consider your total set of assessments that count for a grade in your class. Approximately what percentage of the students' grade is dedicated to evaluating each of the following? (These percentages do not need to add up to 100%.)

1. Students' ability to use formulas to produce numerical summaries of a data set:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 10 | 20 | 100 | 14.5 | 17.2 |

2. Students' ability to perform step-by-step calculations to compute answers to problems:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 10 | 20 | 100 | 18.2 | 20.3 |

3. Students' ability to critically examine statistics in the media:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 10 | 15 | 90 | 11.7 | 14.5 |

4. Students' ability to interpret results of a statistical analysis:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 20 | 33 | 50 | 100 | 37.9 | 21.6 |

5. Students' ability to reason correctly about important statistical concepts:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 20 | 30 | 50 | 100 | 36.2 | 23.5 |

6. Students' ability to successfully complete a statistical investigation (e.g., a course project):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 5 | 15 | 25 | 100 | 17.9 | 18.5 |

7. Other (please describe)

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 41 | 1 | 10 | 20 | 40 | 100 | 28.7 | 25.1 |

**Common "Other" responses:**

- Students' ability to present findings to an audience (6)
- Statistical investigation using real data (not necessarily a course project) (5)
- Students' ability to carry out a statistical analysis using software (4)
- Students' ability to identify an appropriate research question and method of analysis (3)
- Class Participation (3)

## Part 6: Beliefs

Please rate the extent to which you agree or disagree with each of the following statements as they reflect your beliefs (but not necessarily your actual teaching) regarding the teaching, learning, and assessment of introductory statistics:

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Rules of probability should be included in an introductory statistics course. | 338 | | 17 (5%) | | 29 (8.6%) | 79 (23.4%) | 140 (41.4%) | 73 (21.6%) | | 213 (63%) |
| 2. The topic of theoretical probability distributions (e.g., the binomial distribution) should be included in an introductory statistics course. | 333 | | 17 (5.1%) | | 25 (7.5%) | 77 (23.1%) | 152 (45.6%) | 62 (18.6%) | | 214 (64.2%) |
| 3. Students should learn how to read statistical tables of theoretical distributions (e.g., *t*-table, *F*-table). | 337 | | 14 (4.2%) | | 82 (24.3%) | 88 (26.1%) | 92 (27.3%) | 61 (18.1%) | | 153 (45.4%) |
| 4. Technology tools should be used to illustrate most abstract statistical concepts. | 337 | | 15 (4.5%) | | 1 (0.3%) | 19 (5.6%) | 137 (40.7%) | 165 (49%) | | 302 (89.7%) |
| 5. Students should learn the importance of using appropriate methods for collecting data. | 338 | | 4 (1.2%) | | 0 (0%) | 18 (5.3%) | 126 (37.3%) | 190 (56.2%) | | 316 (93.5%) |
| 6. Students should learn connections between the quality/nature of the data and inferences that are made. | 336 | | 3 (0.9%) | | 0 (0%) | 4 (1.2%) | 125 (37.2%) | 204 (60.7%) | | 329 (97.9%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. Students should learn fewer topics in greater depth instead of learning more topics in less depth. | 337 | | 23 (6.8%) | | 4 (1.2%) | 54 (16%) | 140 (41.5%) | 116 (34.4%) | | 256 (75.9%) |
| 8. Lectures should be the primary way for students to learn statistical content. | 338 | | 38 (11.2%) | | 36 (10.7%) | 159 (47%) | 88 (26%) | 17 (5%) | | 105 (31%) |
| 9. Quizzes and exams should be used as the primary way to evaluate student learning. | 338 | | 21 (6.2%) | | 16 (4.7%) | 122 (36.1%) | 156 (46.2%) | 23 (6.8%) | | 179 (53%) |
| 10. Alternative assessments (e.g., projects, presentations,) should be used to provide important information about student learning. | 338 | | 13 (3.8%) | | 2 (0.6%) | 13 (3.8%) | 209 (61.8%) | 101 (29.9%) | | 310 (91.7%) |
| 11. All assessments should be regularly reviewed to see that they are aligned with important student learning goals. | 337 | | 15 (4.5%) | | 3 (0.9%) | 18 (5.3%) | 170 (50.4%) | 131 (38.9%) | | 301 (89.3%) |
| 12. Assessments should be used to provide formative feedback to students to improve their learning. | 337 | | 6 (1.8%) | | 0 (0%) | 7 (2.1%) | 169 (50.1%) | 155 (46%) | | 324 (96.1%) |
| 13. Students should be assessed on their ability to complete an open-ended statistical problem. | 337 | | 17 (5%) | | 3 (0.9%) | 35 (10.4%) | 171 (50.7%) | 111 (32.9%) | | 282 (83.6%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 14. Students should be assessed on their statistical literacy (e.g., ability to read a graph, understand common statistical words, etc.). | 338 | | 4 (1.2%) | | 0 (0%) | 4 (1.2%) | 141 (41.7%) | 189 (55.9%) | | 330 (97.6%) |
| 15. Students should analyze data primarily using technology. | 337 | | 8 (2.4%) | | 5 (1.5%) | 40 (11.9%) | 111 (32.9%) | 173 (51.3%) | | 284 (84.2%) |
| 16. Statistics courses should be updated continually in light of developments such as new technology and common core curriculum requirements. | 337 | | 17 (5%) | | 0 (0%) | 22 (6.5%) | 153 (45.4%) | 145 (43%) | | 298 (88.4%) |
| 17. Statistics instructors should be actively engaged in the statistics education community. | 335 | | 31 (9.3%) | | 1 (0.3%) | 24 (7.2%) | 160 (47.8%) | 119 (35.5%) | | 279 (83.3%) |

## Part 7: Course Characteristics

1. How many students are enrolled in one typical section of this course?

   _____ students

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 336 | 5 | 25 | 30 | 35 | 160 | 33.2 | 18.7 |

2. Please indicate the mathematical prerequisite for this course:

| N | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| 338 | 18 (5.3%) | 115 (34%) | 136 (40.2%) | 51 (15.1%) | 18 (5.3%) |

**Common "Other" responses:**

- Beginning algebra (not necessarily taken in high school) (3)
- Intermediate algebra (e.g. Algebra II) (2)
- Precalculus/trigonometry (2)
- Reasonable high school math background (2)

4. Do you have teaching assistants who help with the course?

| N | Yes | No |
|---|---|---|
| 337 | 51 (15.1%) | 286 (84.9%) |

*Note: For 4 instructors who have TAs, the "check all that apply" function did not work. The table in question #3a presents the number of people who checked each response out of N = 47 instructors who reported having teaching assistants.*

3b. What is the role of the teaching assistant in the course? (Select all that apply):

| | |
|---|---|
| Facilitate discussions or activities | 7 (14.9%) |
| Grade assignments | 40 (85.1%) |
| Answer students' questions | 31 (66.0%) |
| Other | 10 (21.3%) |
| ***N*** | 47 |

**Common "Other" responses:**

- Assist in the classroom (4)
- Help students with technology (4)
- Hold office hours (2)

*Note: For the first 38 instructors who responded, the "check all that apply" function did not work. The table in question #4 presents the number of people who checked each response out of N = 300* instructors.

4. Identify any constraints that keep you from making changes that you would like to implement to improve your course. (Select all that apply):

| | |
|---|---|
| Personal time constraints | 206 (68.7%) |
| Characteristics of students (ability, interest, etc.) | 138 (46.0%) |
| Departmental or institutional constraints | 129 (43.0%) |
| Technology constraints (e.g., lack of computer lab, cost of software) | 113 (37.7%) |
| Limitations in terms of what can be done within the classroom management system | 48 (16.0%) |
| Your own comfort level with the classroom management system | 10 (3.3%) |
| The teaching assistants you work with | 8 (2.7%) |
| None | 18 (6.0%) |
| Other | 38 (12.7%) |
| ***N*** | 300 |

**Common "Other" responses:**

- Not enough class time (13)
- Class size (6)
- Other requirements outside of our institution (e.g. state requirements, requirements to transfer to other colleges) (6)
- Limited knowledge/background (4)
- Textbook limitations (3)
- Staying consistent with other sections of the same course (2)

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| N | Two-year college | Four-year college | University | Other |
|---|---|---|---|---|
| 336 | 65 (19.3%) | 127 (37.8%) | 140 (41.7%) | 4 (1.2%) |

2. How would you classify the department in which you teach statistics?

| | |
|---|---|
| Mathematics | 199 (59.4%) |
| Other | 44 (13.1%) |
| Business | 32 (9.6%) |
| Psychology | 26 (7.8%) |
| Statistics | 23 (6.9%) |
| Educational Psychology/Educational Statistics | 8 (2.4%) |
| Mathematics Education | 2 (0.6%) |
| Sociology | 1 (0.3%) |
| N | 335 |

**Common "Other" responses:**

- Mathematics and Statistics (12)
- Mathematics and another science (e.g. Math & Physics, Math & Computer Science, Math & Engineering) (9)
- Biology (4)
- Health sciences (e.g. Public health, biostatistics) (4)
- Multiple departments/interdisciplinary (3)

3. Please classify your position:

| | |
|---|---|
| Adjunct Faculty/Instructional Staff (Part Time) | 22 (6.6%) |
| Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time) | 44 (13.1%) |
| Faculty (Tenure-track) | 64 (19.1%) |
| Faculty (Tenured) | 183 (54.6%) |
| Graduate Student | 8 (2.4%) |
| Other | 14 (4.2%) |
| N | 335 |

**"Other" responses:**

- Faculty in a non-tenure track position, or an institution that does not offer tenure-track positions (12)
- Adjunct/Retired from full time (2)

4. How many years have you been teaching an introductory statistics course?

   _____ years

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 338 | 0 | 6 | 10.5 | 20 | 45 | 13.9 | 10.0 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | |
|---|---|
| None | 55 (16%) |
| 1 | 37 (10.8%) |
| 2 | 50 (14.5%) |
| 3 | 37 (10.8%) |
| 4 | 41 (11.9%) |
| 5 or more | 124 (36%) |
| N | 344 |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | |
|---|---|
| None | 64 (19%) |
| 1 | 30 (8.9%) |
| 2 | 46 (13.6%) |
| 3 | 33 (9.8%) |
| 4 | 26 (7.7%) |
| 5 or more | 138 (40.9%) |
| N | 337 |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | |
|---|---|
| No experience | 18 (5.3%) |
| Very little experience | 47 (13.9%) |
| Some experience | 133 (39.3%) |
| A lot of experience | 140 (41.4%) |
| N | 338 |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | |
|---|---|
| I've never heard of it | 45 (13.4%) |
| I am aware of it, but never used it | 46 (13.7%) |
| I've used it every once in awhile | 177 (52.8%) |
| I've used it frequently | 67 (20%) |
| N | 335 |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | N | I've never heard of it | I'm aware of this journal, but never read it | I've read the journal a few times | I've read the journal frequently |
|---|---|---|---|---|---|
| *Statistics Education Research Journal*(SERJ) | 335 | 100 (29.9%) | 113 (33.7%) | 97 (29%) | 25 (7.5%) |
| *Journal of Statistics Education*(JSE) | 335 | 48 (14.3%) | 86 (25.7%) | 129 (38.5%) | 72 (21.5%) |
| *Teaching Statistics* | 336 | 105 (31.2%) | 118 (35.1%) | 90 (26.8%) | 23 (6.8%) |
| *Technology Innovations in Statistics Education*(TISE) | 334 | 179 (53.6%) | 88 (26.3%) | 57 (17.1%) | 10 (3%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| Conference | N | Never participated | | No impact | Small impact | Large impact |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics*(USCOTS) | 338 | 145 (42.9%) | | 3 (0.9%) | 82 (24.3%) | 108 (32%) |
| *International Conference on Teaching Statistics*(ICOTS) | 332 | 271 (81.6%) | | 18 (5.4%) | 29 (8.7%) | 14 (4.2%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | 328 | 188 (57.3%) | | 12 (3.7%) | 71 (21.6%) | 57 (17.4%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | 328 | 225 (68.6%) | | 25 (7.6%) | 53 (16.2%) | 25 (7.6%) |
| Other: _____ _____ _____ | 56 | ---- | | 5 | 30 | 21 |

**Common "Other" responses:**

- AMATYC (American Mathematics at Two Year Colleges) (14)
- MAA (Mathematical Association of America) conference (e.g. Section Meeting, Mathfest) (4)
- e-COTS (Electronic Conference on Teaching Statistics) (3)
- ICTCM (International Conference on Technology in Collegiate Mathematics) (3)
- NCTM (National Council of Teachers of Mathematics) (3)
- AERA (American Educational Research Association) (2)
- AP (Advanced Placement) Statistics Readings (2)
- CAUSE workshops (2)
- Decision Sciences Institute (2)
- ERCBEC (Eastern Regional Competency Based Education Consortium) (2)
- NEISM (New England Isolated Statisticians Meeting) (2)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | |
|---|---|
| 0 | 112 (33.5%) |
| 1-5 | 180 (53.9%) |
| 6-10 | 33 (9.9%) |
| More than 10 | 9 (2.7%) |
| N | 334 |

| | N | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | 326 | 134 (41.1%) | 70 (21.5%) | 64 (19.6%) | 32 (9.8%) | 8 (2.5%) | 18 (5.5%) |
| 13. Short courses/mini-courses | 308 | 201 (65.3%) | 57 (18.5%) | 34 (11%) | 9 (2.9%) | 4 (1.3%) | 3 (1%) |
| 14. Other | 38 | --- | 5 (13.2%) | 19 (50%) | 3 (7.9%) | 5 (13.2%) | 6 (15.8%) |

**Common "Other" responses:**

- Conference sessions and presentations (18)
- Professional development at AP Statistics Reading (5)
- Webinars (5)
- University courses (3)

# STI Descriptive Statistics

## Group 2: Instructors of lecture/recitation courses

$N = 40$

**Part 1: What type of class do you teach?**

1. Do you teach a class that is entirely (100%) online?
   - Yes → **Go to STI Online version**
   - No → **Proceed to #2**

| Yes | No |
|---|---|
| 0 | 40 |

2. Do you teach a class that is entirely (100%) face to face?
   - Yes → **Go to question 2a)**
   - No → **Go to STI Hybrid version**

| Yes | No |
|---|---|
| 40 | 0 |

2a. If yes, does your class use recitations or lab sessions led by someone else (e.g. a teaching assistant)?

- Yes → **Go to STI Lecture/Recitation version**
- No → **Go to STI Face-to-face version**

| Yes | No |
|---|---|
| 40 | 0 |

## Part 2: Pedagogy

*Note: for the lecture/recitation version, two of the respondents' sliders did not work properly for this section, and did not add up to 100%. Therefore, their intended percentages were reconstructed by taking each response and dividing by the total, so that the new percentages add up to 100%.*

**The following questions will be split into two different parts: one for your lecture (large group) session, the other for your recitation/lab session.**

**Consider the total amount of time spent in a typical lecture (large group) session. Approximately what percentage of this time is spent on each of the following? (Note: The percentages below should add up to 100%)**

1. Students meeting together as a whole class (not in small groups) for lecture, discussion, or demonstration:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 20 | 69.3 | 82 | 90 | 100 | 77.8 | 16.4 |

2. Students working in groups:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 5 | 15 | 50 | 9.4 | 11.5 |

3. Students working individually on an activity:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 5.5 | 10 | 30 | 6.8 | 6.9 |

4. Students taking an assessment:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 5 | 10 | 17 | 6.0 | 4.8 |

**Consider the total amount of time spent in a typical recitation or lab session taught by a competent teaching assistant. Approximately what percentage of this time is spent on each of the following? (Note: The percentages below should add up to 100%)**

5. Students meeting together as a whole class (not in small groups) for lecture, discussion, or demonstration:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 10 | 30 | 63 | 100 | 38.7 | 33.0 |

6. Students working in groups:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 10 | 30 | 55 | 100 | 35.0 | 30.7 |

7. Students working individually on an activity:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 0 | 15 | 25 | 90 | 18.6 | 20.1 |

8. Students taking an assessment:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 0 | 0 | 10 | 50 | 7.8 | 12.1 |

9. Consider a student who was fully engaged in your course. To what extent do you think that **student** would agree or disagree with the following statements about this course?

*Counts are given below, along with valid percentages.*

| | N | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| a) The content was presented mostly through the instructor or TA's lectures. | 40 | 2 (5%) | 3 (7.5%) | 10 (25%) | 25 (62.5%) | | 35 (87.5%) |
| b) The instructor and/or TA asked challenging questions that made me think. | 40 | 0 (0%) | 5 (12.5%) | 24 (60%) | 11 (27.5%) | | 35 (87.5%) |
| c) The course frequently required students to work together. | 40 | 7 (17.5%) | 10 (25%) | 18 (45%) | 5 (12.5%) | | 23 (57.5%) |
| d) The content was presented mostly through activities. | 40 | 13 (32.5%) | 19 (47.5%) | 7 (17.5%) | 1 (2.5%) | | 8 (20.0%) |
| e) This course encouraged students to discover ideas on their own. | 40 | 4 (10%) | 21 (52.5%) | 13 (32.5%) | 2 (5%) | | 15 (37.5%) |
| f) This course often used technology (e.g. web applets, statistical software) to help students understand concepts. | 40 | 0 (0%) | 5 (12.5%) | 19 (47.5%) | 16 (40%) | | 35 (87.5%) |

## Part 3: Curricular Emphasis

**The following items will ask you about your curricular emphasis. Consider the entirety of your course as you complete this section.**

**To what extent are the following addressed in your course?**

| | N | Seldom or not at all | A few times | Repeatedly |
|---|---|---|---|---|
| 1. The need to base decisions on evidence (data) | 40 | 0 (0%) | 6 (15%) | 34 (85%) |
| 2. Difficulties involved in getting good quality data | 40 | 4 (10%) | 22 (55%) | 14 (35%) |
| 3. The study of variability is at the core of statistics | 40 | 1 (2.5%) | 3 (7.5%) | 36 (90%) |
| 4. The need to select an appropriate model for making a statistical inference | 40 | 1 (2.5%) | 15 (37.5%) | 24 (60%) |
| 5. The process of selecting an appropriate model for making a statistical inference | 40 | 2 (5%) | 12 (30%) | 26 (65%) |

**To what extent do you emphasize each of the following approaches to <u>statistical inference</u> in your course?**

| | N | Not at all | To some extent | A major emphasis |
|---|---|---|---|---|
| 6. Parametric methods (e.g., *t*-test, *z*-test) | 40 | 0 (0%) | 3 (7.5%) | 37 (92.5%) |
| 7. Bayesian methods | 40 | 33 (82.5%) | 7 (17.5%) | 0 (0%) |
| 8. Simulation/resampling (e.g., randomization, bootstrap methods) | 40 | 18 (45%) | 20 (50%) | 2 (5%) |
| 9. Other (please describe) | 40 | "Not at all" or "NA": 37 (92.5%) | 1 (2.5%) | 2 (5.0%) |

**"Other" responses:**

- Replication of effects and effect size, meta-analysis (1)
- Data visualization, big data & machine learning algorithms (1)
- Underlying concepts behind inference (1)

10. Of all the data sets students see in this course, what portion of them are real data?

| N | None | A few | About half | Most of them | All of them |
|---|---|---|---|---|---|
| 40 | 0 (0%) | 5 (12.5%) | 6 (15%) | 22 (55%) | 7 (17.5%) |

## Part 4: Technology

**For this section, consider your entire course -- time spent in lecture, in recitation, and outside of class.**

1. Other than hand calculators, do students use technology tools during the course?

| N | Yes (skipped to question #3) | No (answered question #2 and then skipped to Part 5) |
|---|---|---|
| 40 | 39 (97.5%) | 1 (2.5%) |

2. What are your reasons for not using technology other than hand calculators in your course? (Select all that apply.)

| | |
|---|---|
| **There is no computer technology available.** | 0 (0%) |
| **There are departmental constraints on technology use.** | 0 (0%) |
| **Students are already provided with statistical output.** | 0 (0%) |
| **Students use hand calculators to compute statistics using formulas.** | 1 (100%) |
| **Other** | 0 (0%) |
| ***N*** | 1 |

*Note: For the first 3 instructors who reported using technology, the "check all that apply" function did not work. The table in question #3 presents the number of people out of N = 36 instructors who checked that response.*

3. In what settings do students work with each of these technology tools? (Select all that apply.)

| | N | Delivery of course content | Activities and assignments (e.g. homework, projects) | Assessments (e.g. quizzes, exams) |
|---|---|---|---|---|
| a) Statistical analysis package (e.g. Minitab, SPSS, JMP, StatCrunch…) | 36 | 24 (66.7%) | 35 (97.2%) | 12 (33.3%) |
| b) Graphing calculator with built-in statistical functions | 36 | 2 (5.6%) | 8 (19.5%) | 4 (11.1%) |
| c) Spreadsheet tools (e.g. Excel) | 36 | 5 (13.9%) | 12 (30.6%) | 3 (8.3%) |
| d) Web Applets | 36 | 20 (55.6%) | 7 (19.4%) | 1 (2.8%) |
| e) Conceptual software (e.g. TinkerPlots, Fathom) | 36 | 1 (2.8%) | 1 (2.8%) | 1 (2.8%) |
| f) Other | 36 | 2 (5.6%) | 2 (5.6%) | 2 (5.6%) |

**"Other" responses:**

- Online resources (video, articles…) (1)
- Independent website with interactive learning objects (1)
- Basic calculator (1)

Questions 4 and 5 ask you to consider how students use technology. In answering these questions, consider the total amount of time that students use technology. (These responses do not need to add up to 100%.)

4. What percentage of time that students spend using technology is designed to be spent **analyzing data**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 50 | 60 | 80 | 100 | 61.1 | 27.1 |

5. What percentage of time that students spend using technology is designed to be spent **understanding statistical concepts**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 0 | 15 | 30 | 50 | 100 | 33.0 | 22.9 |

## Part 5: Assessment

Consider your total set of assessments that count for a grade in your class. Approximately what percentage of the students' grade is dedicated to evaluating each of the following? (These percentages do not need to add up to 100%.)

1. Students' ability to use formulas to produce numerical summaries of a data set:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 5 | 10 | 20 | 75 | 15.7 | 18.7 |

2. Students' ability to perform step-by-step calculations to compute answers to problems:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 10 | 10 | 31.3 | 75 | 21.3 | 19.7 |

3. Students' ability to critically examine statistics in the media:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 10 | 20 | 64 | 12.6 | 14.8 |

4. Students' ability to interpret results of a statistical analysis:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 10 | 23.8 | 30 | 50 | 100 | 37.1 | 20.0 |

5. Students' ability to reason correctly about important statistical concepts:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 10 | 23.8 | 30 | 50 | 100 | 39.7 | 24.3 |

6. Students' ability to successfully complete a statistical investigation (e.g., a course project):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 4 | 20 | 55 | 10.8 | 14.0 |

7. Other (please describe): _____

*Only one instructor selected "Other," and indicated a response of 5%: "Writing a conclusion to an analysis."*

## Part 6: Beliefs

Please rate the extent to which you agree or disagree with each of the following statements as they reflect your beliefs (but not necessarily your actual teaching) regarding the teaching, learning, and assessment of introductory statistics:

| | N | Undecided | Strongly Disagree | Disagree | Agree | Strongly Agree | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| 1. Rules of probability should be included in an introductory statistics course. | 40 | 1 (2.5%) | 2 (5%) | 6 (15%) | 18 (45%) | 13 (32.5%) | 31 (77.5%) |
| 2. The topic of theoretical probability distributions (e.g., the binomial distribution) should be included in an introductory statistics course. | 40 | 0 (0%) | 3 (7.5%) | 6 (15%) | 19 (47.5%) | 12 (30%) | 31 (77.5%) |
| 3. Students should learn how to read statistical tables of theoretical distributions (e.g., t-table, F-table). | 40 | 3 (7.5%) | 9 (22.5%) | 9 (22.5%) | 14 (35%) | 5 (12.5%) | 19 (47.5%) |
| 4. Technology tools should be used to illustrate most abstract statistical concepts. | 40 | 2 (5%) | 0 (0%) | 5 (12.5%) | 15 (37.5%) | 18 (45%) | 33 (82.5%) |
| 5. Students should learn the importance of using appropriate methods for collecting data. | 40 | 2 (5%) | 1 (2.5%) | 1 (2.5%) | 16 (40%) | 20 (50%) | 36 (90%) |
| 6. Students should learn connections between the quality/nature of the data and inferences that are made. | 40 | 1 (2.5%) | 0 (0%) | 0 (0%) | 11 (27.5%) | 28 (70%) | 39 (97.5%) |

Group 2: Instructors of lecture/recitation courses

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. Students should learn fewer topics in greater depth instead of learning more topics in less depth. | 40 | | 4 (10%) | | 0 (0%) | 7 (17.5%) | 18 (45%) | 11 (27.5%) | | 29 (72.5%) |
| 8. Lectures should be the primary way for students to learn statistical content. | 40 | | 6 (15%) | | 2 (5%) | 20 (50%) | 12 (30%) | 0 (0%) | | 12 (30%) |
| 9. Quizzes and exams should be used as the primary way to evaluate student learning. | 40 | | 3 (7.5%) | | 1 (2.5%) | 16 (40%) | 20 (50%) | 0 (0%) | | 20 (50%) |
| 10. Alternative assessments (e.g., projects, presentations,) should be used to provide important information about student learning. | 40 | | 2 (5%) | | 0 (0%) | 4 (10%) | 23 (57.5%) | 11 (27.5%) | | 34 (85.0%) |
| 11. All assessments should be regularly reviewed to see that they are aligned with important student learning goals. | 40 | | 1 (2.5%) | | 0 (0%) | 1 (2.5%) | 23 (57.5%) | 15 (37.5%) | | 38 (95.0%) |
| 12. Assessments should be used to provide formative feedback to students to improve their learning. | 40 | | 0 (0%) | | 0 (0%) | 1 (2.5%) | 22 (55%) | 17 (42.5%) | | 39 (97.5%) |
| 13. Students should be assessed on their ability to complete an open-ended statistical problem. | 40 | | 1 (2.5%) | | 0 (0%) | 3 (7.5%) | 24 (60%) | 12 (30%) | | 36 (90.0%) |

Group 2: Instructors of lecture/recitation courses

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 14. Students should be assessed on their statistical literacy (e.g., ability to read a graph, understand common statistical words, etc.). | 40 | | 1 (2.5%) | | 0 (0%) | 0 (0%) | 15 (37.5%) | 24 (60%) | | 39 (97.5%) |
| 15. Students should analyze data primarily using technology. | 40 | | 0 (0%) | | 0 (0%) | 4 (10%) | 17 (42.5%) | 19 (47.5%) | | 36 (90%) |
| 16. Statistics courses should be updated continually in light of developments such as new technology and common core curriculum requirements. | 40 | | 3 (7.5%) | | 0 (0%) | 3 (7.5%) | 15 (37.5%) | 19 (47.5%) | | 34 (85%) |
| 17. Statistics instructors should be actively engaged in the statistics education community. | 40 | | 7 (17.5%) | | 0 (0%) | 5 (12.5%) | 12 (30%) | 16 (40%) | | 28 (70%) |

## Part 7: Course Characteristics

1a. How many students are enrolled in a typical **lecture** section of this course?

_____ students

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 15 | 80 | 100 | 165 | 255 | 127.1 | 75.7 |

1b. How many students are enrolled in a typical **recitation/lab** section of this course?

_____ students

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 39 | 1 | 20 | 25 | 30 | 50 | 26.0 | 10.7 |

2. Please indicate the mathematical prerequisite for this course:

| N | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| 39 | 6 (15.4%) | 13 (33.3%) | 18 (46.2%) | 2 (5.1%) | 0 (0%) |

3. Do you have teaching assistants who help with the course?

| N | Yes | No |
|---|---|---|
| 39 | 39 (100%) | 0 (0%) |

*Note: For 3 instructors, the "check all that apply" function did not work. The table in question #3a presents the number of people who checked each response out of N=36 instructors who reported having teaching assistants.*

3a. What is the role of the teaching assistant in the course? (Select all that apply):

| | |
|---|---|
| **Facilitate discussions or activities** | 22 (61.1%) |
| **Grade assignments** | 30 (83.3%) |
| **Answer students' questions** | 29 (80.6%) |
| **Lead recitation/lab sections** | 35 (97.2%) |
| **Lead lecture sections** | 2 (5.6%) |
| **Other** | 3 (8.3%) |
| ***N*** | 36 |

**"Other" responses:**

- Office hours in tutor/help room (2)
- Help grade exams (1)

*Note: For the first 3 instructors who responded, the "check all that apply" function did not work. The table in question #4 presents the number of people who checked each response out of N = 37* instructors.

4. Identify any constraints that keep you from making changes that you would like to implement to improve your course. (Select all that apply):

| | |
|---|---|
| **Personal time constraints** | 24 (64.9%) |
| **Departmental or institutional constraints** | 23 (62.2%) |
| **Characteristics of students (ability, interest, etc.)** | 14 (37.8%) |
| **Limitations in terms of what can be done within the classroom management system** | 12 (32.4%) |
| **The teaching assistants you work with** | 9 (24.3%) |
| **Technology constraints (e.g., lack of computer lab, cost of software)** | 7 (18.9%) |
| **Your own comfort level with the classroom management system** | 1 (2.7%) |
| **None** | 3 (8.1%) |
| **Other** | 4 (10.8%) |
| ***N*** | 37 |

**"Other" responses:**

- Class size (3)
- Co-instructor constraints (1)
- Cost of materials (1)
- Time limitations for more authentic assessment (1)

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| N | Two-year college | Four-year college | University | Other |
|---|---|---|---|---|
| 38 | 0 (0%) | 2 (5.3%) | 36 (94.7%) | 0 (0%) |

2. How would you classify the department in which you teach statistics?

| | |
|---|---|
| **Statistics** | 25 (64.1%) |
| **Other** | 6 (15.4%) |
| **Mathematics** | 4 (10.3%) |
| **Psychology** | 3 (7.7%) |
| **Sociology** | 1 (2.6%) |
| **Business** | 0 (0%) |
| **Educational Psychology/Educational Statistics** | 0 (0%) |
| **Mathematics Education** | 0 (0%) |
| **N** | 39 |

**"Other" responses:**

- Biostatistics (2)
- Mathematics & Statistics (1)
- Political Science (1)
- Human Development & Family Studies (1)
- Economics (1)

3. Please classify your position:

| | |
|---|---|
| **Adjunct Faculty/Instructional Staff (Part Time)** | 1 (2.6%) |
| **Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time)** | 18 (46.2%) |
| **Faculty (Tenure-track)** | 4 (10.3%) |
| **Faculty (Tenured)** | 11 (28.2%) |
| **Graduate Student** | 3 (7.7%) |
| **Other** | 2 (5.1%) |
| **N** | 39 |

**"Other" responses:**

- Clinical Assistant Professor (1)
- Part-time continuing lecturer (1)

4. How many years have you been teaching an introductory statistics course?

   _____ years

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 40 | 0 | 4.75 | 10.5 | 17.5 | 50 | 12.6 | 11.1 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | |
|---|---|
| **None** | 4 (10.3%) |
| **1** | 4 (10.3%) |
| **2** | 2 (5.1%) |
| **3** | 6 (15.4%) |
| **4** | 4 (10.3%) |
| **5 or more** | 19 (48.7%) |
| **N** | 39 |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | |
|---|---|
| **None** | 1 (2.6%) |
| **1** | 5 (12.8%) |
| **2** | 2 (5.1%) |
| **3** | 4 (10.3%) |
| **4** | 3 (7.7%) |
| **5 or more** | 24 (61.5%) |
| **N** | 39 |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | |
|---|---|
| **No experience** | 1 (2.6%) |
| **Very little experience** | 4 (10.3%) |
| **Some experience** | 14 (35.9%) |
| **A lot of experience** | 20 (51.3%) |
| **N** | 39 |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | |
|---|---|
| **I've never heard of it** | 7 (17.9%) |
| **I am aware of it, but never used it** | 6 (15.4%) |
| **I've used it every once in awhile** | 19 (48.7%) |
| **I've used it frequently** | 7 (17.9%) |
| **N** | 39 |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | N | I've never heard of it | I'm aware of this journal, but never read it | I've read the journal a few times | I've read the journal frequently |
|---|---|---|---|---|---|
| *Statistics Education Research Journal* (SERJ) | 39 | 14 (35.9%) | 11 (28.2%) | 7 (17.9%) | 7 (17.9%) |
| *Journal of Statistics Education* (JSE) | 38 | 10 (26.3%) | 9 (23.7%) | 9 (23.7%) | 10 (26.3%) |
| *Teaching Statistics* | 37 | 21 (56.8%) | 6 (16.2%) | 8 (21.6%) | 2 (5.4%) |
| *Technology Innovations in Statistics Education* (TISE) | 39 | 25 (64.1%) | 2 (5.1%) | 9 (23.1%) | 3 (7.7%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| Conference | N | Never participated | | No impact | Small impact | Large impact |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics* (USCOTS) | 38 | 10 (26.3%) | | 3 (7.9%) | 13 (34.2%) | 12 (31.6%) |
| *International Conference on Teaching Statistics* (ICOTS) | 38 | 29 (76.3%) | | 1 (2.6%) | 6 (15.8%) | 2 (5.3%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | 39 | 18 (46.2%) | | 2 (5.1%) | 11 (28.2%) | 8 (20.5%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | 38 | 28 (73.7%) | | 6 (15.8%) | 4 (10.5%) | 0 (0%) |
| Other | 5 | ---- | | 0 | 2 | 3 |

**"Other" responses:**

- AMATYC (American Mathematics at Two Year Colleges) (1)
- American Political Science Association (1)
- AP (Advanced Placement) Statistics Readings (1)
- Lilly Conference on College and University Teaching (1)
- Sloan-C/MERLOT (1)
- SRTL (Statistical Reasoning, Thinking and Literacy) (1)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | |
|---|---|
| **0** | 17 (43.6%) |
| **1-5** | 20 (51.3%) |
| **6-10** | 1 (2.6%) |
| **More than 10** | 1 (2.6%) |
| **N** | 39 |

| | N | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | 38 | 25 (65.8%) | 3 (7.9%) | 7 (18.4%) | 2 (5.3%) | 0 (0%) | 1 (2.6%) |
| 13. Short courses/mini-courses | 37 | 32 (86.5%) | 4 (10.8%) | 0 (0%) | 1 (2.7%) | 0 (0%) | 0 (0%) |
| 14. Other | 3 | --- | 1 | 2 | 0 | 0 | 0 |

**"Other" responses:**

- AP Statistics Reading (1)
- Online professional certificate program (1)
- Webinars (1)

# STI Descriptive Statistics

## Group 3: Instructors of online classes

$N = 83$

**Part 1: What type of class do you teach?**

1. Do you teach a class that is entirely (100%) online?

- Yes → **Go to STI Online version**
- No → **Proceed to #2**

| Yes | No |
|---|---|
| 83 | 0 |

*By answering "Yes" to question #1, the instructors went to the Online version. They did not see the following two branching questions in Part 1:*

2. Do you teach a class that is entirely (100%) face to face?

- Yes → **Go to question 2a)**
- No → **Go to STI Hybrid version**

| Yes | No |
|---|---|
| --- | --- |

2a) If yes, does your class use recitations or lab sessions led by someone else (e.g. a teaching assistant)?

- Yes → **Go to STI Lecture/Recitation version**
- No → **Go to STI Face-to-face version**

| Yes | No |
|---|---|
| --- | --- |

## Part 2: Pedagogy

1. Consider a student who was fully engaged in your course. To what extent do you think that **student** would agree or disagree with the following statements about this course?

*Counts are given below, along with valid percentages.*

| | N | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| a1) The content was presented mostly through video or audio lectures. | 83 | 11 (13.3%) | 27 (32.5%) | 15 (18.1%) | 30 (36.1%) | | 45 (54.2%) |
| a2) The content was presented mostly through readings (e.g. lecture notes, textbook, text materials, online content) | 82 | 3 (3.7%) | 26 (31.7%) | 32 (39%) | 21 (25.6%) | | 53 (64.6%) |
| b) The instructor asked challenging questions that made me think. | 82 | 0 (0%) | 6 (7.3%) | 56 (68.3%) | 20 (24.4%) | | 76 (92.7%) |
| c) The course frequently required students to work together. | 83 | 27 (32.5%) | 29 (34.9%) | 21 (25.3%) | 6 (7.2%) | | 27 (32.5%) |
| d) The content was presented mostly through activities. | 83 | 13 (15.7%) | 44 (53%) | 21 (25.3%) | 5 (6%) | | 26 (31.3%) |
| e) This course encouraged students to discover ideas on their own. | 82 | 2 (2.4%) | 28 (34.1%) | 49 (59.8%) | 3 (3.7%) | | 52 (63.4%) |
| f) This course often used technology (e.g. web applets, statistical software) to help students understand concepts. | 83 | 2 (2.4%) | 15 (18.1%) | 30 (36.1%) | 36 (43.4%) | | 66 (79.5%) |

## Part 3: Curricular Emphasis

**The following items will ask you about your curricular emphasis. Consider the entirety of your course as you complete this section.**

**To what extent are the following addressed in your course?**

| | N | Seldom or not at all | A few times | Repeatedly |
|---|---|---|---|---|
| 1. The need to base decisions on evidence (data) | 83 | 0 (0%) | 17 (20.5%) | 66 (79.5%) |
| 2. Difficulties involved in getting good quality data | 83 | 10 (12.0%) | 42 (50.6%) | 31 (37.3%) |
| 3. The study of variability is at the core of statistics | 83 | 2 (2.4%) | 24 (28.9%) | 57 (68.7%) |
| 4. The need to select an appropriate model for making a statistical inference | 83 | 5 (6%) | 26 (31.3%) | 52 (62.7%) |
| 5. The process of selecting an appropriate model for making a statistical inference | 82 | 4 (4.9%) | 31 (37.8%) | 47 (57.3%) |

**To what extent do you emphasize each of the following approaches to <u>statistical inference</u> in your course?**

| | N | Not at all | To some extent | A major emphasis |
|---|---|---|---|---|
| 6. Parametric methods (e.g. t-test, z-test) | 81 | 2 (2.5%) | 10 (12.3%) | 69 (85.2%) |
| 7. Bayesian methods | 83 | 68 (81.9%) | 14 (16.9%) | 1 (1.2%) |
| 8. Simulation/resampling (e.g. randomization, bootstrap methods) | 83 | 38 (45.8%) | 40 (48.2%) | 5 (6%) |
| 9. Other (please describe): _____ | 83 | "Not at all" or "NA": 73 (88.0%) | 7 (8.4%) | 3 (3.6%) |

**"Other" responses:**

- Non-parametric methods (8)
- Qualitative methods (1)
- SPC (Statistical Process Control) methods (1)
- Student conceptions of statistics (1)
- Viewing normal probability plots for linearity (1)

10. Of all the data sets students see in this course, what portion of them are real data?

| N | None | A few | About half | Most of them | All of them |
|---|---|---|---|---|---|
| 81 | 1 (1.2%) | 11 (13.6%) | 23 (28.4%) | 36 (44.4%) | 10 (12.3%) |

## Part 4: Technology

**For this section, consider your entire course.**

1. Other than hand calculators, do students use technology tools during the course?

| N | Yes (skipped to question #3) | No (answered question #2 and then skipped to Part 5) |
|---|---|---|
| 83 | 76 (91.6%) | 7 (9.6%) |

*Note: For the first 2 instructors who reported not using technology, the "check all that apply" function did not work. The table in question #2 presents the number of people out of N = 5 instructors who checked each response.*

2. What are your reasons for not using technology other than hand calculators in your course? (Select all that apply.)

| | |
|---|---|
| there is no computer technology available | 0 (0%) |
| there are departmental constraints on technology use | 1 (20%) |
| students are already provided with statistical output | 3 (60%) |
| students use hand calculators to compute statistics using formulas | 3 (60%) |
| Other: _____ | 2 (40%) |
| ***N*** | 5 |

**"Other" responses:**

- Cost concerns for students (1)
- Statistical literacy course that is not computation-heavy (1)

*Note: For the first 9 instructors who reported using technology, the "check all that apply" function did not work. The table in question #3 presents the number of people out of N = 67 instructors who checked that response.*

3. In what settings do students work with each of these technology tools? (Select all that apply.)

| | N | Delivery of course content | Activities and assignments (e.g. homework, projects) | Assessments (e.g. quizzes, exams) |
|---|---|---|---|---|
| a) Statistical analysis package (e.g. Minitab, SPSS, JMP, StatCrunch…) | 67 | 30 (44.8%) | 46 (68.7%) | 31 (46.3%) |
| b) Graphing calculator with built-in statistical functions | 67 | 18 (26.9%) | 31 (46.3%) | 32 (47.8%) |
| c) Spreadsheet tools (e.g. Excel) | 67 | 18 (26.9%) | 29 (43.3%) | 16 (23.8%) |
| d) Web Applets | 67 | 34 (50.7%) | 26 (38.9%) | 5 (7.5%) |
| e) Conceptual software (e.g. TinkerPlots, Fathom) | 67 | 5 (7.5%) | 4 (6.0%) | 2 (3.0%) |
| f) Other: _____ | 67 | 3 (4.5%) | 2 (3.0%) | 1 (1.5%) |

**Common "Other" responses:**

- Course management system (e.g. Moodle) (2)
- Online practice software (MyStatLab, WebAssign) (2)
- Mega-Stat (Excel add-in ) (1)

Questions 4 and 5 ask you to consider how students use technology. In answering these questions, consider the total amount of time that students use technology. (These responses do not need to add up to 100%.)

4. What percentage of time that students spend using technology is designed to be spent **analyzing data**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 76 | 5 | 36.5 | 60 | 80 | 100 | 57.3 | 26.4 |

5. What percentage of time that students spend using technology is designed to be spent **understanding statistical concepts**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 76 | 5 | 20 | 32.5 | 50 | 100 | 39.3 | 25.7 |

## Part 5: Assessment

Consider your total set of assessments that count for a grade in your class. Approximately what percentage of the students' grade is dedicated to evaluating each of the following? (These percentages do not need to add up to 100%.)

1. Students' ability to use formulas to produce numerical summaries of a data set:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 5 | 15 | 25 | 80 | 21.5 | 23.2 |

2. Students' ability to perform step-by-step calculations to compute answers to problems:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 10 | 20 | 31.5 | 80 | 23.9 | 21.9 |

3. Students' ability to critically examine statistics in the media:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 4.5 | 10 | 20 | 95 | 15.4 | 19.0 |

4. Students' ability to interpret results of a statistical analysis:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 10 | 25 | 40 | 60 | 100 | 44.3 | 24.0 |

5. Students' ability to reason correctly about important statistical concepts:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 20 | 32 | 60 | 100 | 41.5 | 26.1 |

6. Students' ability to successfully complete a statistical investigation (e.g., a course project):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 0 | 10 | 30 | 100 | 19.6 | 22.4 |

7. Other (please describe): _____

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 7 | 5 | 11.5 | 20 | 25 | 30 | 18.3 | 9.8 |

**"Other" responses:**

- Online class discussion (e.g. applying concepts to real-world situations, discussing article from peer-reviewed journal) (3)
- Interactive team projects (1)

## Part 6: Beliefs

Please rate the extent to which you agree or disagree with each of the following statements as they reflect your beliefs (but not necessarily your actual teaching) regarding the teaching, learning, and assessment of introductory statistics:

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Rules of probability should be included in an introductory statistics course. | 82 | | 1 (1.2%) | | 3 (3.7%) | 19 (23.2%) | 37 (45.1%) | 22 (26.8%) | | 59 (72.0%) |
| 2. The topic of theoretical probability distributions (e.g., the binomial distribution) should be included in an introductory statistics course. | 81 | | 3 (3.7%) | | 4 (4.9%) | 13 (16%) | 42 (51.9%) | 19 (23.5%) | | 61 (75.3%) |
| 3. Students should learn how to read statistical tables of theoretical distributions (e.g., t-table, F-table). | 82 | | 5 (6.1%) | | 14 (17.1%) | 22 (26.8%) | 30 (36.6%) | 11 (13.4%) | | 41 (50.0%) |
| 4. Technology tools should be used to illustrate most abstract statistical concepts. | 82 | | 5 (6.1%) | | 0 (0%) | 2 (2.4%) | 34 (41.5%) | 41 (50%) | | 75 (91.5%) |
| 5. Students should learn the importance of using appropriate methods for collecting data. | 82 | | 0 (0%) | | 0 (0%) | 1 (1.2%) | 28 (34.1%) | 53 (64.6%) | | 81 (98.8%) |
| 6. Students should learn connections between the quality/nature of the data and inferences that are made. | 82 | | 0 (0%) | | 0 (0%) | 0 (0%) | 25 (30.5%) | 57 (69.5%) | | 82 (100%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. Students should learn fewer topics in greater depth instead of learning more topics in less depth. | 82 | | 7 (8.5%) | | 1 (1.2%) | 13 (15.9%) | 33 (40.2%) | 28 (34.1%) | | 61 (74.4%) |
| 8. Lectures should be the primary way for students to learn statistical content. | 82 | | 6 (7.3%) | | 15 (18.3%) | 46 (56.1%) | 12 (14.6%) | 3 (3.7%) | | 15 (18.3%) |
| 9. Quizzes and exams should be used as the primary way to evaluate student learning. | 82 | | 5 (6.1%) | | 2 (2.4%) | 41 (50%) | 30 (36.6%) | 4 (4.9%) | | 34 (41.5%) |
| 10. Alternative assessments (e.g., projects, presentations,) should be used to provide important information about student learning. | 82 | | 5 (6.1%) | | 0 (0%) | 1 (1.2%) | 57 (69.5%) | 19 (23.2%) | | 76 (92.7%) |
| 11. All assessments should be regularly reviewed to see that they are aligned with important student learning goals. | 82 | | 2 (2.4%) | | 0 (0%) | 0 (0%) | 40 (48.8%) | 40 (48.8%) | | 80 (97.6%) |
| 12. Assessments should be used to provide formative feedback to students to improve their learning. | 81 | | 2 (2.5%) | | 0 (0%) | 1 (1.2%) | 36 (44.4%) | 42 (51.9%) | | 78 (96.3%) |
| 13. Students should be assessed on their ability to complete an open-ended statistical problem. | 82 | | 3 (3.7%) | | 1 (1.2%) | 7 (8.5%) | 40 (48.8%) | 31 (37.8%) | | 71 (86.6%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 14. Students should be assessed on their statistical literacy (e.g., ability to read a graph, understand common statistical words, etc.). | 82 | | 1 (1.2%) | | 0 (0%) | 0 (0%) | 30 (36.6%) | 51 (62.2%) | | 83 (98.8%) |
| 15. Students should analyze data primarily using technology. | 82 | | 3 (3.7%) | | 0 (0%) | 7 (8.5%) | 28 (34.1%) | 44 (53.7%) | | 72 (87.8%) |
| 16. Statistics courses should be updated continually in light of developments such as new technology and common core curriculum requirements. | 81 | | 7 (8.6%) | | 2 (2.5%) | 1 (1.2%) | 38 (46.9%) | 33 (40.7%) | | 71 (87.7%) |
| 17. Statistics instructors should be actively engaged in the statistics education community. | 82 | | 3 (3.7%) | | 0 (0%) | 3 (3.7%) | 38 (46.3%) | 38 (46.3%) | | 76 (92.7%) |

## Part 7: Course Characteristics

1. How many students are enrolled in one typical section of this course?

_____ students

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 82 | 10 | 22.5 | 28.5 | 40 | 255 | 37.8 | 39.2 |

2. Please indicate the mathematical prerequisite for this course:

| N | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| 83 | 1 (1.2%) | 37 (44.6%) | 34 (41.0%) | 7 (8.4%) | 3 (3.6%) |

**"Other" responses:**

- College Algebra or Quantitative Methods (1)
- Quantitative Business Analysis (1)
- Test score showing college-level math readiness (1)

3. Do you have teaching assistants who help with the course?

| N | Yes | No |
|---|---|---|
| 82 | 18 (22.0%) | 64 (78.0%) |

*Note: For 1 instructor who has TAs, the "check all that apply" function did not work. The table in question #3a presents the number of people who checked each response out of N =* 17 instructors who reported having teaching assistants.

3a) What is the role of the teaching assistant in the course? (Select all that apply):

| | |
|---|---|
| Facilitate discussions or activities | 10 (58.8%) |
| Grade assignments | 12 (70.6%) |
| Answer students' questions | 11 (64.7%) |
| Other: _____ | 1 (5.9%) |
| ***N*** | 17 |

**"Other" response:**

- Grade exams (1)

*Note: For the first 11 instructors who responded, the "check all that apply" function did not work. (Also, one instructor did not complete most of Part 8, including this question.) The table in question #4 presents the number of people who checked each response out of N = 71* instructors.

4. Identify any constraints that keep you from making changes that you would like to implement to improve your course. (Select all that apply):

| | |
|---|---|
| Personal time constraints | 42 (59.2%) |
| Characteristics of students (ability, interest, etc.) | 34 (47.9%) |
| Departmental or institutional constraints | 34 (47.9%) |
| Technology constraints (e.g., lack of computer lab, cost of software) | 29 (40.8%) |
| Limitations in terms of what can be done within the classroom management system | 20 (28.2%) |
| Your own comfort level with the classroom management system | 3 (4.2%) |
| The teaching assistants you work with | 3 (4.2%) |
| None | 4 (5.6%) |
| Other: _____ | 5 (7.0%) |
| ***N*** | 71 |

**"Other" responses:**

- Class size (1)
- Conformity across multiple sections of the same class (1)
- Course objectives (1)
- Department where lecturing is the norm (1)
- In the process of making changes (1)
- Institutions want a "classical" statistics course (1)
- Physical classroom space (1)
- Short course length (6 weeks) (1)

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| N | Two-year college | Four-year college | University | Other |
|---|---|---|---|---|
| 82 | 23 (28.0%) | 8 (9.8%) | 50 (61.0%) | 1 (1.2%) |

2. How would you classify the department in which you teach statistics?

| | |
|---|---|
| Mathematics | 40 (48.8%) |
| Statistics | 12 (14.6%) |
| Other | 11 (13.4%) |
| Business | 9 (11%) |
| Psychology | 4 (4.9%) |
| Educational Psychology/Educational Statistics | 3 (3.7%) |
| Sociology | 3 (3.7%) |
| Mathematics Education | 0 (0%) |
| N | 82 |

**"Other" responses:**

- Biostatistics (2)
- Decision Science and Information Management (1)
- Education (1)
- Engineering Technology (1)
- Human Services (1)
- Math/Science (1)
- Mathematics and Statistics (1)
- Nursing (1)
- Political Science (1)

3. Please classify your position:

| | |
|---|---|
| Adjunct Faculty/Instructional Staff (Part Time) | 7 (8.5%) |
| Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time) | 22 (26.8%) |
| Faculty (Tenure-track) | 7 (8.5%) |
| Faculty (Tenured) | 42 (51.2%) |
| Graduate Student | 0 (0%) |
| Other | 4 (4.9%) |
| N | 82 |

**"Other" responses:**

- Faculty in a non-tenure track position (3)
- Faculty (1)

4. How many years have you been teaching an introductory statistics course?

_____ years

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 83 | 0 | 7.5 | 13 | 20 | 44 | 14.6 | 9.6 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | |
|---|---|
| None | 7 (8.6%) |
| 1 | 7 (8.6%) |
| 2 | 16 (19.8%) |
| 3 | 12 (14.8%) |
| 4 | 16 (19.8%) |
| 5 or more | 23 (28.4%) |
| N | 81 |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | |
|---|---|
| None | 9 (11.1%) |
| 1 | 9 (11.1%) |
| 2 | 12 (14.8%) |
| 3 | 7 (8.6%) |
| 4 | 5 (6.2%) |
| 5 or more | 39 (48.1%) |
| N | 81 |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | |
|---|---|
| No experience | 2 (2.5%) |
| Very little experience | 16 (19.8%) |
| Some experience | 30 (37%) |
| A lot of experience | 33 (40.7%) |
| N | 81 |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | |
|---|---|
| I've never heard of it | 9 (11.4%) |
| I am aware of it, but never used it | 13 (16.5%) |
| I've used it every once in awhile | 37 (46.8%) |
| I've used it frequently | 20 (25.3%) |
| N | 79 |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | N | I've never heard of it | I'm aware of this journal, but never read it | I've read the journal a few times | I've read the journal frequently |
|---|---|---|---|---|---|
| *Statistics Education Research Journal*(SERJ) | 79 | 21 (26.6%) | 26 (32.9%) | 23 (29.1%) | 9 (11.4%) |
| *Journal of Statistics Education*(JSE) | 79 | 9 (11.4%) | 22 (27.8%) | 28 (35.4%) | 20 (25.3%) |
| *Teaching Statistics* | 78 | 23 (29.5%) | 18 (23.1%) | 29 (37.2%) | 8 (10.3%) |
| *Technology Innovations in Statistics Education*(TISE) | 80 | 35 (43.8%) | 24 (30%) | 14 (17.5%) | 7 (8.8%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| Conference | N | Never participated | | No impact | Small impact | Large impact |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics*(USCOTS) | 78 | 39 (50%) | | 0 (0%) | 15 (19.2%) | 24 (30.8%) |
| *International Conference on Teaching Statistics*(ICOTS) | 79 | 70 (88.6%) | | 5 (6.3%) | 2 (2.5%) | 2 (2.5%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | 76 | 53 (69.7%) | | 4 (5.3%) | 10 (13.2%) | 9 (11.8%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | 79 | 62 (78.5%) | | 4 (5.1%) | 9 (11.4%) | 4 (5.1%) |
| Other: _____ _____ _____ | 15 | ---- | | 0 | 8 | 7 |

**"Other" responses:**

- AMATYC (American Mathematics at Two Year Colleges) (7)
- Decision Sciences Institute (2)
- AP (Advanced Placement) Statistics Readings (1)
- e-COTS (Electronic Conference on Teaching Statistics) (1)
- ICME (Institute for Computational and Mathematical Engineering (1)
- ICTCM (International Conference on Technology in Collegiate Mathematics) (1)
- NCTM (National Council of Teachers of Mathematics) (1)
- INFORMS (1)
- MSMSBE (1)
- useR (1)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | |
|---|---|
| 0 | 10 (12.7%) |
| 1-5 | 52 (65.8%) |
| 6-10 | 5 (6.3%) |
| More than 10 | 12 (15.2%) |
| N | 79 |

| | N | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | 77 | 17 (22.1%) | 18 (23.4%) | 25 (32.5%) | 6 (7.8%) | 4 (5.2%) | 7 (9.1%) |
| 13. Short courses/mini-courses | 71 | 46 (64.8%) | 10 (14.1%) | 10 (14.1%) | 2 (2.8%) | 1 (1.4%) | 2 (2.8%) |
| 14. Other: _____ _____ _____ | 8 | --- | 4 | 0 | 3 | 0 | 1 |

**"Other" responses:**

- Webinars (2)
- ASA Chapter Presentations (1)
- Attend session (1)
- CERME conference (1)
- e-COTS (Electronic Conference on Teaching Statistics) (1)
- Faculty Development meetings (1)
- MOOC (1)
- No funding to attend conferences (1)
- University course (1)

# STI Descriptive Statistics

## Group 4: Instructors of hybrid courses

$N = 31$

**Part 1: What type of class do you teach?**

1. Do you teach a class that is entirely (100%) online?

- Yes → **Go to STI Online version**
- No → **Proceed to #2**

| Yes | No |
|---|---|
| 0 | 31 |

2. Do you teach a class that is entirely (100%) face to face?

- Yes → **Go to question 2a)**
- No → **Go to STI Hybrid version (question 3)**

| Yes | No |
|---|---|
| 0 | 31 |

*By answering "No" to questions #1 and #2, the instructors went to the Hybrid version. They did not see question 2a):*

2a) If yes, does your class use recitations or lab sessions led by someone else (e.g. a teaching assistant)?

- Yes → **Go to STI Lecture/Recitation version**
- No → **Go to STI Face-to-face version**

| Yes | No |
|---|---|
| --- | --- |

3. How much of the time that you spend **face-to-face** with students is spent in each of the following ways?

a) Administrative tasks (e.g. answering questions about course structure, going over course details and syllabus):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 4 | 5 | 10 | 20 | 7.1 | 5.5 |

b) Instruction and learning (e.g. activities, discussion, lecture):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 75 | 80 | 85.5 | 98 | 74.8 | 21.0 |

c) Assessment (i.e., taking quizzes or tests):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 10 | 15 | 15 | 100 | 17.8 | 20.0 |

## Part 2: Pedagogy

*Note: for the hybrid version, two of the respondents' sliders did not work properly for this section, and did not add up to 100%. Therefore, their intended percentages were reconstructed by taking each response and dividing by the total, so that the new percentages add up to 100%.*

**Consider the total amount of time that you meet face-to-face with your students. Approximately what percentage of this time is spent on each of the following? (Note: The percentages below should add up to 100%)**

10. Students meeting together as a whole class (not in small groups) for lecture, discussion, or demonstration:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 42.5 | 60 | 77.5 | 100 | 58.0 | 24.4 |

11. Students working in groups:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 5 | 13 | 30 | 40 | 16.2 | 13.5 |

12. Students working individually on an activity:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 4 | 5 | 15 | 100 | 11.8 | 18.4 |

13. Students taking an assessment:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 5 | 10 | 15 | 100 | 14.1 | 18.7 |

14. Consider a student who was fully engaged in your course. To what extent do you think that **student** would agree or disagree with the following statements about this course?

*Counts are given below, along with valid percentages.*

| | N | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| a1) The content was presented mostly through the instructor's face-to-face lectures. | 31 | 3 (9.7%) | 10 (32.3%) | 12 (38.7%) | 6 (19.4%) | | 18 (58.1%) |
| a2) The content was presented mostly through video or audio lectures. | 31 | 14 (45.2%) | 9 (29%) | 6 (19.4%) | 2 (6.5%) | | 8 (25.8%) |
| a3) The content was presented mostly through readings (e.g. lecture notes, textbook, text materials, online content). | 31 | 2 (6.5%) | 11 (35.5%) | 17 (54.8%) | 1 (3.2%) | | 18 (58.1%) |
| b) The instructor and/or TA asked challenging questions that made me think. | 31 | 0 (0%) | 1 (3.2%) | 22 (71%) | 8 (25.8%) | | 30 (96.8%) |
| c) The course frequently required students to work together. | 31 | 2 (6.5%) | 9 (29%) | 14 (45.2%) | 6 (19.4%) | | 20 (64.5%) |
| d) The content was presented mostly through activities. | 31 | 4 (12.9%) | 13 (41.9%) | 11 (35.5%) | 3 (9.7%) | | 14 (45.2%) |
| e) This course encouraged students to discover ideas on their own. | 31 | 2 (6.5%) | 13 (41.9%) | 14 (45.2%) | 2 (6.5%) | | 16 (51.6%) |
| f) This course often used technology (e.g. web applets, statistical software) to help students understand concepts. | 31 | 1 (3.2%) | 2 (6.5%) | 16 (51.6%) | 12 (38.7%) | | 28 (90.3%) |

## Part 3: Curricular Emphasis

**The following items will ask you about your curricular emphasis. Consider the entirety of your course as you complete this section.**

**To what extent are the following addressed in your course?**

| | N | Seldom or not at all | A few times | Repeatedly |
|---|---|---|---|---|
| 1. The need to base decisions on evidence (data) | 31 | 1 (3.2%) | 5 (16.1%) | 25 (80.6%) |
| 2. Difficulties involved in getting good quality data | 31 | 4 (12.9%) | 16 (51.6%) | 11 (35.5%) |
| 3. The study of variability is at the core of statistics | 31 | 1 (3.2%) | 4 (12.9%) | 26 (83.9%) |
| 4. The need to select an appropriate model for making a statistical inference | 31 | 3 (9.7%) | 11 (35.5%) | 17 (54.8%) |
| 5. The process of selecting an appropriate model for making a statistical inference | 31 | 5 (16.1%) | 8 (25.8%) | 18 (58.1%) |

**To what extent do you emphasize each of the following approaches to <u>statistical inference</u> in your course?**

| | N | Not at all | To some extent | A major emphasis |
|---|---|---|---|---|
| 6. Parametric methods (e.g. t-test, z-test) | 31 | 0 (0%) | 1 (3.2%) | 30 (96.8%) |
| 7. Bayesian methods | 30 | 23 (76.7%) | 7 (23.3%) | 0 (0%) |
| 8. Simulation/resampling (e.g. randomization, bootstrap methods) | 31 | 12 (38.7%) | 16 (51.6%) | 3 (9.7%) |
| 9. Other (please describe): _____ | 31 | "Not at all" or "NA": 28 (90.3%) | 2 (6.5%) | 1 (3.2%) |

**"Other" responses:**

- Probability (1)
- Statistical graphs (1)

10. Of all the data sets students see in this course, what portion of them are real data?

| N | None | A few | About half | Most of them | All of them |
|---|---|---|---|---|---|
| 31 | 2 (6.5%) | 8 (25.8%) | 6 (19.4%) | 14 (45.2%) | 1 (3.2%) |

## Part 4: Technology

**For this section, consider your entire course -- time spent both in class and outside of class.**

1. Other than hand calculators, do students use technology tools during the course?

| N | Yes (skipped to question #3) | No (answered question #2 and then skipped to Part 5) |
|---|---|---|
| 31 | 29 (93.5%) | 2 (6.5%) |

2. What are your reasons for not using technology other than hand calculators in your course? (Select all that apply.)

| | |
|---|---|
| there is no computer technology available | 0 (0%) |
| there are departmental constraints on technology use | 0 (0%) |
| students are already provided with statistical output | 1 (50%) |
| students use hand calculators to compute statistics using formulas | 1 (50%) |
| Other: _____ | 0 (0%) |
| ***N*** | 2 |

*Note: For the first 4 instructors who reported using technology, the "check all that apply" function did not work. The table in question #3 presents the number of people out of N = 25 instructors who checked that response.*

3. In what settings do students work with each of these technology tools? (Select all that apply.)

| | **N** | **Delivery of course content** | **Activities and assignments (e.g. homework, projects)** | **Assessments (e.g. quizzes, exams)** |
|---|---|---|---|---|
| a) Statistical analysis package (e.g. Minitab, SPSS, JMP, StatCrunch…) | 25 | 14 (56%) | 23 (92%) | 14 (56%) |
| b) Graphing calculator with built-in statistical functions | 25 | 8 (32%) | 14 (56%) | 12 (48%) |
| c) Spreadsheet tools (e.g. Excel) | 25 | 9 (36%) | 15 (60%) | 5 (20%) |
| d) Web Applets | 25 | 15 (60%) | 13 (52%) | 3 (12%) |
| e) Conceptual software (e.g. TinkerPlots, Fathom) | 25 | 1 (4%) | 0 (0%) | 0 (0%) |
| f) Other: _____ | 25 | 6 (24%) | 1 (4%) | 2 (8%) |

**"Other" responses:**

- R (2)
- Publishers' software (2)
- Online readings, lectures, and quizzes (1)
- Moodle (1)
- WebCT (1)

Questions 4 and 5 ask you to consider how students use technology. In answering these questions, consider the total amount of time that students use technology. (These responses do not need to add up to 100%.)

4. What percentage of time that students spend using technology is designed to be spent **analyzing data**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 29 | 0 | 25 | 50 | 70 | 90 | 47.7 | 25.7 |

5. What percentage of time that students spend using technology is designed to be spent **understanding statistical concepts**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 29 | 0 | 15 | 30 | 50 | 100 | 34.7 | 23.4 |

## Part 5: Assessment

Consider your total set of assessments that count for a grade in your class. Approximately what percentage of the students' grade is dedicated to evaluating each of the following? (These percentages do not need to add up to 100%.)

1. Students' ability to use formulas to produce numerical summaries of a data set:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 10 | 10 | 25 | 50 | 16.9 | 13.7 |

2. Students' ability to perform step-by-step calculations to compute answers to problems:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 10 | 20 | 29.5 | 75 | 20.6 | 15.7 |

3. Students' ability to critically examine statistics in the media:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 5 | 10 | 12.5 | 80 | 13.4 | 18.6 |

4. Students' ability to interpret results of a statistical analysis:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 17.5 | 25 | 40 | 90 | 31.3 | 20.2 |

5. Students' ability to reason correctly about important statistical concepts:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 20 | 25 | 40 | 90 | 33.4 | 23.5 |

6. Students' ability to successfully complete a statistical investigation (e.g., a course project):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 10 | 10 | 20 | 85 | 19.0 | 21.7 |

7. Other (please describe): _____

*Only four instructors selected "Other." Their responses were:*

- Producing appropriate graphs of data (10%)
- Making right decisions based on data and analysis (70%)
- Students' ability to modify existing methods to address new concerns (10%)
- Students' ability to critically examine a research report (20%)

## Part 6: Beliefs

Please rate the extent to which you agree or disagree with each of the following statements as they reflect your beliefs (but not necessarily your actual teaching) regarding the teaching, learning, and assessment of introductory statistics:

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Rules of probability should be included in an introductory statistics course. | 31 | | 1 (3.2%) | | 2 (6.5%) | 1 (3.2%) | 22 (71%) | 5 (16.1%) | | 27 (87.1%) |
| 2. The topic of theoretical probability distributions (e.g., the binomial distribution) should be included in an introductory statistics course. | 31 | | 4 (12.9%) | | 2 (6.5%) | 7 (22.6%) | 12 (38.7%) | 6 (19.4%) | | 18 (58.1%) |
| 3. Students should learn how to read statistical tables of theoretical distributions (e.g., t-table, F-table). | 31 | | 3 (9.7%) | | 4 (12.9%) | 8 (25.8%) | 13 (41.9%) | 3 (9.7%) | | 16 (51.6%) |
| 4. Technology tools should be used to illustrate most abstract statistical concepts. | 31 | | 2 (6.5%) | | 0 (0%) | 1 (3.2%) | 10 (32.3%) | 18 (58.1%) | | 28 (90.3%) |
| 5. Students should learn the importance of using appropriate methods for collecting data. | 31 | | 1 (3.2%) | | 0 (0%) | 2 (6.5%) | 14 (45.2%) | 14 (45.2%) | | 28 (90.3%) |
| 6. Students should learn connections between the quality/nature of the data and inferences that are made. | 31 | | 2 (6.5%) | | 0 (0%) | 0 (0%) | 10 (32.3%) | 19 (61.3%) | | 29 (93.5%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. Students should learn fewer topics in greater depth instead of learning more topics in less depth. | 31 | | 3 (9.7%) | | 0 (0%) | 6 (19.4%) | 14 (45.2%) | 8 (25.8%) | | 22 (71.0%) |
| 8. Lectures should be the primary way for students to learn statistical content. | 31 | | 1 (3.2%) | | 4 (12.9%) | 17 (54.8%) | 8 (25.8%) | 1 (3.2%) | | 9 (29.0%) |
| 9. Quizzes and exams should be used as the primary way to evaluate student learning. | 31 | | 1 (3.2%) | | 0 (0%) | 17 (54.8%) | 12 (38.7%) | 1 (3.2%) | | 13 (41.9%) |
| 10. Alternative assessments (e.g., projects, presentations,) should be used to provide important information about student learning. | 31 | | 2 (6.5%) | | 0 (0%) | 1 (3.2%) | 17 (54.8%) | 11 (35.5%) | | 28 (90.3%) |
| 11. All assessments should be regularly reviewed to see that they are aligned with important student learning goals. | 31 | | 1 (3.2%) | | 0 (0%) | 0 (0%) | 17 (54.8%) | 13 (41.9%) | | 30 (96.8%) |
| 12. Assessments should be used to provide formative feedback to students to improve their learning. | 31 | | 1 (3.2%) | | 0 (0%) | 0 (0%) | 16 (51.6%) | 14 (45.2%) | | 30 (96.8%) |
| 13. Students should be assessed on their ability to complete an open-ended statistical problem. | 31 | | 3 (9.7%) | | 0 (0%) | 1 (3.2%) | 18 (58.1%) | 9 (29%) | | 27 (87.1%) |
| 14. Students should be assessed on their statistical literacy (e.g., ability to read a graph, understand common statistical words, etc.). | 31 | | 1 (3.2%) | | 0 (0%) | 0 (0%) | 14 (45.2%) | 16 (51.6%) | | 30 (96.8%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 15. Students should analyze data primarily using technology. | 31 | | 1 (3.2%) | | 1 (3.2%) | 4 (12.9%) | 11 (35.5%) | 14 (45.2%) | | 25 (80.6%) |
| 16. Statistics courses should be updated continually in light of developments such as new technology and common core curriculum requirements. | 31 | | 2 (6.5%) | | 0 (0%) | 3 (9.7%) | 17 (54.8%) | 9 (29%) | | 26 (83.9%) |
| 17. Statistics instructors should be actively engaged in the statistics education community. | 31 | | 4 (12.9%) | | 0 (0%) | 1 (3.2%) | 19 (61.3%) | 7 (22.6%) | | 26 (83.9%) |

## Part 7: Course Characteristics

1. How many students are enrolled in one typical section of this course?

_____ students

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 15 | 24.5 | 32 | 40 | 255 | 60.4 | 73.6 |

2. Please indicate the mathematical prerequisite for this course:

| N | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| 31 | 1 (3.2%) | 13 (41.9%) | 13 (41.9%) | 3 (9.7%) | 1 (3.2%) |

3. Do you have teaching assistants who help with the course?

| N | Yes | No |
|---|---|---|
| 31 | 8 (25.8%) | 23 (74.2%) |

*Note: For 2 instructors who have TAs, the "check all that apply" function did not work. The table in question #3a presents the number of people who checked each response out of N=*6 instructors who reported having teaching assistants.

3a) What is the role of the teaching assistant in the course? (Select all that apply):

| | |
|---|---|
| Facilitate discussions or activities | 3 (50%) |
| Grade assignments | 5 (83.3%) |
| Answer students' questions | 4 (66.6%) |
| Other: _____ | 1 (16.7%) |
| ***N*** | 6 |

**"Other" response:**

- Proctor statistics lab

*Note: For the first 4 instructors who responded, the "check all that apply" function did not work. The table in question #4 presents the number of people who checked each response out of N = 27* instructors.

4. Identify any constraints that keep you from making changes that you would like to implement to improve your course. (Select all that apply):

| | |
|---|---|
| Personal time constraints | 22 (81.5%) |
| Technology constraints (e.g., lack of computer lab, cost of software) | 17 (63.0%) |
| Characteristics of students (ability, interest, etc.) | 15 (55.6%) |
| Departmental or institutional constraints | 13 (48.1%) |
| Limitations in terms of what can be done within the classroom management system | 8 (29.6%) |
| Your own comfort level with the classroom management system | 3 (11.1%) |
| The teaching assistants you work with | 0 (0%) |
| None | 1 (3.7%) |
| Other: | 3 (11.1%) |
| ***N*** | 27 |

**"Other" responses:**

- Lack of knowledge about current statistical practice and pedagogy (1)
- Not enough TA support for grading (1)
- Not full-time faculty (1)
- Time and high learning curve of using technology effectively (1)

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| N | Two-year college | Four-year college | University | Other |
|---|---|---|---|---|
| 31 | 6 (19.4%) | 6 (19.4%) | 19 (61.3%) | 0 (0%) |

2. How would you classify the department in which you teach statistics?

| | |
|---|---|
| Mathematics | 14 (45.2%) |
| Statistics | 6 (19.4%) |
| Other | 5 (16.1%) |
| Psychology | 3 (9.7%) |
| Business | 2 (6.5%) |
| Educational Psychology/Educational Statistics | 1 (3.2%) |
| Sociology | 0 (0%) |
| Mathematics Education | 0 (0%) |
| N | 31 |

**"Other" responses:**

- Biology/Biotechnology (1)
- General Education (1)
- Mathematical Sciences (Math, Statistics, and Math Education) (1)
- Mathematics and Statistics (1)

3. Please classify your position:

| | |
|---|---|
| Adjunct Faculty/Instructional Staff (Part Time) | 3 (9.7%) |
| Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time) | 5 (16.1%) |
| Faculty (Tenure-track) | 4 (12.9%) |
| Faculty (Tenured) | 14 (45.2%) |
| Graduate Student | 3 (9.7%) |
| Other | 2 (6.5%) |
| N | 31 |

**"Other" responses:**

- Administrative Faculty (1)
- Faculty (1)

4. How many years have you been teaching an introductory statistics course?

_____ years

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 31 | 0 | 5 | 9 | 15 | 35 | 11.4 | 9.0 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | |
|---|---|
| None | 5 (16.1%) |
| 1 | 3 (9.7%) |
| 2 | 4 (12.9%) |
| 3 | 6 (19.4%) |
| 4 | 3 (9.7%) |
| 5 or more | 10 (32.3%) |
| N | 31 |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | |
|---|---|
| None | 3 (9.7%) |
| 1 | 3 (9.7%) |
| 2 | 3 (9.7%) |
| 3 | 4 (12.9%) |
| 4 | 5 (16.1%) |
| 5 or more | 13 (41.9%) |
| N | 31 |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | |
|---|---|
| No experience | 3 (9.7%) |
| Very little experience | 3 (9.7%) |
| Some experience | 10 (32.3%) |
| A lot of experience | 15 (48.4%) |
| N | 31 |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | |
|---|---|
| I've never heard of it | 4 (12.9%) |
| I am aware of it, but never used it | 3 (9.7%) |
| I've used it every once in awhile | 16 (51.6%) |
| I've used it frequently | 8 (25.8%) |
| N | 31 |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | N | I've never heard of it | I'm aware of this journal, but never read it | I've read the journal a few times | I've read the journal frequently |
|---|---|---|---|---|---|
| Statistics Education Research Journal(SERJ) | 31 | 8 (25.8%) | 14 (45.2%) | 7 (22.6%) | 2 (6.5%) |
| Journal of Statistics Education(JSE) | 31 | 6 (19.4%) | 10 (32.3%) | 13 (41.9%) | 2 (6.5%) |
| Teaching Statistics | 31 | 11 (35.5%) | 10 (32.3%) | 9 (29%) | 1 (3.2%) |
| Technology Innovations in Statistics Education(TISE) | 31 | 15 (48.4%) | 9 (29%) | 7 (22.6%) | 0 (0%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| Conference | N | Never participated | | No impact | Small impact | Large impact |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics*(USCOTS) | 30 | 16 (53.3%) | | 1 (3.3%) | 7 (23.3%) | 6 (20%) |
| *International Conference on Teaching Statistics*(ICOTS) | 30 | 29 (96.7%) | | 1 (3.3%) | 0 (0%) | 0 (0%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | 29 | 19 (65.5%) | | 1 (3.4%) | 7 (24.1%) | 2 (6.9%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | 31 | 28 (90.3%) | | 1 (3.2%) | 2 (6.5%) | 0 (0%) |
| Other: _____ _____ _____ | 2 | ---- | | 0 | 2 | 0 |

**"Other" responses:**

- Quality and Productivity Research Conference by ASA (1)
- MAA Joint Math Meetings (Not necessarily Statistics Education section) (1)
- Not enough funding to go to conferences (1)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | |
|---|---|
| 0 | 8 (26.7%) |
| 1-5 | 16 (53.3%) |
| 6-10 | 4 (13.3%) |
| More than 10 | 2 (6.7%) |
| N | 30 |

| | N | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | 29 | 12 (41.4%) | 7 (24.1%) | 7 (24.1%) | 1 (3.4%) | 1 (3.4%) | 1 (3.4%) |
| 13. Short courses/mini-courses | 27 | 16 (59.3%) | 7 (25.9%) | 2 (7.4%) | 0 (0%) | 2 (7.4%) | 0 (0%) |
| 14. Other: _____ _____ _____ | 2 | --- | 0 | 1 | 0 | 1 | 0 |

**"Other" response:**

- Learn Six Sigma Master Black Belt Training (1)

# STI Descriptive Statistics

## Summary of data from all groups together on common items

$N = 492$

**Part 1: What type of class do you teach?**

| Class format | Number of Instructors |
|---|---|
| Face-to-face | 338 |
| Lecture/recitation | 40 |
| Online | 83 |
| Hybrid | 31 |

## Part 2: Pedagogy

Consider a student who was fully engaged in your course. To what extent do you think that **student** would agree or disagree with the following statements about this course?

| | N | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|
| b) The instructor asked challenging questions that made me think. | 485 | 0 (0%) | 28 (5.8%) | 328 (67.6%) | 129 (26.6%) | | 457 (94.2%) |
| c) The course frequently required students to work together. | 488 | 55 (11.3%) | 163 (33.4%) | 185 (37.9%) | 85 (17.4%) | | 270 (55.3%) |
| d) The content was presented mostly through activities. | 486 | 58 (11.9%) | 264 (54.3%) | 127 (26.1%) | 37 (7.6%) | | 164 (33.7%) |
| e) This course encouraged students to discover ideas on their own. | 485 | 20 (4.1%) | 203 (41.9%) | 231 (47.6%) | 31 (6.4%) | | 262 (54.0%) |
| f) This course often used technology (e.g. web applets, statistical software) to help students understand concepts. | 488 | 12 (2.5%) | 70 (14.3%) | 207 (42.4%) | 199 (40.8%) | | 406 (83.2%) |

## Part 3: Curricular Emphasis

**The following items will ask you about your curricular emphasis. Consider the entirety of your course as you complete this section.**

**To what extent are the following addressed in your course?**

| | N | Seldom or not at all | A few times | Repeatedly |
|---|---|---|---|---|
| 1. The need to base decisions on evidence (data) | 491 | 4 (0.8%) | 82 (16.7%) | 405 (82.5%) |
| 2. Difficulties involved in getting good quality data | 492 | 50 (10.2%) | 259 (52.6%) | 183 (37.2%) |
| 3. The study of variability is at the core of statistics | 491 | 10 (2%) | 106 (21.6%) | 375 (76.4%) |
| 4. The need to select an appropriate model for making a statistical inference | 491 | 23 (4.7%) | 176 (35.8%) | 292 (59.5%) |
| 5. The process of selecting an appropriate model for making a statistical inference | 485 | 40 (8.2%) | 171 (35.3%) | 274 (56.5%) |

**To what extent do you emphasize each of the following approaches to <u>statistical inference</u> in your course?**

| | N | Not at all | To some extent | A major emphasis |
|---|---|---|---|---|
| 6. Parametric methods (e.g. t-test, z-test) | 487 | 14 (2.9%) | 57 (11.7%) | 416 (85.4%) |
| 7. Bayesian methods | 487 | 407 (83.6%) | 76 (15.6%) | 4 (0.8%) |
| 8. Simulation/resampling (e.g. randomization, bootstrap methods) | 490 | 210 (42.9%) | 226 (46.1%) | 54 (11%) |
| 9. Other (please describe): _____ | 492 | "Not at all" or "NA": 447 (90.9%) | 29 (5.9%) | 16 (3.3%) |

**Common "Other" responses:**

- Non-parametric methods (35)
- Descriptive statistics and graphs (5)
- Exact inference (e.g. Fisher's exact test) (2)
- Regression (2)

10. Of all the data sets students see in this course, what portion of them are real data?

| N | None | A few | About half | Most of them | All of them |
|---|---|---|---|---|---|
| 490 | 9 (1.8%) | 70 (14.3%) | 100 (20.4%) | 232 (47.3%) | 79 (16.1%) |

## Part 4: Technology

**For this section, consider your entire course.**

1. Other than hand calculators, do students use technology tools during the course?

| N | Yes (skipped to question #3) | No (answered question #2 and then skipped to Part 5) |
|---|---|---|
| 492 | 451 (91.7%) | 41 (8.3%) |

*Note: For the first 5 instructors who reported not using technology, the "check all that apply" function did not work. The table in question #2 presents the number of instructors out of N = 36 who checked each response.*

2. What are your reasons for not using technology other than hand calculators in your course? (Select all that apply.)

| | |
|---|---|
| there is no computer technology available | 7 (19.4%) |
| there are departmental constraints on technology use | 8 (22.2%) |
| students are already provided with statistical output | 8 (22.2%) |
| students use hand calculators to compute statistics using formulas | 13 (36.1%) |
| Other: _____ | 16 (44.4%) |
| ***N*** | 36 |

**Common "Other" responses:**

- Limited access to computers/computer labs (4)
- Students need to understand the formulas and calculation (3)
- Course emphasizes reasoning and concepts, not calculation (4)
- Students use calculators with built-in statistical functions (3)
- Not enough time for students to learn technology (3)

*Note: For the first 50 instructors who reported using technology, the "check all that apply" function did not work. The table in question #3 presents the number of people out of N = 401 instructors who checked that response.*

3. In what settings do students work with each of these technology tools? (Select all that apply.)

| | N | Delivery of course content | Activities and assignments (e.g. homework, projects) | Assessments (e.g. quizzes, exams) |
|---|---|---|---|---|
| a) Statistical analysis package (e.g. Minitab, SPSS, JMP, StatCrunch…) | 401 | 212 (52.9%) | 312 (77.8%) | 169 (42.1%) |
| b) Graphing calculator with built-in statistical functions | 401 | 110 (27.4%) | 163 (40.6%) | 153 (38.2%) |
| c) Spreadsheet tools (e.g. Excel) | 401 | 93 (23.2%) | 159 (39.7%) | 60 (15.0%) |
| d) Web Applets | 401 | 223 (55.6%) | 150 (37.4%) | 34 (8.5%) |
| e) Conceptual software (e.g. TinkerPlots, Fathom) | 401 | 34 (8.5%) | 26 (6.5%) | 16 (4.0%) |
| f) Other: _____ | 401 | 30 (7.5%) | 24 (6.0%) | 17 (4.2%) |

**Common "Other" responses:**

- Online practice software (e.g. MyMathLab, MyStatLab, ActivStats, WebAssign) (11)
- R/RStudio (8)
- Hand calculators without statistical functions (4)
- Simulation software (3)
- Course management system (3)
- Presentation software (e.g. PowerPoint, Prezi) (2)
- Clickers (2)

Questions 4 and 5 ask you to consider how students use technology. In answering these questions, consider the total amount of time that students use technology. (These responses do not need to add up to 100%.)

4. What percentage of time that students spend using technology is designed to be spent **analyzing data**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 451 | 0 | 45 | 65 | 80 | 100 | 60.2 | 25.8 |

5. What percentage of time that students spend using technology is designed to be spent **understanding statistical concepts**?

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 451 | 0 | 20 | 30 | 50 | 100 | 36.6 | 24.8 |

## Part 5: Assessment

Consider your total set of assessments that count for a grade in your class. Approximately what percentage of the students' grade is dedicated to evaluating each of the following? (These percentages do not need to add up to 100%.)

1. Students' ability to use formulas to produce numerical summaries of a data set:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 5 | 10 | 20 | 100 | 16.0 | 18.5 |

2. Students' ability to perform step-by-step calculations to compute answers to problems:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 5 | 10 | 25 | 100 | 19.6 | 20.4 |

3. Students' ability to critically examine statistics in the media:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 5 | 10 | 15 | 95 | 12.4 | 15.6 |

4. Students' ability to interpret results of a statistical analysis:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 20 | 35 | 50 | 100 | 38.5 | 21.9 |

5. Students' ability to reason correctly about important statistical concepts:

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 20 | 30 | 50 | 100 | 37.1 | 24.0 |

6. Students' ability to successfully complete a statistical investigation (e.g., a course project):

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 3.8 | 15 | 25 | 100 | 17.5 | 18.8 |

7. Other (please describe): _____

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 53 | 1 | 10 | 20 | 40 | 100 | 26.8 | 23.8 |

**Common "Other" responses:**

- Students' ability to present findings to an audience (7)
- Statistical investigation using real data (not necessarily a course project) (5)
- Students' ability to carry out a statistical analysis using software (4)
- Students' ability to identify an appropriate research question and method of analysis (3)
- Class Participation (3)
- Online class discussion (e.g. applying concepts to real-world situations, discussing article from peer-reviewed journal) (3)

## Part 6: Beliefs

Please rate the extent to which you agree or disagree with each of the following statements as they reflect your beliefs (but not necessarily your actual teaching) regarding the teaching, learning, and assessment of introductory statistics:

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Rules of probability should be included in an introductory statistics course. | 491 | | 20 (4.1%) | | 36 (7.3%) | 104 (21.2%) | 218 (44.4%) | 113 (23%) | | 331 (67.4%) |
| 2. The topic of theoretical probability distributions (e.g., the binomial distribution) should be included in an introductory statistics course. | 485 | | 24 (4.9%) | | 34 (7%) | 104 (21.4%) | 224 (46.2%) | 99 (20.4%) | | 323 (66.6%) |
| 3. Students should learn how to read statistical tables of theoretical distributions (e.g., t-table, F-table). | 490 | | 24 (4.9%) | | 109 (22.2%) | 128 (26.1%) | 149 (30.4%) | 80 (16.3%) | | 229 (46.7%) |
| 4. Technology tools should be used to illustrate most abstract statistical concepts. | 490 | | 24 (4.9%) | | 1 (0.2%) | 27 (5.5%) | 198 (40.4%) | 240 (49%) | | 438 (89.4%) |
| 5. Students should learn the importance of using appropriate methods for collecting data. | 491 | | 7 (1.4%) | | 1 (0.2%) | 22 (4.5%) | 184 (37.5%) | 277 (56.4%) | | 461 (93.9%) |
| 6. Students should learn connections between the quality/nature of the data and inferences that are made. | 489 | | 6 (1.2%) | | 0 (0%) | 4 (0.8%) | 170 (34.8%) | 309 (63.2%) | | 479 (98.0%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. Students should learn fewer topics in greater depth instead of learning more topics in less depth. | 490 | | 37 (7.6%) | | 5 (1%) | 81 (16.5%) | 204 (41.6%) | 163 (33.3%) | | 367 (74.9%) |
| 8. Lectures should be the primary way for students to learn statistical content. | 491 | | 51 (10.4%) | | 58 (11.8%) | 241 (49.1%) | 120 (24.4%) | 21 (4.3%) | | 141 (28.7%) |
| 9. Quizzes and exams should be used as the primary way to evaluate student learning. | 491 | | 30 (6.1%) | | 19 (3.9%) | 197 (40.1%) | 217 (44.2%) | 28 (5.7%) | | 245 (49.9%) |
| 10. Alternative assessments (e.g., projects, presentations,) should be used to provide important information about student learning. | 491 | | 22 (4.5%) | | 2 (0.4%) | 19 (3.9%) | 306 (62.3%) | 142 (28.9%) | | 448 (91.2%) |
| 11. All assessments should be regularly reviewed to see that they are aligned with important student learning goals. | 490 | | 19 (3.9%) | | 3 (0.6%) | 19 (3.9%) | 249 (50.8%) | 200 (40.8%) | | 449 (91.6%) |
| 12. Assessments should be used to provide formative feedback to students to improve their learning. | 489 | | 9 (1.8%) | | 0 (0%) | 9 (1.8%) | 244 (49.9%) | 227 (46.4%) | | 471 (96.3%) |
| 13. Students should be assessed on their ability to complete an open-ended statistical problem. | 490 | | 24 (4.9%) | | 4 (0.8%) | 46 (9.4%) | 255 (52%) | 161 (32.9%) | | 416 (84.9%) |

| | N | | Undecided | | Strongly Disagree | Disagree | Agree | Strongly Agree | | Agree or Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|---|
| 14. Students should be assessed on their statistical literacy (e.g., ability to read a graph, understand common statistical words, etc.). | 491 | | 7 (1.4%) | | 0 (0%) | 4 (0.8%) | 200 (40.7%) | 280 (57%) | | 480 (97.8%) |
| 15. Students should analyze data primarily using technology. | 490 | | 12 (2.4%) | | 6 (1.2%) | 56 (11.4%) | 167 (34.1%) | 249 (50.8%) | | 416 (84.9%) |
| 16. Statistics courses should be updated continually in light of developments such as new technology and common core curriculum requirements. | 489 | | 28 (5.7%) | | 2 (0.4%) | 30 (6.1%) | 223 (45.6%) | 206 (42.1%) | | 429 (87.7%) |
| 17. Statistics instructors should be actively engaged in the statistics education community. | 488 | | 45 (9.2%) | | 1 (0.2%) | 33 (6.8%) | 230 (47.1%) | 179 (36.7%) | | 409 (83.8%) |

## Part 7: Course Characteristics

2. Please indicate the mathematical prerequisite for this course:

| N | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| 490 | 26 (5.3%) | 177 (36.1%) | 202 (41.2%) | 63 (12.9%) | 22 (4.5%) |

**Common "Other" responses:**

- Beginning algebra (not necessarily taken in high school) (4)
- Intermediate algebra (e.g. Algebra II) (2)
- Precalculus/trigonometry (2)

3. Do you have teaching assistants who help with the course?

| N | Yes | No |
|---|---|---|
| 489 | 115 (23.5%) | 374 (76.5%) |

*Note: For 10 instructors who have TAs, the "check all that apply" function did not work. The table in question #3a presents the number of people who checked each response out of N* = 105 instructors who reported having teaching assistants.

3a) What is the role of the teaching assistant in the course? (Select all that apply):

| | |
|---|---|
| Facilitate discussions or activities | 43 (41.0%) |
| Grade assignments | 89 (84.8%) |
| Answer students' questions | 77 (73.3%) |
| Lead recitation/lab sessions (Lecture/Recitation instructors only) | 35 (33.3%) |
| Lead lecture sessions (Lecture/Recitation instructors only) | 2 (1.9%) |
| Other: _____ | 14 (13.3%) |
| ***N*** | 105 |

**Common "Other" responses:**

- Assist in the classroom (4)
- Help students with technology (4)
- Hold office hours (4)
- Grade exams (2)

*Note: For the first 55 instructors who responded, the "check all that apply" function did not work. The table in question #4 presents the number of people who checked each response out of N = 437* instructors.

4. Identify any constraints that keep you from making changes that you would like to implement to improve your course. (Select all that apply):

| | |
|---|---|
| Personal time constraints | 294 (67.3%) |
| Characteristics of students (ability, interest, etc.) | 204 (46.7%) |
| Departmental or institutional constraints | 201 (46.0%) |
| Technology constraints (e.g., lack of computer lab, cost of software) | 168 (38.4%) |
| Limitations in terms of what can be done within the classroom management system | 89 (20.4%) |
| Your own comfort level with the classroom management system | 19 (4.3%) |
| The teaching assistants you work with | 20 (4.6%) |
| None | 28 (6.4%) |
| Other: _____ | 51 (11.7%) |
| ***N*** | 437 |

**Common "Other" responses:**

- Not enough class time (15)
- Class size (9)
- Other requirements outside of our institution (e.g. state requirements, requirements to transfer to other colleges) (6)
- Limited knowledge/background (5)
- Textbook limitations (3)
- Staying consistent with other sections of the same course (3)

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| N | Two-year college | Four-year college | University | Other |
|---|---|---|---|---|
| 492 | 93 (19.1%) | 143 (29.4%) | 246 (50.5%) | 5 (1.0%) |

2. How would you classify the department in which you teach statistics?

| | |
|---|---|
| Mathematics | 256 (52.5%) |
| Other | 68 (13.9%) |
| Statistics | 66 (13.5%) |
| Business | 43 (8.8%) |
| Psychology | 36 (7.4%) |
| Educational Psychology/Educational Statistics | 12 (2.5%) |
| Mathematics Education | 2 (0.4%) |
| Sociology | 5 (1.0%) |
| N | 488 |

**Common "Other" responses:**

- Mathematics and Statistics (15)
- Mathematics and another science (e.g. Math & Physics, Math & Computer Science, Math & Engineering) (11)
- Health sciences (e.g. Public health, biostatistics) (9)
- Biology (5)
- Multiple departments/interdisciplinary (3)

3. Please classify your position:

| | |
|---|---|
| Adjunct Faculty/Instructional Staff (Part Time) | 33 (6.8%) |
| Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time) | 89 (18.3%) |
| Faculty (Tenure-track) | 79 (16.2%) |
| Faculty (Tenured) | 250 (51.3%) |
| Graduate Student | 14 (2.9%) |
| Other | 22 (4.5%) |
| N | 487 |

**"Other" responses:**

- Faculty in a non-tenure track position, or an institution that does not offer tenure-track positions (15)
- Adjunct/Retired from full time (2)

4. How many years have you been teaching an introductory statistics course?

_____ years

| N | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| 492 | 0 | 7 | 12 | 20 | 50 | 14.6 | 10.1 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | |
|---|---|
| None | 71 (14.6%) |
| 1 | 48 (9.9%) |
| 2 | 70 (14.4%) |
| 3 | 60 (12.3%) |
| 4 | 63 (12.9%) |
| 5 or more | 175 (35.9%) |
| N | 487 |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | |
|---|---|
| None | 77 (15.8%) |
| 1 | 46 (9.4%) |
| 2 | 64 (13.1%) |
| 3 | 48 (9.8%) |
| 4 | 39 (8%) |
| 5 or more | 214 (43.9%) |
| N | 488 |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | |
|---|---|
| No experience | 24 (4.9%) |
| Very little experience | 69 (14.1%) |
| Some experience | 187 (38.2%) |
| A lot of experience | 209 (42.7%) |
| N | 489 |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | |
|---|---|
| I've never heard of it | 65 (13.4%) |
| I am aware of it, but never used it | 69 (14.3%) |
| I've used it every once in awhile | 249 (51.4%) |
| I've used it frequently | 101 (20.9%) |
| N | 484 |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | N | I've never heard of it | I'm aware of this journal, but never read it | I've read the journal a few times | I've read the journal frequently |
|---|---|---|---|---|---|
| *Statistics Education Research Journal*(SERJ) | 484 | 143 (29.5%) | 163 (33.7%) | 135 (27.9%) | 43 (8.9%) |
| *Journal of Statistics Education*(JSE) | 483 | 73 (15.1%) | 128 (26.5%) | 177 (36.6%) | 105 (21.7%) |
| *Teaching Statistics* | 482 | 161 (33.4%) | 151 (31.3%) | 136 (28.2%) | 34 (7.1%) |
| *Technology Innovations in Statistics Education*(TISE) | 484 | 256 (52.9%) | 122 (25.2%) | 86 (17.8%) | 20 (4.1%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| Conference | N | Never participated | | No impact | Small impact | Large impact |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics*(USCOTS) | 484 | 210 (43.4%) | | 7 (1.4%) | 117 (24.2%) | 150 (31%) |
| *International Conference on Teaching Statistics*(ICOTS) | 479 | 399 (83.3%) | | 25 (5.2%) | 37 (7.7%) | 18 (3.8%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | 472 | 277 (58.7%) | | 19 (4%) | 100 (21.2%) | 76 (16.1%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | 476 | 343 (72.1%) | | 36 (7.6%) | 68 (14.3%) | 29 (6.1%) |
| Other: _____ _____ _____ | 77 | ---- | | 6 | 39 | 32 |

**Common "Other" responses:**

- AMATYC (American Mathematics at Two Year Colleges) (22)
- MAA (Mathematical Association of America) conference (e.g. Section Meeting, Mathfest) (5)
- AP (Advanced Placement) Statistics Readings (4)
- e-COTS (Electronic Conference on Teaching Statistics) (4)
- ICTCM (International Conference on Technology in Collegiate Mathematics) (4)
- NCTM (National Council of Teachers of Mathematics) (4)
- AERA (American Educational Research Association) (2)
- CAUSE workshops (2)
- Decision Sciences Institute (2)
- ERCBEC (Eastern Regional Competency Based Education Consortium) (2)
- NEISM (New England Isolated Statisticians Meeting) (2)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | |
|---|---|
| 0 | 148 (30.7%) |
| 1-5 | 268 (55.6%) |
| 6-10 | 43 (8.9%) |
| More than 10 | 23 (4.8%) |
| N | 482 |

| | N | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | 470 | 190 (40.4%) | 98 (20.9%) | 101 (21.5%) | 41 (8.7%) | 13 (2.8%) | 27 (5.7%) |
| 13. Short courses/mini-courses | 443 | 296 (66.8%) | 78 (17.6%) | 45 (10.2%) | 12 (2.7%) | 7 (1.6%) | 5 (1.1%) |
| 14. Other: _____ _____ _____ | 51 | --- | 9 (17.6%) | 21 (41.2%) | 8 (15.7%) | 6 (11.8%) | 7 (13.7%) |

**Common "Other" responses:**

- Conference sessions and presentations (18)
- Webinars (7)
- Professional development at AP Statistics Reading (5)
- University courses (4)

# Comparison of Causeweb and random samples

*There were a total of N = 400 instructors from the Causeweb sample. For the N = 98 instructors from the random sample, the cases are weighted by sampling weights. The two samples were compared on their course characteristics and additional instructor information.*

*Please note that six of the instructors were included in both samples and took the survey twice. For this comparison, each of these six instructors is included in both the Causeweb and random samples. When data were aggregated, only the most recent response was included for these six instructors.*

## Part 7: Course Characteristics

*Note: Questions #1 (about class size) and #3 (about TAs) vary among the four versions. Also, the "check all that apply" from question #4 did not work properly for the first 60 respondents from the random sample, so only question #2 of Part 7 is reported here for comparison.*

2. Please indicate the mathematical prerequisite for this course:

| Sample | Calculus | College Algebra | H.S. Algebra | None | Other |
|---|---|---|---|---|---|
| Random sample ($N$ = 98) | 4 (3.7%) | 46 (47.3%) | 35 (35.4%) | 7 (7.4%) | 6 (6.2%) |
| Causeweb sample ($N$ = 398) | 21 (5.5%) | 137 (34.4%) | 171 (43.0%) | 51 (12.8%) | 18 (4.5%) |

**"Other" responses for Causeweb sample:**

- Another statistics class (e.g. introductory biostatistics) (2)
- Beginning algebra (2)
- High school math background (2)
- Quantitative reasoning/analysis course (2)
- Math/quantitative reasoning placement test score (2)
- Business calculus
- Calculus (1 semester) OR permission
- College level math or accounting course
- Domain training based criteria
- High school math teacher
- Intermediate algebra
- Precalculus

**"Other" responses for random sample:**

- Foundations of algebra
- Intermediate algebra
- Precalculus/trigonometry
- Test score showing college-level math readiness
- Two introductory courses taught: one requires algebra, the other calculus

## Part 8: Additional Information

1. How would you classify the institution at which you teach statistics?

| Sample | Four-year college | Two-year college | University | Other |
|---|---|---|---|---|
| Random sample ($N$ = 98) | 25 (25.8%) | 37 (37.6%) | 36 (36.6%) | 0 (0%) |
| Causeweb sample ($N$ = 394) | 119 (30.1% | 63 (15.9%) | 208 (52.5%) | 4 (1.0%) |

2. How would you classify the department in which you teach statistics?

| | Random sample ($N$ = 98) | Causeweb sample ($N$ =391 ) |
|---|---|---|
| **Business** | 3 (2.9%) | 38 (9.7%) |
| **Educational Psychology/Educational Statistics** | 1 (.6%) | 11 (2.8%) |
| **Mathematics** | 51 (51.9%) | 216 (55.0%) |
| **Mathematics Education** | 0 (0%) | 0 (0%) |
| **Psychology** | 17 (17.1%) | 17 (4.3%) |
| **Sociology** | 3 (2.6%) | 3 (0.8%) |
| **Statistics** | 11 (10.8%) | 53 (13.5%) |
| **Other** | 14 (14.0%) | 53 (13.5%) |

**"Other" responses for random sample:**

- Math and Science (4)
- Economics (2)
- Biology (1)
- Biostatistics (1)
- Business and Psychology (1)
- Criminology (1)
- Interdisciplinary (1)
- Mathematics and Statistics (1)

**Common "Other" responses for Causeweb sample:**

- Mathematics and Statistics (11)
- Mathematics and another science (e.g. Math & Physics, Math & Computer Science, Math & Engineering) (5)
- Biology (3)
- Health sciences (e.g. Public health, biostatistics) (3)
- Multiple departments/interdisciplinary (2)

3. Please classify your position:

| | Random sample ($N$ = 95) | Causeweb sample ($N$ = 395) |
|---|---|---|
| **Adjunct Faculty/Instructional Staff (Part Time)** | 11 (11.1%) | 25 (6.3%) |
| **Adjunct Faculty/Instructional Staff/Non-Tenure Track Faculty (Full Time)** | 16 (16.8%) | 72 (18.2%) |
| **Faculty (Tenure-track)** | 20 (21.1%) | 63 (15.9%) |
| **Faculty (Tenured)** | 42 (44.3%) | 206 (52.2%) |
| **Graduate Student** | 4 (4.2%) | 10 (2.5%) |
| **Other** | 2 (2.0%) | 19 (4.8%) |

**"Other" responses for random sample:**

- Adjunct/Retired from full time (1)
- Clinical Assistant Professor (1)

**"Other" responses from Causeweb sample:**

- Faculty in a non-tenure track position, or an institution that does not offer tenure-track positions (11)
- Adjunct/Retired from full time (1)

4. How many years have you been teaching an introductory statistics course?

_____ years

| Sample | Min | Q1 | Median | Q3 | Max | Mean | StDev |
|---|---|---|---|---|---|---|---|
| Random sample ($N$ = 98) | 1 | 4 | 7 | 15.7 | 43 | 10.9 | 9.5 |
| Causeweb sample ($N$ = 400 ) | 0 | 7 | 12 | 20 | 50 | 14.6 | 10.1 |

5. In your graduate coursework, how many courses did you take in theoretical statistics (e.g., mathematical statistics, probability)?

| | Random sample ($N$ = 98) | Causeweb sample ($N$ = 395) |
|---|---|---|
| **None** | 18 (18.0%) | 53 (13.4%) |
| **1** | 11 (11.4%) | 34 (8.6%) |
| **2** | 23 (23.5%) | 53 (13.4%) |
| **3** | 14 (13.9%) | 47 (11.9%) |
| **4** | 14 (14.7%) | 51 (12.9%) |
| **5 or more** | 18 (18.4%) | 157 (39.7%) |

6. In your graduate coursework, how many courses did you take in applied statistics (i.e., involved the analysis of data)?

| | Random sample ($N$ = 98) | Causeweb sample ($N$ = 396) |
|---|---|---|
| **None** | 17 (17.1%) | 62 (15.7%) |
| **1** | 12 (12.5%) | 34 (8.6%) |
| **2** | 15 (15.7%) | 47 (11.9%) |
| **3** | 14 (13.9%) | 36 (9.1%) |
| **4** | 4 (4.2%) | 35 (8.8%) |
| **5 or more** | 36 (36.6%) | 182 (46%) |

7. Please rate the amount of experience you have had in analyzing data outside of your coursework in statistics (e.g., in your own research, consulting, etc.).

| | Random sample ($N$ = 98) | Causeweb sample ($N$ = 397) |
|---|---|---|
| **No experience** | 6 (6.5%) | 18 (4.5%) |
| **Very little experience** | 18 (18.6%) | 56 (14.1%) |
| **Some experience** | 45 (45.6%) | 149 (37.5%) |
| **A lot of experience** | 29 (29.4%) | 174 (43.8%) |

8. Please rate your level of interaction with www.causeweb.org (the website for the Consortium of Advancement of Undergraduate Statistics Education):

| | Random sample ($N$ = 96) | Causeweb sample ($N$ = 393) |
|---|---|---|
| **I've never heard of it** | 57 (59.4%) | 4 (1%) |
| **I am aware of it, but never used it** | 17 (17.7%) | 52 (13.2%) |
| **I've used it every once in awhile** | 13 (13.5%) | 241 (61.3%) |
| **I've used it frequently** | 9 (9.4%) | 96 (24.4%) |

9. Please rate the level of your interaction with each of the following statistics education journals:

| | **Sample** | **I've never heard of it** | **I'm aware of this journal, but never read it** | **I've read the journal a few times** | **I've read the journal frequently** |
|---|---|---|---|---|---|
| *Statistics Education Research Journal*(SERJ) | Random sample ($N$ = 98) | 49 (50.3%) | 31 (31.2%) | 13 (13.7%) | 5 (4.8%) |
| | Causeweb sample ($N$ = 392) | 86 (21.9%) | 140 (35.7%) | 127 (32.4%) | 39 (9.9%) |
| *Journal of Statistics Education*(JSE) | Random sample ($N$ = 98) | 37 (38.2%) | 23 (23.8%) | 35 (35.4%) | 3 (2.6%) |
| | Causeweb sample ($N$ = 391) | 30 (7.7%) | 104 (26.6%) | 155 (39.6%) | 102 (26.1%) |
| *Teaching Statistics* | Random sample ($N$ = 97) | 47 (47.9%) | 31 (32.0%) | 17 (17.6%) | 2 (2.4%) |
| | Causeweb sample ($N$ = 390) | 113 (29%) | 121 (31%) | 123 (31.5%) | 33 (8.5%) |
| *Technology Innovations in Statistics Education*(TISE) | Random sample ($N$ = 96) | 73 (76.2%) | 7 (7.4%) | 13 (13.4%) | 3 (3.0%) |
| | Causeweb sample ($N$ =394) | 187 (47.5%) | 112 (28.4%) | 77 (19.5%) | 18 (4.6%) |

10. Each of the following conferences has sections on statistics education. To what extent has your participation in each of the following impacted the way you teach statistics?

| **Conference** | **Sample** | **Never participated** | | **No impact** | **Small impact** | **Large impact** |
|---|---|---|---|---|---|---|
| *U.S. Conference on Teaching Statistics*(USCOTS) | Random sample ($N$ = 98) | 79 (80.9%) | | 2 (1.9%) | 5 (5.2%) | 12 (12.0%) |
| | Causeweb sample ($N$ = 392) | 128 (32.7%) | | 7 (1.8%) | 112 (28.6%) | 145 (37%) |
| *International Conference on Teaching Statistics*(ICOTS) | Random sample ($N$ = 98) | 95 (97.2%) | | 0 (0%) | 2 (2.0%) | 1 (0.8%) |
| | Causeweb sample ($N$ = 387) | 310 (80.1%) | | 25 (6.5%) | 35 (9%) | 17 (4.4%) |
| *Joint Statistical Meetings* (JSM) Sections on Statistics Education | Random sample ($N$ = 94) | 85 (91.1%) | | 2 (2.3%) | 3 (3.3%) | 3 (3.0%) |
| | Causeweb sample ($N$ = 384) | 199 (51.8%) | | 18 (4.7%) | 94 (24.5%) | 73 (19%) |
| Joint Mathematics Meetings(JMM) Sections on Statistics Education | Random sample ($N$ = 98) | 87 (88.6%) | | 1 (1.4%) | 5 (5.0%) | 5 (4.9%) |
| | Causeweb sample ($N$ = 384) | 257 (66.9%) | | 34 (8.9%) | 66 (17.2%) | 27 (7%) |
| Other: _____ _____ __ - _____ __ | Random sample ($N$ = 98) | --- | | 0 | 9 | 2 |
| | Causeweb sample ($N$ = 400) | --- | | 6 | 34 | 30 |

**"Other" responses for random sample:**

AMATYC (7)
AP Statistics Reading (2)
ICME (1)
New England ISOSTAT (1)
Sloan-C/MERLOT (1)

**Common "Other" responses for Causeweb sample:**

- AMATYC (American Mathematics at Two Year Colleges) (7)
- MAA (Mathematical Association of America) conference (e.g. Section Meeting, Mathfest) (4)
- e-COTS (Electronic Conference on Teaching Statistics) (3)
- ICTCM (International Conference on Technology in Collegiate Mathematics) (3)
- NCTM (National Council of Teachers of Mathematics) (3)
- AERA (American Educational Research Association) (2)
- CAUSE workshops (2)
- Decision Sciences Institute (2)
- ERCBEC (Eastern Regional Competency Based Education Consortium) (2)
- NEISM (New England Isolated Statisticians Meeting) (1)

**For items 11-14, please indicate the number of professional development opportunities in which you have participated during the last 2 years to improve your teaching of statistics.**

11. Live or pre-recorded webinars (online seminars):

| | Random sample ($N$ = 96) | Causeweb sample ($N$ = 391) |
|---|---|---|
| **0** | 49 (51.6%) | 90 (23%) |
| **1-5** | 39 (40.3%) | 239 (61.1%) |
| **6-10** | 2 (2.0%) | 42 (10.7%) |
| **More than 10** | 6 (6.1%) | 20 (5.1%) |

| | Sample | 0 | 1 | 2 | 3 | 4 | 5 or more |
|---|---|---|---|---|---|---|---|
| 12. Workshops | Random sample ($N$ = 94) | 49 (52.0%) | 10 (10.9%) | 24 (25.2%) | 4 (4.1%) | 5 (5.1%) | 3 (2.7%) |
| | Causeweb sample ($N$ = 382) | 133 (34.8%) | 87 (22.8%) | 91 (23.8%) | 37 (9.7%) | 9 (2.4%) | 25 (6.5%) |
| 13. Short courses/mini-courses | Random sample ($N$ = 87) | 64 (73.6%) | 15 (16.8%) | 3 (3.7%) | 1 (1.3%) | 1 (.9%) | 3 (3.7%) |
| | Causeweb sample ($N$ = 359) | 225 (62.7%) | 72 (20.1%) | 42 (11.7%) | 11 (3.1%) | 6 (1.7%) | 3 (0.8%) |
| 14. Other: _____ | Random sample ($N$ = 98) | --- | 1 | 1 | 2 | 2 | 0 |
| | Causeweb sample ($N$ = 400) | --- | 7 | 20 | 7 | 4 | 7 |

**"Other" responses for random sample:**

Other responses:

- Research Methods Courses (1)
- Conference sessions (1)
- AP Statistics Readings (1)
- Seminar on Statistics Education (1)
- Read books (1)
- eCOTS (1)

**Common "Other" responses for Causeweb sample:**

- Conference sessions and presentations (18)
- Professional development at AP Statistics Reading (5)
- Webinars (5)
- University courses (3)